Systematic Review

Use of Telehealth During the COVID-19 Era

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None of the investigators have any affiliations or financial involvement that conflicts with the material presented in this report.

The information in this report is intended to help healthcare decision makers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of healthcare services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of systematic reviews to assist public- and private-sector organizations in their efforts to improve the quality of healthcare in the United States. These reviews provide comprehensive, science-based information on common, costly medical conditions, and new healthcare technologies and strategies.

Systematic reviews are the building blocks underlying evidence-based practice; they focus attention on the strength and limits of evidence from research studies about the effectiveness and safety of a clinical intervention. In the context of developing recommendations for practice, systematic reviews can help clarify whether assertions about the value of the intervention are based on strong evidence from clinical studies. For more information about AHRQ EPC systematic reviews, see https://effectivehealthcare.ahrq.gov/about/epc/evidence-synthesis.

AHRQ expects that these systematic reviews will be helpful to health plans, providers, purchasers, government programs, and the healthcare system as a whole. Transparency and stakeholder input are essential to the Effective Health Care Program. Please visit the website (www.effectivehealthcare.ahrq.gov) to see draft research questions and reports or to join an email list to learn about new program products and opportunities for input.

If you have comments on this systematic review, they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to epc@ahrq.hhs.gov.

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Stakeholders

In designing the study questions, the EPC consulted several Stakeholders who represent the end-users of research. The EPC sought Stakeholder input on the priority areas for research and synthesis. Stakeholders are not involved in the analysis of the evidence or the writing of the report. Therefore, in the end, study questions, design, methodological approaches, and/or conclusions do not necessarily represent the views of individual Stakeholders.

All Stakeholders must disclose any financial conflicts of interest greater than $5,000 and any other relevant business or professional conflicts of interest. Because of their role as end-users, individuals with potential conflicts may be retained. The Task Order Officer (TOO) and the EPC work to balance, manage, or mitigate any conflicts of interest.

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Peer Reviewers

Prior to publication of the final evidence report, the EPC sought input from independent Peer Reviewers without financial conflicts of interest. However, the conclusions and synthesis of the scientific literature presented in this report do not necessarily represent the views of individual reviewers. AHRQ may also seek comments from other Federal agencies when appropriate.

Peer Reviewers must disclose any financial conflicts of interest greater than $5,000 and any other relevant business or professional conflicts of interest. Because of their unique clinical or content expertise, individuals with potential nonfinancial conflicts may be retained. The TOO and the EPC work to balance, manage, or mitigate any potential nonfinancial conflicts of interest identified.

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Use of Telehealth During the COVID-19 Era

Structured Abstract

Objectives. To assess how to provide telehealth care by identifying characteristics of telehealth delivery, patient populations, settings, benefits and harms, and implementation strategies during the COVID-19 era.

Data sources. PubMed®, CINAHL®, PsycINFO®, and the Cochrane Central Register of Controlled Trials were searched from March 2020 to May 2022. Additional studies were identified from reference lists and experts.

Review methods. We included studies that reported characteristics of telehealth use; benefits and harms of telehealth; factors impacting the success of telehealth, including satisfaction/dissatisfaction and barriers/facilitators; and implementation outcomes. We conducted a mixed-methods review, synthesizing quantitative and qualitative studies. Two reviewers independently screened search results for eligibility, serially extracted data, and independently assessed risk of bias of included studies.

Results. We included 764 studies; 310 studies were included in our syntheses. Patients using telehealth were more likely to be people who are young to middle-aged, female, White, of higher socioeconomic status, and living in urban settings. Visits for mental and behavioral health conditions were more frequent than visits for other conditions, and mental or behavioral care was also more likely to be delivered via telehealth than care for other conditions. Across a variety of conditions, telehealth produced similar clinical outcomes as compared with in-person care. Telehealth care is appropriate for some patients, but more information is necessary to determine the suitability of telehealth for specific patient populations; patients and providers felt that telehealth may be less suitable and less desirable for patients with complex clinical conditions; and some patients perceive telehealth as a barrier to improved health outcomes owing to the absence of a physical exam and challenges in developing rapport and communicating with their care team. There was a lack of evidence addressing implementation cost, penetration, and sustainability of telehealth, and about telehealth implementation at the health system level.

Conclusions. Whereas telehealth use spiked after the beginning of the pandemic, the characteristics of patients using telehealth follow a pattern similar to that for other healthcare and digital health services. We found that the use of telehealth may be comparable to in-person care across different clinical and process outcomes. Telehealth implementation has addressed the needs of both patients and providers to some extent, even as clinical conditions, patient and provider characteristics, and type of assessment varied. Telehealth has provided a viable alternative mode of care delivery during the pandemic and holds promise for the future.

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Executive Summary

Main Points

- Telehealth may improve access to care; however, patients using telehealth during the COVID-19 era are, like before COVID-19, more likely to be people who are young to middle-aged, female, White, of higher socioeconomic status, and living in urban settings.
- Across a variety of conditions, telehealth produced similar clinical outcomes as compared with in-person care; differences in clinical outcomes, when seen, were generally small and not clinically meaningful when comparing in-person with telehealth care.
- Telehealth may be less suitable and less desirable for patients with complex clinical conditions, those needing physical exams, and for therapies requiring the development of rapport between patients and providers.
- Providers note that the cost of telehealth can be a barrier to care owing to the limits of insurance reimbursement.
- Some patients perceive telehealth as a barrier to improved health outcomes owing to the absence of a physical exam and challenges in developing rapport and communicating with their care team, potentially resulting in delayed or missed diagnoses.

Background and Purpose

Telehealth is remotely delivered and synchronous medical services (e.g., telephone/audio, video visit) between a patient and a healthcare provider in an ambulatory setting (e.g., outpatient or community-based clinic) or emergency department (ED) and is further defined by the Centers for Medicare & Medicaid Services as the use of telecommunications and information technology to provide access to health assessment, diagnosis, intervention, consultation, supervision, and information across distance.[1] The COVID-19 pandemic has resulted in an unprecedented increase in the use of telehealth. The question is no longer whether to use telehealth but how to provide telehealth care.

We sought to answer: (1) What are the characteristics of the patients, providers, and health systems using telehealth during the COVID-19 era? (2) What are the benefits and harms of telehealth during the COVID-19 era? (3) What is considered a successful telehealth intervention during the COVID-19 era? and (4) What strategies have been used to implement telehealth interventions during the COVID-19 era?

Methods

We conducted a mixed-methods review using methods consistent with the Agency for Healthcare Research and Quality Evidence-based Practice Center Program Methods Guidance (https://effectivehealthcare.ahrq.gov/topics/cer-methods-guide/overview) and described in the full report. Our searches covered publication dates from March 11, 2020, through May 2, 2022. We are updating the search during review of this draft report.

Results

We identified 9,987 unique citations, of which 764 were eligible and applicable to at least one of the four Key Questions (KQs); 310 were included in the syntheses:

KQ1. What are the characteristics of the patients, providers, and health systems using telehealth during the COVID-19 era? (Eleven studies were included in the synthesis.) Patients using telehealth during the COVID-19 era were more likely to be people who are young to middle-aged, female, White, of higher socioeconomic status, and living in urban settings. As before COVID-19, visits for mental and behavioral health conditions were more frequent than for other conditions and mental or behavioral care was also more likely to be delivered via telehealth than care for other conditions.

KQ2. What are the benefits and harms of telehealth during the COVID-19 era? (Sixty-three studies were included in the synthesis.) Patients seeking care for COVID-19 and for women's health (including pregnancy/prenatal/gynecological care) who received an initial telehealth visit had higher emergency department (ED) visit and hospitalization rates compared with those who received in-person care; however, differences, if any, for healthcare utilization rates between in-person and telehealth care were generally small and/or not clinically meaningful (i.e., would not result in changing the clinical practice or care plan for the patient) and varied across clinical conditions. For instance, patients with COVID-19 receiving telehealth care may have been more likely than those receiving in-person care to be hospitalized or visit the ED; whereas, of adult patients who received care for general medical conditions, those who received an initial telehealth visit had lower hospitalization rates compared with those who received in-person care.

For clinical outcomes, the difference between telehealth and in-person care varied by the type of outcome; differences in mortality rates and reported adverse events between telehealth and in-person care were small and/or not clinically meaningful. Patients who received an initial telehealth visit may have had better patient-reported outcomes and condition-specific clinical outcomes compared with those who received in-person care.

For process outcomes, the difference between telehealth and in-person care varied by the type of outcome. There was a mostly lower rate of missed visits, lower rate of change in therapy/medication, higher rate of therapy/medication adherence, but lower rate of up-to-date labs and paraclinical assessment among patients receiving an initial telehealth visit. Among patients who received general medical care or surgical care, those who received telehealth care may have had lower rates of care resolution in their initial visit, thus higher rates of followup visits. However, among patients who received care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care) those who received an initial telehealth visit may have had higher rates of case resolution.

KQ3. What is considered a successful telehealth intervention during the COVID-19 era? (One hundred eighty-seven studies, plus 138 surveys, were included in the qualitative synthesis.) Our qualitative evidence synthesis found that telehealth is more convenient, provides greater access for many patients, provides patient and provider flexibility, is more efficient in terms of time and use of office space, allows for remote work, and supports greater inclusion of family caregivers. However, telehealth may not be suitable for all patient populations, such as those who are more difficult to reach and engage via telehealth, and may result in missed or delayed diagnoses owing to the lack of a physical exam. In addition, telehealth raises concerns about the maintenance of privacy and confidentiality in the digital environment, especially if patients access telehealth in public places or in multi-person homes. Insufficient communication and technical issues emerged as critical barriers to long-term implementation of telehealth. A combination of telehealth with traditional, in-person visits may help to ensure regular and appropriate followups, especially for specific patient populations (e.g., those who live far away from in-person care).

KQ4. What strategies have been used to implement telehealth interventions during the COVID-19 era? (Fifty-one studies were included in the synthesis.) We identified no studies that directly evaluated or compared implementation strategies, which was not surprising given the haste with which telehealth had to be implemented. Even during the update of the search, when we more than doubled the number of studies we identified that addressed implementation, we found none that directly evaluated or compared implementation strategies. There is a lack of evidence about telehealth implementation cost and sustainability of services, as well as about implementation outcomes at the health-system level. On the provider side, telehealth adoption and acceptability were affected by factors such as prior training in and experience with telehealth. The appropriateness of telehealth services in achieving planned outcomes was mixed on both patient and provider levels. Among providers, the feasibility of telehealth services was generally high but, for patients, feasibility was sometimes limited by the availability of telehealth technologies.

Limitations

Included studies lacked standard information on the type of telehealth and how it was implemented. Outcomes were defined widely and were measured using a variety of approaches. Most of the quantitative studies were at high risk of bias and the qualitative studies often lacked rigorous reporting or methods. Evidence was lacking regarding the burden and costs of telehealth for patients, providers, and health systems. The outcomes reported were often short-term; long-term sustainability and implementation issues were not evaluated.

Implications and Conclusions

Whereas telehealth use spiked after the beginning of the COVID-19 pandemic, the characteristics of patients using the telehealth services follow a similar pattern as for other healthcare and digital health services. Those who are young to middle-aged, female, White, with higher socioeconomic status, and living in urban settings comprised a higher proportion of telehealth users. Our findings suggest that, while telehealth may improve access to care, it may be doing so for those who already have access. We found that, compared with in-person care, the use of telehealth may achieve comparable clinical or process outcomes; in some specific contexts, telehealth outcomes were better than for in-person care. As we transition through the COVID-19 era, telehealth likely will continue to be one of the main modes of care delivery. Thus, models for integrating telehealth with traditional care process become increasingly important and ongoing evaluations of telehealth will be particularly valuable. Our findings suggest a direction for future work. There is a need for a clear definition of telehealth and other modes of virtual care delivery, the context in which the services are implemented, and the usual or alternative models of care used for comparison. Furthermore, research needs to be conducted as multisite studies and in different private and public health systems. Future research is needed on the effectiveness of telehealth for clinical applications with limited prior evidence but rapid expansion during a pandemic. More research is needed to perform an economic assessment of telehealth and the impact of telehealth care within alternative payment arrangements.

References

1. Telemedicine. Centers for Medicare & Medicaid Services; 2020. https://www.medicaid.gov/medicaid/benefits/telemedicine/index.html. Accessed May 2021.

1. Introduction

Starting in early 2020, the COVID-19 pandemic necessitated dramatic changes in healthcare in the United States. Much routine healthcare was put on hold in the early months of the pandemic, as many hospitals were overwhelmed by patients with COVID-19 who were seriously ill.[1-3] Health insurance coverage for telehealth services was expanded and licensure flexibilities were provided on an emergency basis to provide an alternative to in-person care.

The COVID-19 pandemic has resulted in an unprecedented increase in the use of telehealth services; from March 2020 to April 2020, case reports suggest that telehealth use went from less than 1 percent of visits[1] to as much as 80 percent of visits in places where COVID-19 prevalence was high.[4] A deeper dive into the patterns of telehealth use shows that, in the early months of the pandemic, there was a striking drop in in-person visit rates accompanied by a dramatic increase in telehealth visits.[2] Providers and patients adapted quickly and, by the early summer of 2020, the persistent drop in in-person visits was fully offset by a corresponding increase in telehealth visits.[2]

The Centers for Medicare & Medicaid Services defines telehealth as the use of telecommunications and information technology to provide access to health assessment, diagnosis, intervention, consultation, supervision, and information across distance.[5] Although these telehealth services have been available in the United States for decades, adoption was still relatively uncommon prior to the COVID-19 pandemic.[6, 7] While the telehealth infrastructure has been in place in many health systems, several barriers slowed the uptake of the use of telehealth as the main mode of healthcare delivery. Some of the barriers to use included limited insurance coverage, regulations regarding jurisdiction of licensure, and technical challenges for many providers and patients to offer and use these digitally mediated services, respectively.[8] During the COVID-19 era, however, telehealth was recognized as a way to deliver socially-distanced care. In response, policymakers, payors, and providers eliminated almost all financial, regulatory, and technical barriers that had hampered previous telehealth expansion initiatives.[9-11]

Many policy, clinical, and e-health experts believe that, while coverage policies and provider and consumer telehealth adoption levels may change following the end of the pandemic, the adoption trajectory of these technologies has been forever changed.[12-15] Therefore, assessing the provider and patient experience and the characteristics of telehealth during the COVID-19 era is of great importance. Further, understanding characteristics of telehealth delivery that is considered successful by providers and patients is needed to improve access to care, reduce patient burden, and inform decisions about the allocation of resources between in-person and telehealth services modes.

Several review articles have compiled and synthesized evidence on virtual health expansion during the pandemic. Among the more notable articles is a scoping review of telehealth use, which included 543 articles published across 331 different journals (43.6 percent U.S.-based studies).[16] About half of the articles focused on the provision of multiple components of clinical care, and about one-fourth focused on various specialties and subspecialties of internal medicine. An integrative review assessed patient and provider satisfaction with the use of telehealth during the pandemic reviewing 18 studies (55.6 percent U.S.-based) and identifying high levels of satisfaction in both groups.[17] Other reviews have addressed challenges related to the rapid implementation and expansion of virtual health services during the pandemic, assessing the facilitators and barriers of implementation and recommending the use of implementation best practices specific to each medical specialty.[18, 19] While these review articles start to provide evidence on the characteristics of telehealth expansion during the COVID-19 era, they are all limited in scope, key search phrases, and number of included studies. Moreover, each review addresses one aspect of such service expansion (e.g., characteristics of the clinical providers or patients, patient/provider satisfaction, implementation challenges). Thus, there is a need to perform a comprehensive synthesis of available evidence and to review available evidence on different considerations related to telehealth expansion. Such review needs to focus on both the early months of the COVID-19 era, when telehealth services were being implemented, and the later months, when those services were established and maintained.

Thus, in this review we focused on identifying what happened during the COVID-19 pandemic in terms of telehealth use and addressed the key decision dilemma of *how* to provide telehealth services rather than *whether* to provide telehealth services. In other words, we sought to identify characteristics of telehealth that works, for which patient population, in which setting, and through which implementation strategy.

2. Methods

2.1. Review Approach

We conducted a mixed-methods review that considered both quantitative and qualitative studies.[20] The topic of this report was developed by a Learning Health System representative in consultation with the Agency for Healthcare Research and Quality (AHRQ) (https://effectivehealthcare.ahrq.gov/products/learning-health-systems-panel/overview). Initially, a panel of stakeholders gave input on the Key Questions (KQs) to be examined; these KQs were posted on AHRQ's website for public comment in June 2021 for 3 weeks and revised in response to comments. A panel of technical experts provided high-level content and methodological expertise throughout the development of the review protocol, including of the analytic figure seen in Figure 1. The final protocol is posted on the AHRQ website at https://effectivehealthcare.ahrq.gov/products/virtual-health-covid/protocol.

2.2. Key Questions

KQ 1. What are the characteristics of patients, providers, and health systems using telehealth during the COVID-19 era? Specifically:

a. What are the characteristics of patients (e.g., age, race/ethnicity, gender, socioeconomic status, education, geographic location [urban vs. rural])?
b. What are the characteristics of providers and health systems (e.g., specialty, geographic location, private practice, hospital-based practice)?
c. How do the characteristics of patients, providers, and health systems differ between the first 4 months of the COVID-19 era versus the remainder of the COVID-19 era?

KQ 2. What are the benefits and harms of telehealth during the COVID-19 era?

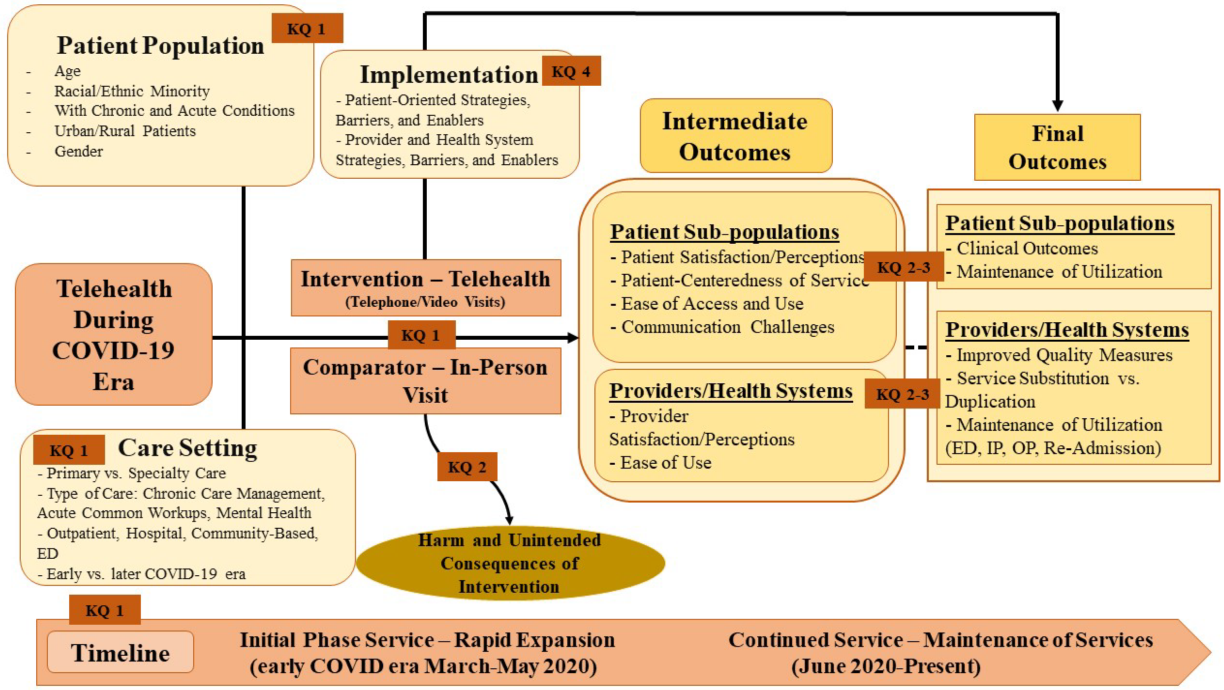
a. Does this vary by type of telehealth intervention (e.g., telephone, video visits)?
b. Does this vary by patient characteristics (e.g., age, gender, race/ethnicity, type of clinical condition or health concern, geographic location)?
c. Does this vary by provider and health system characteristics (e.g., specialty, geographic location, private practice, hospital-based practice)?

KQ 3. What is considered a successful telehealth intervention, and what are the barriers and facilitators of these interventions during the COVID-19 era:

a. From the patient or caregiver perspective?
b. From the provider perspective?

KQ 4. What strategies have been used to implement telehealth interventions during the COVID-19 era?

Figure 1. Analytic framework for telehealth during COVID-19



ED = emergency department; IP = inpatient; KQ = Key Question; OP = outpatient

2.3. Study Selection

We conducted a search for studies of any design about telehealth that were conducted after the onset of the era of COVID-19. We searched PubMed®, CINAHL®, PsycINFO®, and the Cochrane Central Register of Controlled Trials (see Appendix A Methods, Table A.1.1 through A1.3). An information specialist reviewed search strategies using the Peer Review of Electronic Search Strategies (PRESS) guidelines.[21] Searches were conducted in July 2021, and updated in May 2022, and were limited to studies published during the era of COVID-19 (beginning March 2020). Additional studies were identified from reference lists and experts. Searches will be updated while the draft report is under review. A Supplemental Evidence and Data for Systematic review (SEADS) portal was posted in November 2021 and a Federal Register Notice was posted in October 2021 for this review.

We included studies according to a PICOTS (population, intervention, comparators, outcomes, timing, setting) framework (see Appendix A Methods, Table A.2). For all KQs, we included patients of any age (and their caregivers), all centers/locations of patient care, and healthcare providers of any type. We included only remotely delivered, synchronous medical services (e.g., telephone/audio, video visits) between a patient and a healthcare provider in an ambulatory setting or emergency department (ED) providing acute/urgent care, routine/chronic care, mental health services, wellness visits, post-hospital discharge care, and patient and specialist communications facilitated by an ED physician in an ED. Asynchronous and automated (artificial intelligence or semi-automated applications) services were not included. For KQ4, we included studies of implementation strategies for telehealth. All studies took place during the COVID-19 era (starting March 2020). We defined telehealth as any healthcare provided outside of a medical office via phone or video and healthcare provided in an ED by a specialist via phone or video, limiting it to the interaction between a patient or their caregiver and a healthcare provider. We included all outpatient populations in countries with a population similar to that of the United States, using the Organisation for Economic Cooperation and Development (OECD) nations excluding those with a World Health Organization classification below "upper income"[22] (Appendix A, Methods Table A.3). Applicable study designs and synthesis methods are listed in Appendix A, Methods Table A.4.

We managed and screened the results of the search using DistillerSR (Evidence Partners, 2010). Citations were screened at abstract and full-text level by two screeners, independently. At both levels, exclusion required that both screeners agreed. Differences between reviewers regarding abstract or full-text eligibility were resolved through consensus. Owing to the volume of new studies identified during the update, we used the artificial intelligence (AI) feature in DistillerSR during abstract screening to prioritize studies most eligible for inclusion. A threshold of 95 percent was used: when the AI detected that 95 percent of potentially eligible studies were detected, we discontinued screening.

2.4. Data Extraction

For all KQs, study and participant characteristics were extracted by one reviewer, and a second reviewer confirmed accuracy and completeness. KQ-specific information was extracted in the same manner for KQs 1, 2, and 4. Information specific to KQ3 (qualitative data and survey data) was extracted by one reviewer, and then reviewed and compiled by a second reviewer.

In cases where the study period began prior to the COVID-19 era, we extracted data in the following manner:

- If data collection began between 1 January and 11 March 2020 and was in response to the COVID-19 pandemic, we abstracted all data.
- If data collection began prior to the era of COVID-19 and extended into the era of COVID-19, we extracted data for the COVID-19 era. If it was not possible to extract separate data, the study was excluded.

If data were presented for countries with populations similar to the United States, according to the OECD,[22] and countries with populations unlike the United States, we only extracted data from countries with populations similar to the United States.

2.5. Risk of Bias Assessment

For KQ2 and KQ4, paired investigators independently assessed studies included in the syntheses for risk of bias. We used the Cochrane Risk of Bias Tool, Version 2, for assessing the risk of bias of randomized controlled trials[23] and the Cochrane Risk of Bias Assessment Tool for Non-Randomized Studies of Interventions (ROBINS-I) tool[24] for non-randomized trials.

For qualitative studies (KQ3), reviewers independently assessed study quality using the Critical Appraisals Skills Programme (CASP) tool.[25] The CASP criteria includes 10 elements. We included eight of the 10 elements in our assessment (excluding both the relationship between researcher and participants, as this was rated "no" across all studies, and value of the research, as we did not consider this to be an appropriate question for an emerging body of evidence). We followed Long et al.[26] while assessing each criterion: yes, somewhat/to some extent, can't tell, and no. Each included element was scored equally following Njau et al.[27]: 2, criterion is completely met (yes); 1, criterion is partially met (somewhat/to some extent); 0, criterion was not met or not mentioned (can't tell, or no). A maximum score of 16=high quality; 12.8-15.9=moderate quality; 9.6-12.79=low quality; <9.6=very low quality. We did not assess risk of bias for studies selected for KQ1 or for surveys (KQ3).

2.6. Data Synthesis and Analysis

2.6.1. Key Question 1

As this was a descriptive question, we did not conduct a systematic review; we selected a subset of studies to describe; we did not conduct risk of bias of those studies, and did not conduct strength of evidence grading. We aggregated information and presented descriptive statistics on the characteristics of users (by patients, providers, and health systems) during the COVID-19 era. In the appendix, we listed all studies identified; but, in the results, we described a subset of studies that were large (greater than one million patients), with comprehensive assessment of the patient or provider or telehealth characteristics, and with a sampling method providing results that are representative of the U.S. population.

2.6.2. Key Question 2

We addressed the question of benefits and harms of telehealth during the COVID-19 era through a synthesis of studies that provided comparative data for outcomes. Studies without comparative data or design are described briefly in the report but otherwise are listed in the appendix. We were unable to conduct meta-analysis owing to limited and heterogeneous data, missing information, and variation in the outcomes measured. We considered an effect or difference clinically meaningful if it would result in a change in the clinical practice or care plan for the patient.

2.6.3. Key Question 3

We addressed the question of what is considered a "successful" telehealth intervention by evaluating satisfaction/dissatisfaction and barriers/facilitators through a qualitative evidence synthesis. We created a matrix of users (i.e., patients, caregivers, providers), their characteristics, and their perspectives or expectations (themes) of a satisfactory telehealth service. We followed the same approach to synthesize patient, caregiver, or provider perspectives on the barriers or facilitators to telehealth. The themes were extracted to saturation. The findings of each research paper are "data" points and we evaluated these data to determine themes. When no new findings emerged, we considered thematic saturation to have been achieved. For the results from the updated search, we synthesized only those studies which added new theme(s), provided more evidence for a theme(s), and addressed the later COVID-19 period (i.e., where thematic saturation had not been achieved). We did not add survey data during the updated search.

Survey data on patient, caregiver, or provider perceptions of satisfaction, barriers, and facilitators of telehealth were not included in the qualitative evidence synthesis. Survey results are discussed as supporting or not supporting the findings of the qualitative evidence synthesis. The surveys were also mapped to the above matrix. We used a convergent segregated approach to synthesis and integration of the quantitative and qualitative data.[28] In this approach, the syntheses of qualitative and quantitative (survey) studies are conducted separately, and then these results are juxtaposed to determine how the findings complement each other. Taking this approach allowed us to identify how the data from quantitative and qualitative sources complement one other (converge) and also identify where gaps between the two bodies of literature exist.

2.6.4. Key Question 4

We synthesized the strategies and outcomes presented in the studies using an adaptation of the implementation outcomes and categories defined by Proctor et al. (2011).[29]

2.7. Grading the Strength of the Body of Evidence

We graded the body of evidence separately for quantitative and qualitative studies. For the systematic review of quantitative studies for KQs 2 and 4, we used the grading scheme recommended in the AHRQ Methods Guide for Effectiveness and Comparative Effectiveness Reviews (Methods Guide).[30] For studies included in the qualitative evidence syntheses in KQ3, we followed the GRADE-CERQual (Confidence in the Evidence from Reviews of Qualitative research) approach.[31-37] In each case, two reviewers independently conducted the grading with input from other team members, as needed, to reach consensus. Grading was not completed for KQ1.

2.8 Peer Review and Public Commentary

For a period of 3 weeks, experts in healthcare (providers), telehealth (industry, policy, implementation, and research), and qualitative synthesis, along with patient and caregiver advocates and federal representatives, were asked to provide external peer review of this report; AHRQ and an associate editor also provided comments. Following peer review, the revised draft report was posted on the AHRQ website for 4 weeks to elicit public comment. We addressed all reviewer comments, revising the report as appropriate. A disposition of comments table including comments from public reviewers will be posted on the AHRQ website 3 months after the Agency posts the final report.

3. Results

3.1. Results of the Search

Our searches identified a total of 9,987 unique citations, of which 764 were eligible and applicable to at least one of the four Key Questions (KQs) (Figure 2). We identified 406 studies applicable to KQ1, of which 11 were selected to directly address the question; 165 studies applicable to KQ2, of which 63 provided comparative data and were included in the synthesis; 412 studies applicable to KQ3, of which 187 were included in the qualitative evidence synthesis along with 138 surveys; and 51 studies addressing KQ4. (Of note, this field is moving rapidly and our updated search in May 2022 identified an additional 410 eligible citations, of which 124 were added to our synthesis.) See Appendix B for a list of excluded studies.

3.2. Results of Key Question 1

Key Question 1. What are the characteristics of patient, provider, and health systems using telehealth during the COVID-19 era?

3.2.1. Key Points and Summary

- Patients using telehealth were more likely to be people who were young to middle-aged, female, White, of higher socioeconomic status, and living in urban settings.
- Visits for mental and behavioral health conditions were more frequent than visits for other conditions, and mental or behavioral care was also more likely to be delivered via telehealth than care for other conditions.
- There was an increase in the use of telehealth for primary care, specialty care, and diagnostic/ancillary care.

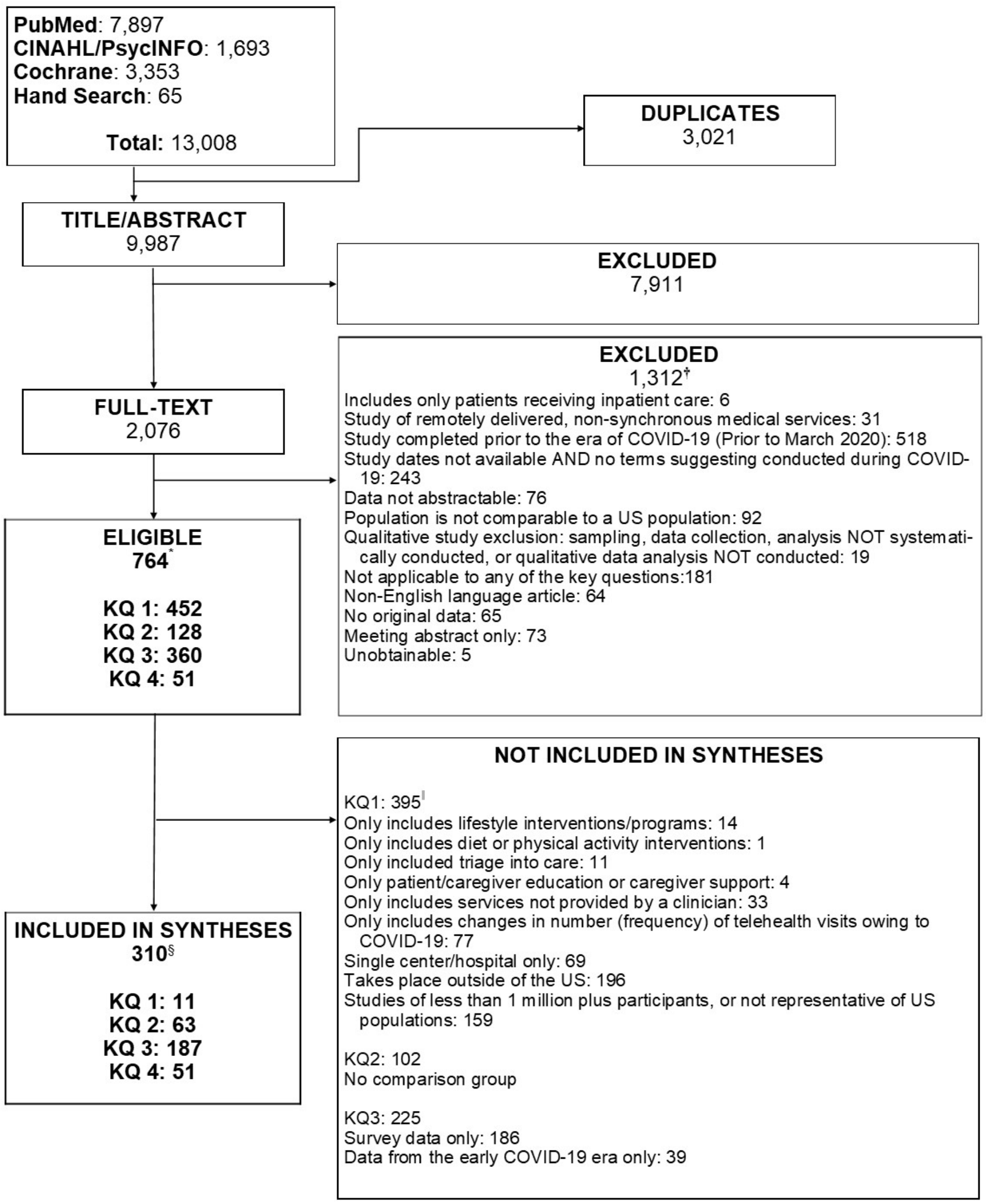
We identified a total of 406 studies that provided information about the characteristics of patients, providers, and health systems using telehealth during the COVID-19 era (see Appendix C, list of KQ1 studies). Many of the studies were conducted in a small patient population or in a small health system with few providers and, so, were not generalizable to the U.S. population. Thus, we selected 11 studies to provide the descriptive characteristics of use of telehealth. These studies analyzed eight different nationally representative databases, which represented millions of telehealth visits in the United States (Table 1; Appendix C, List of Key Question 1 Studies).

Each of the data sources was very large, with wide and slightly different coverage:

- Two studies used the IQVIA National Disease and Therapeutic Index,[38] a nationally representative audit of outpatient practice in the United States (Appendix D, Table D.1).[39, 40] In 2020, the total number of telehealth encounters was 117.9 million in quarter 1 and 99.3 million in quarter 2.[39]
- The Centers for Disease Control and Prevention (CDC) used data from four large national telehealth providers.[41] In the first three months of 2020, this dataset reported about 1.63 million telehealth visits.
- Castlight Health aggregates medical and pharmaceutical claims from self-insured employers and health plans.[42] The data from Castlight included claims from 6.8 million individuals in 2020.

Chapter 3. Results

Figure 2. Results of the search and screening



KQ=Key Question

[*] Sum of included articles exceeds 764 because studies could be applicable to more than one KQ.
[†] Sum of excluded articles exceeds 1,312 because reviewers were not required to agree on reasons for exclusion.
[ǁ] Sum of KQ1-specific exclusions exceeds 395 because reviewers were not required to agree on reasons for exclusion.
[§] Sum of articles included in the syntheses does not equal the sum of the studies as there is some overlap between KQs.

Chapter 3. Results

Table 1. Summary of studies analyzing characteristics of patients, providers, and health systems using telehealth during the COVID-19 era (N=11 studies)

Data Source, N	Study	Dates/ COVID-19 Eras	Patient Population/ Conditions	Characteristics Reported
Blue Health Intelligence	Weiner, 2021[2]	Pre-COVID-19: Mar-Jun 2019 Early COVID-19: Mar-Jun 2020	Ambulatory care	Age SES Urban/rural Provider specialty (patient condition)
Blue Health Intelligence	Hatef, 2022[3]	Pre-COVID-19: Mar-Jun 2019 Later COVID-19: July-December 2020	All	Age SES Urban/rural Provider specialty (patient condition) (Also looked at post-visit follow up outcomes, See KQ2)
CastlightHealth	Whaley, 2020[42]	Pre-COVID-19: Mar-Apr 2018 & 2019 Early COVID-19: Mar-Apr 2020	All	Race/ethnicity SES
CDC: Amwell Medical Group, Boston, Massachusetts; Teladoc Health, Inc., Purchase, New York; MDLIVE, Miramar, Florida; and Doctor on Demand, Inc., San Francisco, California	Koonin, 2020[41]	Pre-COVID-19: Jan-Mar 2019 Early COVID-19: Jan-Mar 2020	All	Gender Age
Change Healthcare	Campion, 2021[43]	Pre-COVID-19: Jan 2019 Later COVID-19: Dec 2020	All	Provider specialty (patient condition)
IQVIA's National Disease and Therapeutic Index	Alexander, 2020[39]	Pre-COVID-19: Q1/Q2 2018 & 2019 Early COVID-19: Q1/Q2 2020	Outpatient	Gender Age Race/ethnicity
IQVIA's National Disease and Therapeutic Index	Mansour, 2020[40]	Pre-COVID-19: Q1/Q2 2018 & 2019 Early COVID-19: Q1/Q2 2020	Outpatient Anxiety, bipolar disorder, insomnia, opioid use disorder, overactivity	Gender Age Race/ethnicity
Office Ally (Electronic Claims Interchange),	Zhu, 2022[44]	Pre COVID-19 Early and later COVID-19: March 2020-Dec 2020	Mental Health Ambulatory Services	Age Gender MH provider type
Optum Clinformatics (United Health Care),	Rabbini, 2022[45]	Pre COVID-19 Later COVID-19: January 21-March 21	Children's Ambulatory Services	Age (patient condition)
Optum Labs (United Health Care),	Patel 2021[46]	Pre COVID-19 Early COVID-19: March -June 2020		Age SES Urban/rural Provider specialty (patient condition)

Veterans Affairs Corporate Data Warehouse (electronic records),	Ferguson, 2021[47]	Early COVID-19: Jan-Jun 2020	Outpatient	Gender Age Race/ethnicity Urban/rural Provider specialty (patient condition)

CDC = Centers for Disease Control and Prevention; IQVIA = IQVIA National Disease and Therapeutic Index; KQ = Key Question; MH = mental health;SES = socioeconomic status.
Pre-COVID-19 era: prior to March 2020.
Early COVID-19 era: March 2020 through June 2020.
Late COVID-19 era: July 2020 onward.

- Two studies used Blue Health Intelligence data repository which includes data from most Blue Cross Blue Shield Association health insurance plans. The analysis included over 36 million patients.[2, 3] The first study assessed a wide range of care patterns and factors through June 2020, and the second through December 2022.
- One study used healthcare claims provided by Change Healthcare, representing more than 50 percent of private insurance claims in the United States.[43] Submitted telehealth claims in this dataset were a modest 524,670 in February 2020 and then spiked to 12,626,363 telehealth claims in April 2020.
- One study focusing on mental health services only made use of data from large electronic claims submission service (Office Ally) and assessed telehealth patterns for over 25 million behavioral health encounters through December 2020.[44]
- Two studies made use of United Healthcare / Optum data (one from Optum Labs and the other from Optum Clinformatics). The first[46] looked at all ambulatory services for 16.7 million people through June 2020; the second[45] focused on 2.1 million children in the early part (January–March) of 2021.
- Finally, one study used Veterans Affairs (VA) encounters and veteran patient data from the VA Corporate Data Warehouse, a repository for VA electronic health records.[47] This study analyzed over 42 million outpatient healthcare encounters.

As noted, studies analyzed either the early COVID-19 era (from March through June 2020) or later pandemic periods (from July 2020 through March 2021) and all but one provided comparative data from a 2018 and/or 2019 pre-Covid period (Appendix D, Table D.1).

3.2.2. Results of Key Question 1a

Key Question 1a. What are the characteristics of patients using telehealth during the COVID-19 era?

3.2.2.1. Age

Nine studies provided details about the ages of patients using telehealth.[2, 3, 39-41, 44-47] A study of outpatient practices reported that patients 19 to 35 years of age and 36 to 55 years of age accounted for 12.4 percent and 19.8 percent of in-person visits, respectively, in the early COVID-19 era, but accounted for 17.8 percent and 26.1 percent of telehealth visits, respectively, during the early COVID-19 era. This indicates substantial adoption of telehealth of those 19 to 55 years of age compared with both younger and older patients (15.6 percent of telehealth visits were individuals <19 years and 15.2 percent and 25.3 percent of visits were individuals 56 to 65 years and 66+ years, respectively).[39] Using the same dataset, another study presented similar results, reporting that, compared with the same quarter of the pre-COVID-19 era, those patients who were 39 years of age and younger accounted for more of the telehealth visits for behavioral and psychiatric conditions in the first and second quarter of 2020, while those 40 years of age and older accounted for fewer of the telehealth visits in the first and second quarter of 2020.[40] At the same time, the proportion of office visits decreased for the younger age groups and stayed the same or increased for those 40 years of age and older (Appendix D, Table D.1).

An analysis from CDC reported that most telehealth visits were for adults 18 to 49 years of age, both before and during the COVID-19 era (66 percent in 2019 and 69 percent in 2020).[41] During the early COVID-19 era, the percentage of telehealth visits for persons 18 to 49 years of age increased slightly, from 68 percent during the first week of January 2020 to 73 percent during the last week of March ($p<0.05$). Conversely, the percentage of telehealth visits for children during the early COVID-19 era remained similar or slightly decreased compared with the same period in 2019. An average of 3.5 percent of telehealth visits were for children aged <5 years in 2020 (compared with 4.0 percent in 2019), and an average of 8.6 percent for those aged 5–17 years in 2020 (compared with 10.0 percent in 2019).

A study using electronic records from the VA reported that age was only slightly associated with the use of virtual care in the pandemic period.[47] However, patients using telehealth delivered via video were on average 10 years younger than those who never used video care (57 versus 67 years of age). Older veterans 45 to 64 years of age and 65 years of age and older were substantially less likely to use video care compared with veterans 18 to 44 years of age (Risk Ratio 0.80 [95% confidence interval (CI), 0.79 to 0.82] and 0.50 [95% CI, 0.48 to 0.52], respectively). Patients with high levels of pre-COVID-19 use of care were more likely to be new users of any type of telehealth.

Both studies of ambulatory care using a Blue Health Intelligence dataset across two COVID-19 time periods reported that, compared with those who had in-person visits only, those who had one or more telehealth visits during the COVID-19 era were more likely to be patients with two or more chronic conditions and those 18 to 49 years of age.[2, 3]

The one study that focussed only on children[45] suggested that telehealth visits were highest among infants and toddlers compared with other pediatric age groups.

3.2.2.2. Gender

Seven studies provided details about the gender of patients using telehealth.[3, 39-41, 44, 46, 47] One of the studies, using a nationally representative audit of outpatient practices, compared characteristics of users in 2020 with those of users in 2018 and 2019, noting that the proportion of office visits by gender remained consistent between 2019 and 2020 (51 percent males versus 49 percent females) but that the proportion of females using telehealth increased (49.6 percent in 2019 to 52.2 percent in 2020).[39] Using the same dataset to analyze telehealth visits for behavioral and psychiatric conditions, another study also noted that females represented a larger proportion of telehealth visits before and during the COVID-19 era.[40] For instance, in quarter 2 of 2018 and 2019, females represented 60 percent of telehealth visits, which decreased to 57 percent in quarter 2 of 2020. The CDC analysis similarly reported that female patients represented more of the telehealth visits both before and during the COVID-19 era (63 percent in both 2019 and 2020).[41] The VA study reported that females had a marginally increased likelihood of using telehealth compared with males (1.02 [95% CI, 1.02 to 1.03]) and reported that a greater proportion of new users of video care were female (17 percent) than those who never used video care (8 percent) (Appendix D, Table D.1).[47]

3.2.2.3. Race/Ethnicity

Five studies provided information about patient race/ethnicity and use of telehealth.[39, 40, 42, 46, 47] A study of visit types in eight quarters of 2018–2020, reported that increases in telehealth visits during the COVID-19 era were similar among White patients (1.5 percent of visits in 2019 versus 19.3 percent in 2020) and Black patients (0.7 percent of visits in 2019 versus 20.5 percent in 2020).[39] A study using the same dataset to examine mental and behavioral health visits similarly reported no change in the percentage of telehealth visits by patient race/ethnicity; White patients represented 75 percent of telehealth visits in quarter 2 of 2020, Black patients represented 12 percent, and Hispanic patients 7 percent (Appendix D, Table D.1).[40]

The VA study reported minor, and likely not meaningful, differences in the use of telehealth by race or ethnicity.[47] Black veterans had a marginally increased likelihood of using any telehealth (1.02 [95% CI, 1.01 to 1.03]) and a slightly decreased likelihood of using video care compared with White veterans (0.96 [95% CI, 0.94 to 0.97]). However, the study reported that veterans who used telehealth before and/or during the COVID-19 era were more likely to be non-White, Hispanic, single, urban, disabled, and experiencing homelessness compared with veterans who never used telehealth.

Another study reported lower rates of telehealth use in zip codes with predominately racial/ethnic minority populations.[42] Compared with those in zip codes with 80 percent or more White residents, patients in zip codes with 80 percent or more residents who belong to racial/ethnic minority groups had smaller reductions in the use of in-person office visits (absolute difference: 200.0 per 10,000 [95% CI, 128.9 to 270.1]) and also smaller increases in the use of telehealth (absolute difference: −71.6 per 10,000 [95% CI, −87.6 to −55.5]).

3.2.2.4. Socioeconomic Status and Education

Four studies assessed the economic status of patients using telehealth.[2, 3, 42, 46] All studies of claims data reported lower rates of telehealth use among patients residing in zip codes with lower income.[42] For example, one study of ambulatory care using commercial health insurance plans reported higher use of telehealth in the most versus least socially advantaged neighborhoods (27.4 percent [1.42 contacts per person] versus 19.9 percent [1.24 contacts per person]) (Appendix D, Table D.1).[2] No study assessed the educational level of users of telehealth.

3.2.2.5. Urban/Rural Location

Four studies provided details about urban versus rural location of patients receiving telehealth.[2, 3, 46, 47] In each study, patients living in urban settings represented a larger proportion of patients using telehealth. In the VA study, those living in rural areas had similar likelihood of using virtual care compared with those in urban areas (1.00 [95% CI, 0.99 to 1.00]). However, users of video care during the COVID-19 era were more likely to be urban-dwelling compared with veterans who never used virtual care (75 percent versus 65 percent).[47] Similarly, a study of ambulatory care reported higher use of telehealth in urban versus rural locations (24.2 percent [1.35 contacts per person] versus 14.2 percent [1.15 contacts per person]) (Appendix D, Table D.1).[2]

3.2.3. Results for Key Question 1b

Key Question 1b. What are the characteristics of provider and health systems using telehealth during the COVID-19 era?

3.2.3.1. Specialty

Seven studies provided details about the conditions of patients and, thus, indirectly, the type of provider specialty using telehealth.[2, 3, 43-47] Generally, mental and behavioral health represented the largest proportion of telehealth visits.

The VA study noted that, as before the COVID-19 era, mental health care had the largest percentage of its encounters provided through telehealth and the largest absolute number of visits; however, visits for mental health care had the smallest increase during the COVID-19 era (6.4-fold increase in the first 3 months of COVID-19).[47] In comparison, primary care had a 15.6-fold increase, specialty care had a 14.2-fold increase, and diagnostic/ancillary care had an 8-fold increase in video-based encounters.

Another study also reported that mental health visits were far more likely than medical visits to be delivered via telehealth (46.1 percent [0.23 visits per person] versus 22.1 percent [0.86 visits per person])[2]. Further, this study noted that the use of telehealth for acute conditions (14.1 percent [0.63 visits per person]) was lower than that for chronic conditions (21.5 percent [0.24 visits per person]).

The one study of the later COVID-19 era reported similar findings: the frequency of telehealth claims for behavioral and mental health disorders far exceeded all other clinical issues and were 4 to 5 times more frequent than for other common conditions, such as circulatory and endocrine disorders.[43]

The selected studies did not provide data to allow for description of characteristics of practice setting or community versus hospital-based settings.

3.2.4. Results for Key Question 1c

Key Question 1c. How do the characteristics of patients, providers, and health systems differ between the first 4 months of the COVID-19 era versus the remainder of the COVID-19 era?

Seven of the 11 studies reported characteristics of patients and providers for the early COVID-19 era. Most of the four studies in the later COVID-19 era (July 2020 through March 2021) indicated that the patterns seen in the earlier period were, in general, sustained, with similar levels and patterns of telehealth care, even as in-person visits increased to approach their pre-pandemic levels. Two studies assessed the relative rates of telehealth use in the later period[3, 43] and the distribution was similar to that found in the earlier period. For example, psychiatry/behavioral health continued to represent the highest specialty making use of telehealth.[3, 43]

3.3. Results for Key Question 2

Key Question 2. What are the benefits and harms of telehealth during the COVID-19 era?

3.3.1. Key Points and Summary

- For adult patients who receive general medical care unrelated to COVID-19, those who receive an initial telehealth visit have similar hospitalization rates compared with those who receive in-person care.
- Patients seeking care for women's health (including prenatal care) who receive an initial telehealth visit may have higher emergency department (ED) visit and hospitalization rates compared with those who receive in-person care, however, differences, if any, for healthcare utilization rates between in-person and telehealth care were small and/or not clinically meaningful.

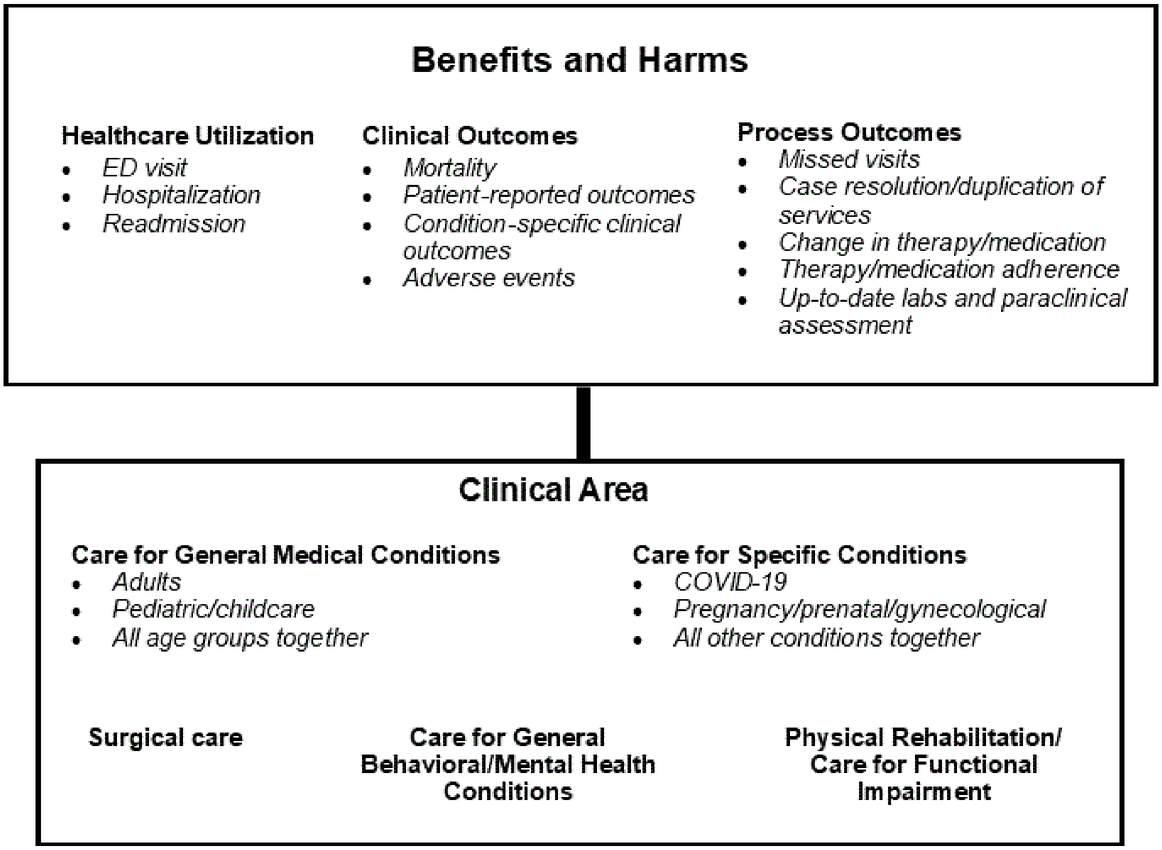
- Patients with COVID-19 receiving telehealth care may be more likely to be hospitalized or visit the ED.
- Clinical outcomes were similar and any differences between in-person and telehealth care varied by the type of outcome: the mortality rates and reported adverse events between in-person and telehealth care were small and/or not clinically meaningful; patients who receive an initial telehealth visit may have better patient-reported outcomes compared with those who receive in-person care.
- Among the process measures, evidence supported a mostly lower rate of missed visits, lower rate of change in therapy/medication, higher rates of therapy/medication adherence, but lower rate of up-to-date labs and paraclinical assessment among patients receiving an initial telehealth visit. Among patients who receive general medical care or surgical care for an acute condition, those who receive telehealth care may have lower rates of care resolution in their initial visit, thus higher rates of followup visits. However, among patients who receive general medical care or surgical care for a chronic condition, those who receive telehealth care may have higher rates of care resolution in their initial visit, thus lower rates of followup visits. Among patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have higher rates of case resolution.
- Few studies conducted subgroup analyses. In studies that conducted subgroup analysis, Non-Hispanic Black, Asian, and Hispanic patients had lower adverse events (i.e., medication-related problems) and higher appointment adherence when receiving telehealth compared with those receiving in-person care. However, not surprisingly, among patients in both in-person and telehealth groups, those patients who were older and/or had more complex conditions had higher rates of hospitalization.

We identified a total of 165 studies reporting outcomes of telehealth visits. Table 2 provides an overview of all studies by type of outcomes and clinical area. We synthesized 63 studies that provided data comparing telehealth with in-person visits. Details of study, participant, and provider characteristics can be found in Appendix C, Results Table C.2 and Appendix D Evidence Tables D.2, D.3, and D.4. Studies that did not include data comparing telehealth with in-person visits are briefly described (Appendix D Evidence Tables D.2 through D.8.2) but were excluded from the synthesis.

We categorized outcomes into three categories: healthcare utilization, clinical outcomes, and process outcomes. Healthcare utilization outcomes include emergency department (ED) visits, hospitalization, and readmission. The clinical outcome category includes mortality, patient-reported outcomes, condition-specific clinical outcomes, and adverse events. Process outcomes include missed visits, case resolution or duplication of services, change in therapy or medication, therapy or medication adherence, and up-to-date laboratory and paraclinical assessments. We did not identify any studies evaluating the cost of telehealth care as an outcome. We considered an effect or difference clinically meaningful if it would result in a change in the clinical practice or care plan for the patient.

Because the outcomes of interest were reported across a very wide range of clinical areas, we categorized the clinical areas into five main categories: care for general medical conditions, care for specific conditions, surgical care, care for general behavioral/mental health conditions, and physical rehabilitation or care for functional impairment (see Figure 3).

Figure 3. Organization of Key Question 2: What are the benefits and harms of telehealth during the COVID-19 era?



ED= emergency department

3.3.2. Healthcare Utilization

3.3.2.1. Emergency Department Visits

We identified twelve observational studies that compared ED visit rates for in-person versus telehealth care (see Appendix D, Evidence Table D.5.1). For the majority of the studies, the differences, if any, of ED visit rates between in-person and telehealth care were small and not clinically meaningful (i.e., would not result in a change in the clinical practice or care plan for the patient). We were unable to make a general statement about the performance of telehealth versus in-person visits, as the clinical conditions, patient/provider characteristics, and type of assessment performed during the visits varied across the small number of studies included in this evidence synthesis. All these factors impacted the outcome of the initial visit and the need for a followup ED visit. Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and the limited number of studies (see Table 3 and Figure 4).

Another eight studies reported ED visit rates for patients who received telehealth care (with no comparison to in-person).[48-55] These studies generally reported ED visit rates of 0 percent to 21 percent among study participants who received telehealth care. Studies varied in their patient and provider characteristics and clinical conditions, resulting in the wide range of ED visit rates (see Appendix D, Evidence Tables D.5.1 and D.5.2).

Table 2. Summary of key findings for the effects of telehealth versus in-person care by clinical conditions (N=124 studies)*

Category	Outcomes	Care for General Medical Conditions, Adults	Care for General Medical Conditions, Children	Care for General Medical Conditions, All Ages	Care for Specific Conditions, COVID-19	Care for Specific Conditions, Pregnancy/ Prenatal/ Gynecological Care	Care for Specific Conditions, Other Conditions	Surgical Care	Care for General Behavioral/ Mental Health	Physical Rehabilitation/ Functional Impairment
Healthcare utilization (N=25 studies)	Emergency Department visits	Non-comparative studies	Non-comparative studies	Moderate P/T	Low P	Low P	Low T	Low T	No evidence	No evidence
	Hospitalization	Moderate =	Non-comparative studies	Moderate P/T	Low P	Low P	Low T	Low T	No evidence	No evidence
	Readmission	No evidence	No evidence	No evidence	Low =	Low =	No evidence	Low =	No evidence	No evidence
Clinical outcomes (N=24 studies)	Mortality	No evidence	No evidence	No evidence	Non-comparative studies	Low =	Low T	Low P	No evidence	No evidence
	Patient-reported outcomes	Non-comparative studies	No evidence	No evidence	No evidence	Low P	Low T	No evidence	Low T	Non-comparative studies
	Condition-specific clinical outcomes	Non-comparative studies	No evidence	No evidence	No evidence	Low P	Low P	Low T	Low T	No evidence
	Adverse events	Low T	No evidence	No evidence	No evidence	Low T	Low T	Low =	Low =	No evidence
Process outcomes (N=34 studies)	Missed visits	No evidence	No evidence	No evidence	No evidence	Low T	Low T	Low T	Insufficient ?\	No evidence
	Case resolution/ Duplication of services	Non-comparative studies	Non-comparative studies	Moderate P/T	Insufficient ?\	Insufficient ?\	Low P	Low T	No evidence	No evidence
	Change in therapy/ Medication	Moderate T	No evidence	No evidence	No evidence	No evidence	Low T	No evidence	No evidence	No evidence
	Therapy/ Medication adherence	Low T	No evidence	No evidence	No evidence	No evidence	Low P	No evidence	Low T	No evidence

Category	Outcomes	Care for General Medical Conditions, Adults	Care for General Medical Conditions, Children	Care for General Medical Conditions, All Ages	Care for Specific Conditions, COVID-19	Care for Specific Conditions, Pregnancy/ Prenatal/ Gynecological Care	Care for Specific Conditions, Other Conditions	Surgical Care	Care for General Behavioral/ Mental Health	Physical Rehabilitation/ Functional Impairment
	Up-to-date labs and paraclinical assessment	No evidence	No evidence	No evidence	Non-comparative studies	Low =	Low P	No evidence	No evidence	No evidence

High = high strength of evidence; Insufficient = insufficient evidence; Moderate = moderate strength of evidence; Low = low strength of evidence
* Intervention: T = favors telehealth; P = favors in-person; P/T = in-person care favored for acute care patients and telehealth favored for chronic care patients; = = little to no difference between in-person versus telehealth; ?\ = insufficient evidence to make a conclusion.

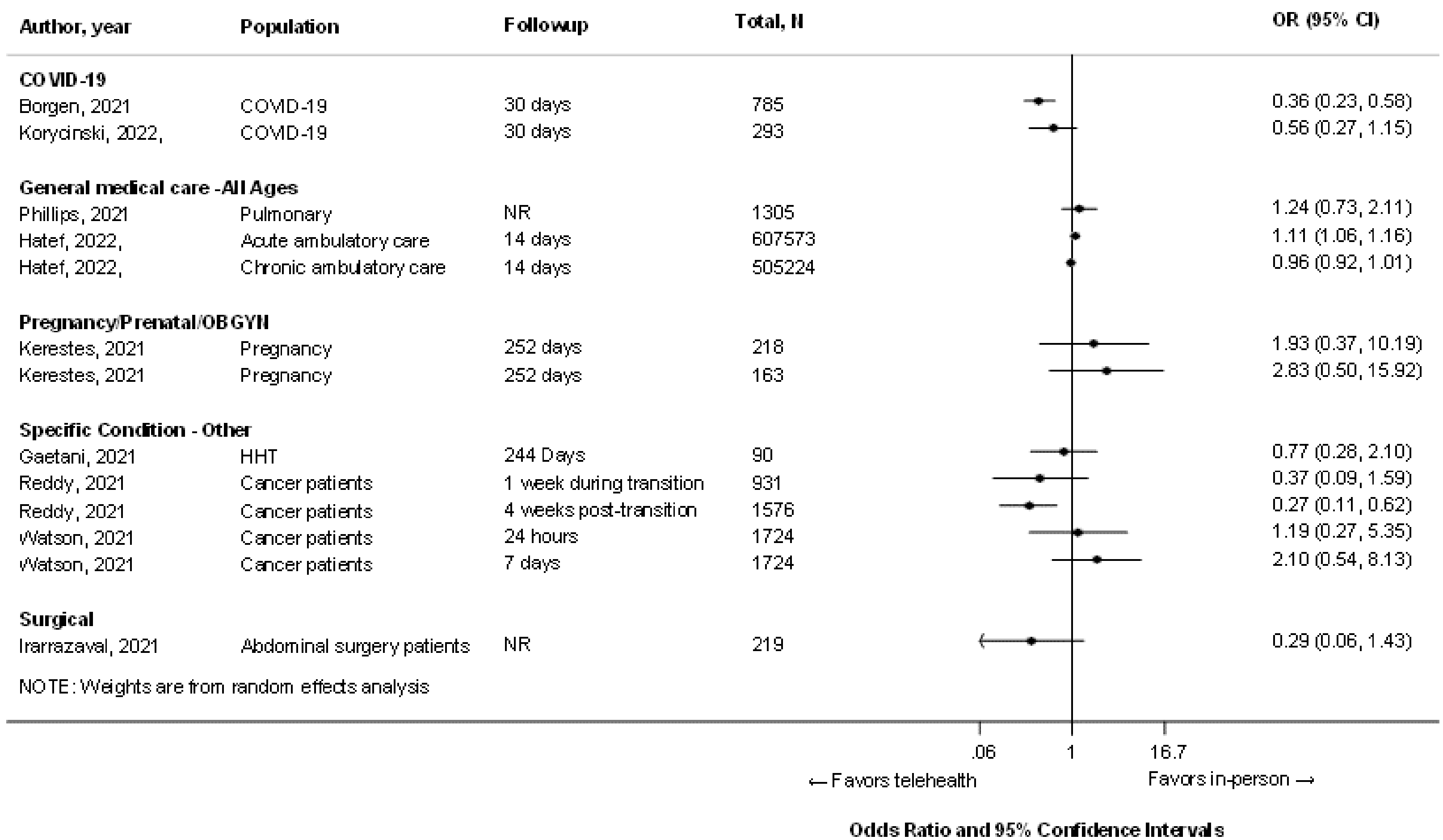
Table 3. Summary of findings: emergency department visits for patients receiving telehealth versus in-person care (N=12 studies)

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
General medical care, Adults	No studies	NA	NA	NA	NA	NA
General medical care, Children	No studies	NA	NA	NA	NA	NA
General medical care, All ages	2 studies (N=608,878) Cohort 2 studies[3, 56] (N=608,878)	Cohort 2 studies[3, 56] (N=608,878)	NA	Cohort 1 study[3] (N=607,573)	Medium Direct Precise Inconsistent Undetected	For patients of all ages who receive care for general medical conditions, those who receive an initial telehealth visit for an acute condition may have higher ED visit rates compared with those who receive in-person care, and those who receive an initial telehealth visit for a chronic condition may have lower rates of ED visits compared with those who receive in-person care (SOE: Moderate).
Care for specific conditions, COVID-19	3 studies (N=5,462) Cohort 3 studies[57-59] (N=5,462)	Cohort 1 study[57] (N=4,384)	NA	Cohort 2 studies[58, 59] (N=1,078)	High Direct Precise Inconsistent Undetected	For patients who receive specialized COVID-19 care, those who receive an initial telehealth visit may have higher ED visit rates compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Pregnancy/prenatal/gynecological care	1 study (N=287) Cohort 1 study[60] (N=287)	Cohort 1 study[60] (N=287)	NA	NA	High Direct Imprecise Unknown consistency Undetected	For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have higher ED visit rates compared with those who receive in-person (SOE: Low).
Care for specific conditions, Other conditions	5 studies (N=11,546)	Cross-sectional	NA	Cohort	High Direct	For patients who receive care for specific conditions

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
	Cohort 4 studies[61-64] (N=9,842) Cross-sectional 1 study[65] (N=1,724)	1 study[65] (N=1,724)		4 studies[61-64] (N=9,842)	Precise Consistent Undetected	(excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower ED visit rates compared with those who - receive in-person (SOE: Low).
Surgical Care	1 study (N=219) Cohort 1 study[66] (N=219)	NA	NA	Cohort 1 study[60] (N=11176)	High Direct Imprecise Unknown consistency Undetected	For patients who receive surgical care, those who receive an initial telehealth visit may have lower ED visit rates compared with those who receive in-person care (SOE: Low).
General behavioral/Mental health	No studies	NA	NA	NA	NA	NA
Physical rehabilitation/ Care for functional impairment	No studies	NA	NA	NA	NA	NA

ED = emergency department; NA = not applicable/no studies; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias .

Figure 4. Forest plot presenting emergency department visits for patients who had an initial telehealth visit versus an initial in-person visit*



CI = confidence interval; HHT = hereditary hemorrhagic telangiectasia; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

3.3.2.2. General Medical Care, All Ages

Among patients of all ages who received care for general medical conditions, two observational studies reported ED visit rates after an in-person or telehealth visit. One cohort study, with serious risk of bias owing to possible selection bias and issues with intervention classification, among adults with a median age of 64 years reported ED visit rates after an in-person or telehealth visit for general medical care (all ages). The study enrolled 741 patients who had in-person visits and 564 patients who had telehealth visits.[56] It identified lower ED visit rates among those who had an initial in-person visit than those who had an initial telehealth visit (29 ED visits [3.9 percent] among those in the in-person group versus 28 ED visits [5 percent] among those in telehealth group, p=0.36). The study only identified ED visits that occurred within 14 days after the initial visit, which may have contributed to the small difference between the two groups. Another cohort study, with a low risk of bias, reported ED visit rates for patients with general medical care (all ages) with a diagnosis of acute or chronic ambulatory care sensitive conditions (i.e., conditions that would avoid healthcare utilization with proper ambulatory management of the disease). Among patients with acute ambulatory care conditions, the study analyzed claims data on 493,716 patients who had in-person visits and 113,857 patients who had telehealth visits and reported higher ED visit rates among those who had an initial telehealth visit than those who had an initial in-person visit (odds ratio (OR): 1.11; 95% confidence intervals [CI], 1.06 to 1.16, with in-person visit as the reference). [3] Among patients with chronic ambulatory care conditions, the study analyzed claims data on 410,743 patients who had in-person visits and 94,481 patients who had telehealth visits and reported lower ED visit rates among those who had an initial telehealth visit than those who had an initial in-person visit (OR: 0.96; 95% CI, 0.92 to 1.01, with in-person visit as the reference). The study only included ED visits that occurred within 14 days after the initial visit, which may have contributed to a modest difference between the two groups.

The two studies showed conflicting results. The difference in the type of clinical conditions that they assessed may have resulted in the conflicting results between two studies. The study favoring telehealth care for a sub-population of patients[3] was much bigger and assessed ED visits separately for those with acute and chronic ambulatory care sensitive conditions, which may have resulted in more accurate parsing out of the difference in ED visit patterns (Table 3). For patients of all ages who receive care for general medical conditions, those who receive an initial telehealth visit for an acute condition may have higher rates of ED visits compared with those who receive in-person care, and those who receive an initial telehealth visit for a chronic condition may have lower rates of ED visits compared with those who receive in-person care (Strength of Evidence (SOE): Moderate) (Table 3).

3.3.2.3. Care for Specific Conditions, COVID-19

Among patients with COVID-19 who received care, three observational studies reported ED visit rates after an in-person or telehealth visit. One cohort with moderate risk of bias among patients with COVID-19 (mean age of 58 years) assessed ED visit rates after an in-person primary care visit or telehealth encounter. The study enrolled 593 patients who had in-person visits and 192 patients who had telehealth visits.[58] This study reported higher ED visit rates among those who had an initial in-person visit compared with those who had an initial telehealth visit (167 ED visits [28.2 percent] among those in the in-person group versus 24 ED visits [12.5 percent] among those in the telehealth group, p<0.001) in the 30 days following the initial assessment. Another cohort study among patients with COVID-19 (patients' age not reported) assessed ED visit rates after an in-person primary care visit or telehealth visit. This study was at serious risk of bias owing to potentially inadequate adjustment for confounding factors and possible selection bias. This study enrolled 3,197 patients who had in-person visits and 1,187 patients who had telehealth visits.[57] The study identified lower ED visit rates among those who had an initial in-person visit (227 ED visits [7.1 percent] among those in the in-person group versus 307 ED visits [25.9 percent] among those in the telehealth group, $p<0.001$) in the 68 days following the initial assessment. A third cohort study with moderate risk of bias among adult and elderly patients with COVID-19 (mean age of 46.03 years) assessed ED visit rates after an in-person primary care visit or telehealth visit. This study enrolled 154 patients who had in-person visits and 139 patients who had telehealth visits.[59] The study reported lower ED visit rates among those who had an initial telehealth visit compared with those who had an initial in-person visit (24 ED visits [15.6 percent] among those in the in-person group versus 13 ED visits [10.1 percent] among those in the telehealth group, $p=0.117$) in the 30 days following the initial assessment. The three studies showed conflicting results. The difference in the followup period (68 days versus 30 days) and the data collection period (later period in the COVID-19 era [starting December 20, 2020][57] versus the early months of the pandemic [starting March 23 and April 7, 2020][58, 59]) may have resulted in conflicting results among three studies. The study favoring in-person care is a larger study (N=4,384 versus N=785 and N=293) with a longer followup period (Table 3). For patients who receive specialized COVID-19 care, those who receive an initial telehealth visit may have higher ED visit rates compared with those who receive in-person care (SOE: Low).

3.3.2.4. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

One cohort study with a moderate risk of bias among patients in a family planning clinic (mean age of 28 years) assessed ED visit rates among those who received an in-person versus telehealth medical abortion service. This study enrolled 94 patients who had in-person visits, 124 patients who had telehealth visits and picked up their medication from the clinic, and 69 patients who had telehealth visits and received their medication in the mail.[60] The study identified lower ED visit rates among those who had an initial in-person visit than among either telehealth group (2 ED visits [2.1 percent] among those in the in-person group versus 5 ED visits [4 percent] among those in telehealth group who picked up their medication from the clinic and 4 ED visits [5.8 percent] in the telehealth group who received their medication in the mail). For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have slightly higher ED visit rates compared with those who receive in-person care (SOE: Low) (Table 3).

3.3.2.5. Other Conditions

Among patients who received care for specific conditions, excluding COVID-19 and pregnancy/prenatal/ gynecological care, five observational studies reported ED visit rates after an in-person versus a telehealth visit. One was a cohort study with moderate risk of bias among patients with hereditary hemorrhagic telangiectasia (mean age of 57 years) enrolling 45 patients who had in-person visits and 45 who had telehealth visits.[61] The study identified lower ED visit rates among those who had an initial telehealth visit compared with those who had an initial in-person visit (11 ED visits [24.4 percent] among those in the in-person group versus 9 ED visits

[20 percent] among those in the telehealth group, p>0.05) in 244 days after the initial visit. The long followup time helped to identify the difference between the two groups in this small population.

The second study, a cohort study with critical risk of bias owing to substantial concerns about how baseline and time-varying confounders were addressed, was conducted in Portugal. This study assessed ED visit rates among elderly patients with chronic heart failure (mean age of 71 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[62] The study identified a lower ED visit rate among patients who had an initial telehealth visit (214 ED visits among 160 patients in the in-person group [1.3 visits per person] versus 52 visits among 43 patients in the telehealth group [1.2 visits per person], p=0.27). The ED visits were assessed within 497 days after the initial visit in the in-person group and 70 days in the telehealth group.

The third study, a cohort study with serious risk of bias owing to lack of information on adjusting for confounders, assessed ED visit rates among adult and elderly patients with cancer (median age of 60 years) and compared the care prior to and during transition to telehealth (mainly in-person visits) with the post-transition period (mainly telehealth visits).[63] The study identified a lower ED visit rate among patients who had an initial visit in the 1 week during the transition and in the 4 weeks after the transition compared with those who had an initial visit in the 4 weeks prior to the transition (24 of 763 patients [3.1 percent] in the pre-transition group versus 2 of 168 [1.2 percent] patients in the during-transition group and 7 of 813 patients [0.9 percent] in the post-transition group, p=0.0031).

The fourth study was a cross-sectional study conducted in Australia, with serious risk of bias owing to lack of information on confounders. This study assessed ED visit rates among adult and elderly patients with cancer (mean age of 62.77 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the later-COVID-19 era (mainly telehealth visits).[65] The study identified a higher ED visit rate among patients who had an initial telehealth visit (3 of 814 patients [0.37 percent] in the in-person group versus 4 of 910 patients [0.44 percent] in the telehealth group, in 24 hours after the first visit, p=1; and 3 of 814 patients [0.37 percent] in the in-person group versus 7 of 910 patients [0.77 percent] in the telehealth group, in 7 days after the first visit, p=0.343).

The fifth study was a cohort study with low risk of bias. This study assessed ED visit rates among adult and elderly patients with asthma (mean age not reported) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the later-COVID-19 era (mainly telehealth visits).[64] The study identified a lower mean of ED visits among patients who had an initial telehealth visit (mean of 0.048, standard error [SE] 0.012 among patients in the in-person group versus mean of 0, SE 0 among patients in telehealth-only group, p comparing the two groups not reported).

The five studies showed conflicting results. The difference in the followup periods (ranging from 7 to 497 days) and the data collection period (early period in the COVID-19 era [63] versus comparison of the pre-COVID-19 era to the COVID-19 era [61, 62, 64, 65]) may have resulted in conflicting results among these studies. Moreover, there were other critical confounders, like COVID-19 infection as a risk of an ED visit among the telehealth group (COVID-19 era), and no risk in the in-person group (pre-COVID-19 era), that have not been taken into consideration in the reported comparison. While the study favoring in-person care [65] is a large study (N=1,724) it has a short followup period of 7 days compared with longer followup periods reported for studies in favor of telehealth (Table 3). For patients who receive specialized care (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower ED visit rates compared with those who receive in-person care (SOE: Low) (Table 3).

3.3.2.6. Surgical Care

One cohort study with serious risk of bias owing to no information on confounders assessed ED visit rates among patients who underwent abdominal surgery (median age of 49 years) and had either an in-person visit or a telehealth visit for post-operation followup. The study enrolled 113 patients who had in-person visits and 106 patients who had telehealth visits.[66] The study identified lower ED visit rates among those who had an initial telehealth visit than among those who had an in-person visit (2 ED visits [1.9 percent] among those in telehealth group versus 7 ED visits [6.2 percent] among those in the in-person group). For patients receiving surgical care, those who receive an initial telehealth visit may have lower ED visit rates compared with those who receive in-person care (SOE: Low) (Table 3).

3.3.3. Hospitalization

We identified 18 observational studies that compared in-person care with telehealth care and evaluated hospitalization rates (see Appendix D, Evidence Table D.5.3). As shown in Figure 5, for the majority of the studies, the differences in hospitalization rates for in-person versus telehealth care were small. We are unable to make a general statement about the relative performance of in-person or telehealth care because the clinical conditions, patient/provider characteristics, and types of assessment performed during the visits varied across the small number of studies included in this evidence synthesis. All these factors impacted the outcome of the initial visit and the need for followup hospitalization. Our confidence in our conclusions across the clinical conditions is generally low, owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 4, and Figure 5).

There were 14 other studies reporting hospitalization rates for patients receiving telehealth (with no comparison).[49-52, 55, 67-75] These studies generally reported hospitalization rates after receipt of telehealth care of 0.01 percent to 37 percent. Studies varied in their patient and provider characteristics and clinical conditions, resulting in a wide range of hospitalization rates (see Appendix D, Evidence Tables D.5.3 and D.5.4).

3.3.3.1. General Medical Care, Adults

Among adult patients who received care for general medical conditions, two observational studies reported hospitalization rates after an in-person or telehealth visit. One was a cohort study with a moderate risk of bias among older adults (mean age of 75 years) enrolling 6,792 patients who had in-person visits and 10,311 who had telehealth visits.[76] The study identified significantly lower hospitalization rates among those who had an initial telehealth visit and for all diagnoses, as well as among those with an ambulatory care sensitive condition (OR: 0.72; 95% CI, 0.57 to 0.9, p=0.004 for all diagnoses and OR: 0.78; 95% CI, 0.61 to 1, p=0.049 for those with ambulatory care sensitive conditions)

The other study, a retrospective cohort study, with a serious risk of bias owing to lack of proper adjustment for confounders and handling of missing data, assessed transfer rate to in-patient care (i.e., hospitalization) among younger, mostly white females in the United States (mean age of 38 years).[77] The study identified a lower hospitalization rate among patients who had an initial telehealth visit (2.9 in-patient transfers for 207 patients [1.4 percent] in the telehealth group versus 7.0 for 207 patients [3.4 percent] in the in-person group, p>0.05). The difference in hospitalization rates was smaller in this population compared with the other study. The younger patient population, with fewer clinical comorbidities, might have resulted in a smaller difference between those who had in-person versus telehealth visits. Considering the consistent results and the demographic difference in populations, we conclude that for adult patients who receive care for general medical conditions, those who receive an initial telehealth visit have similar hospitalization rates compared with those who receive in-person care (SOE: Moderate) (Figure 5, Table 4).

3.3.3.2. General Medical Care, All Ages

Among patients of all ages who received care for general medical conditions, two observational studies reported hospitalization rates after an in-person or telehealth visit. One cohort study, with serious risk of bias owing to possible selection bias and intervention classification bias, among adults (median age of 42 years) reported hospitalization rates after an in-person or telehealth visit for care addressing general medical conditions. The study enrolled 741 patients who had in-person visits and 564 patients who had telehealth visits.[56] Lower hospitalization rates were reported among those who had an initial telehealth visit (11 hospitalization events [2 percent]) compared with those who had in-person visits (21 hospitalization events [2.8 percent)], p=0.31). The study only identified hospitalization events within the 14 days after the initial visit, which may have contributed to the small difference between the two groups. Another cohort study, with low risk of bias, reported hospitalization rates for patients with general medical care (all ages) with a diagnosis of acute or chronic ambulatory care sensitive conditions (i.e., conditions that would avoid healthcare utilization with proper ambulatory management of the disease). Among patients with acute ambulatory care sensitive conditions, the study enrolled claims data on 493,716 patients who had in-person visits and 113,857 patients who had telehealth visits.[3] It identified higher hospitalization rates among those who had an initial telehealth visit than those who had an initial in-person visit (OR: 1.03; 95% CI, 0.98 to 1.08, with in-person visit as the reference). Among patients with chronic ambulatory care conditions, the study enrolled claims data on 410,743 patients who had in-person visits and 94,481 patients who had telehealth visits. It identified lower hospitalization rates among those who had an initial telehealth visit than those who had an initial in-person visit (OR: 0.94; 95% CI, 0.90 to 0.99, with in-person visit as the reference).

The study only identified hospitalization events that occurred within 14 days after the initial visit, which may have contributed to a modest difference between the two groups. The two studies showed conflicting results. The difference in the type of clinical conditions that they assessed may have resulted in conflicting results between two studies. The study favoring in-person care for a sub-population of patients [3] was much larger and assessed hospitalization rates separately for those with acute and chronic ambulatory care sensitive conditions, which may have resulted in more accurate parsing out of the difference in hospitalization patterns (Table 4). For patients of all ages who receive care for general medical conditions, those who receive an initial telehealth visit for an acute condition may have higher hospitalization rates compared with those who receive in-person care and those receive an initial telehealth visit for a chronic condition may have lower hospitalization rates compared with those who receive in-person care (SOE: Moderate) (Figure 5, Table 4).

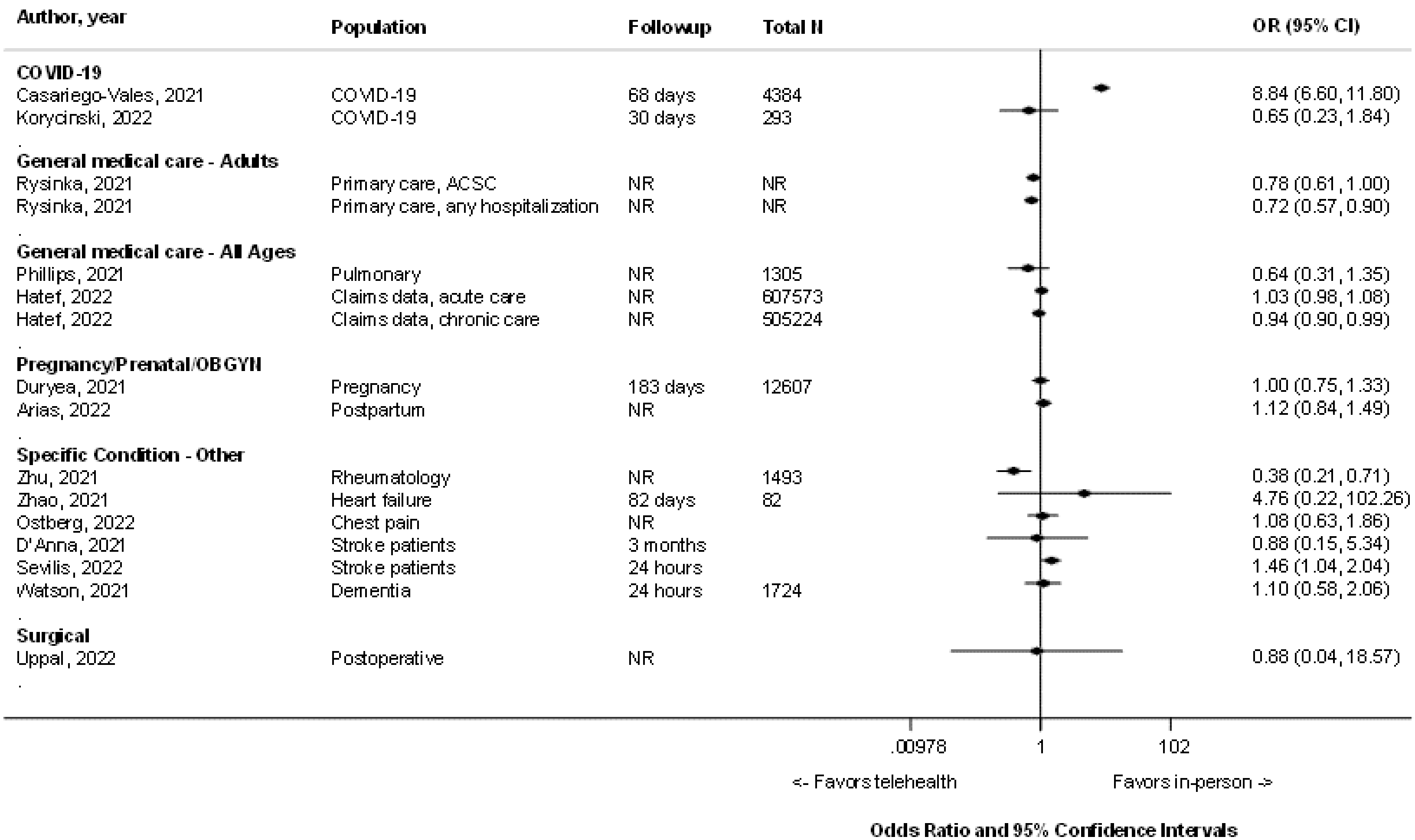
Table 4. Summary of findings: hospitalization rates for patients receiving telehealth versus in-person care (N=18 studies)

Clinical Area/Condition	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
General medical care, Adults	2 studies (N=17,517) Cohort 2 studies[76, 77] (N=17,517)	NA	NA	Cohort 2 studies[76, 77] (N=17,517)	High Direct Precise Consistent Undetected	For adult patients who receive care for general medical conditions, hospitalization rates may be similar for those receiving an initial telehealth visit compared with those who receive an initial in-person visit (SOE: Moderate).
General medical care, Children	No studies	NA	NA	NA	NA	NA
General medical care, All ages	2 studies (N=608,878) Cohort 2 studies[3, 56] (N=608,878)	Cohort 1 study[3] (N=607,573)	NA	Cohort 2 studies[3, 56] (N=506,529)	Medium Direct Precise Inconsistent Undetected	For patients of all ages who receive care for general medical conditions, those who receive an initial telehealth visit for an acute condition may have higher hospitalization rates compared with those who receive in-person care and those who receive an initial telehealth visit for a chronic condition may have lower hospitalization rates compared with those who receive in-person care (SOE: Moderate).
Care for specific conditions, COVID-19	2 studies (N=4,677) Cohort 2 studies[57, 59] (N=4,677)	Cohort 1 study[57] (N=4,384)	NA	Cohort 1 study[59] (N=293)	High Direct Precise Inconsistent Undetected	For patients who receive specialized COVID-19 care, those who receive an initial telehealth visit may have higher hospitalization rates compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Pregnancy/prenatal/gynecological care	2 studies (N=14,186) Cohort 2 studies[78, 79] (N=14,186)	Cohort 2 studies[78, 79] (N=14,186)	NA	NA	High Direct Precise Consistent Undetected	For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have slightly higher hospitalization rates compared with those who receive in-person care (SOE: Low).

Clinical Area/Condition	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
Care for specific conditions, Other conditions	9 studies (N=38,484) Cohort 8 studies[62, 64, 65, 80-84] (N=37,574) Cross-sectional 1 study[85] (N=910)	Cohort 3 studies[65, 80, 84] (N=28,137) Cross-sectional 1 study[85] (N=910)		Cohort 5 studies[62, 64, 81-83] (N=9,437)	High Direct Precise inconsistent Suspected	For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower hospitalization rates compared with those who receive in-person care (SOE: Low).
Surgical Care	1 study (N=535) Cohort 1 study[86] (N=535)	NA	NA	Cohort 1 study[86] (N=535)	High Direct Precise Unknown consistency Undetected	For patients receiving surgical care, those who receive an initial telehealth visit may have lower hospitalization rates compared with those who receive in-person care (SOE: Low).
General Behavioral/Mental Health	No studies	NA	NA	NA	NA	NA
Physical rehabilitation/ Functional impairment	No studies	NA	NA	NA	NA	NA

NA = not applicable/no studies; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.

Figure 5. Forest plot presenting hospitalization for patients who had an initial telehealth visit versus an initial in-person visit*



ACSC = ambulatory care sensitive conditions; CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

3.3.3.3. Care for Specific Conditions, COVID-19

Among patients with COVID-19 who received care, two observational studies reported hospitalization rates after an in-person or telehealth visit. One cohort study, with serious risk of bias owing to potentially inadequate adjustment for confounding factors and possible selection bias, assessed hospitalization rates after an in-person primary care visit or telehealth visit among patients with COVID-19 (patients' ages not reported). The study enrolled 3,197 patients who had in-person visits and 1,187 patients who had telehealth visits.[57] It identified lower hospitalization rates among those who had an initial in-person visit (65 hospitalization events [2 percent] among those in the in-person group versus 184 hospitalization events [15.5 percent] among those in the telehealth group, $p<0.001$) in the 68 days following the initial assessment. The monitoring of COVID-19 symptoms via telehealth and the lack of physical examination, as well as assessment of disease severity during the telehealth visit, might have contributed to the meaningful difference between the hospitalization rates in the two groups. Another cohort study among adult and elderly patients with COVID-19 (mean age of 46.03 years) assessed hospitalization rates after an in-person primary care visit or telehealth visit. The study enrolled 154 patients who had in-person visits and 139 patients who had telehealth visits.[59] This study reported lower hospitalization rates among those who had an initial telehealth visit compared with those who had an initial in-person visit (10 hospitalization events [6.5 percent] among those in the in-person group versus 6 events [4.3 percent] among those in the telehealth group, hazard ratio (HR): 0.578, 95% CI: 0.29 to 1.13, $p=0.452$) in the 30 days following the initial assessment.

The two studies showed conflicting results. The difference in the followup period (68 days versus 30 days) and the data collection period (later period in the COVID-19 era [starting December 20, 2020][57] versus the early months of the pandemic [starting March 23, 2020][59]) may have resulted in conflicting results between two studies. The study favoring in-person care is a larger study (N=4,384 versus N= 293) with a longer followup period (Table 3). For patients who receive care for COVID-19, those who receive an initial telehealth visit may have higher hospitalization rates compared with those who receive in-person care (SOE: Low) (Figure 5, Table 4).

3.3.3.4. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

Among patients who received specialized care for pregnancy/prenatal/gynecological care, two observational studies reported hospitalization rates after an in-person versus a telehealth visit. One cohort study, with serious risk of bias owing to possible issues with confounders, assessed neonatal intensive care unit (NICU) admission rates for full-term newborns of patients who received in-person or telehealth prenatal care (mean age of 28 years). The study enrolled 6,559 patients who had in-person visits and 6,084 patients who had telehealth visits.[78] It identified slightly lower hospitalization rates among those who had an initial in-person visit (98 NICU admissions [1.5 percent] among those in the in-person group versus 94 NICU admissions [1.6 percent] among those in the telehealth group, $p<0.001$), but the difference in NICU admissions was not meaningful. Another cohort study, with moderate risk of bias, assessed neonatal intensive care nursery admission rates for patients who received in-person or telehealth postpartum care (median age of 30.35 years). The study enrolled 780 patients who had in-person visits and 799 patients who had telehealth visits.[79] It identified slightly lower hospitalization rates among those who had an initial in-person visit (102 admissions [13.1 percent] among those in the in-person group versus 115 admissions [14.4 percent] among those in the telehealth group, p=0.45).

For patients who receive specialized pregnancy/prenatal/gynecological care, using telehealth may result in slightly higher hospitalization rates compared with those who receive in-person care (SOE: Low) (Figure 5, Table 4).

3.3.3.5. Care for Specific Conditions, Other Conditions

Among patients who received care for specific conditions, excluding COVID-19 and pregnancy/prenatal/gynecological care, nine observational studies reported hospitalization rates after an in-person or telehealth visit. One was a cohort study with a moderate risk of bias among older adults with heart failure (mean age of 71 years) enrolling 39 patients who had in-person visits and 43 patients who had telehealth visits.[80] The study identified slightly lower hospitalization rates among those who had an initial in-person visit (0 hospitalization events among those in the in-person group versus 2 hospitalization events among those in the telehealth group).

The second study, a cohort study with critical risk of bias owing to substantial concerns about baseline and time-varying confounders, was conducted in Portugal. This study assessed hospitalization rates among elderly patients with chronic heart failure (mean age of 71 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[62] The study identified a lower hospitalization rate among patients who had an initial telehealth visit (71 hospitalization events among 160 patients in the in-person group [44.3 percent] versus 11 hospitalization events among 43 patients in the telehealth group [25.6 percent]). The hospitalization event was assessed in the 497 days after the initial visit in the in-person group and 70 days in the telehealth group. Different followup periods might have contributed to this difference between the two groups.

The third study, a cohort study with a serious risk of bias owing to inadequate reporting for adjustment of confounding factors, assessed hospitalization rates among adult patients with irritable bowel syndrome (age range from 22 to 76 years of age; median age of 36 years).[81] The study identified a lower hospitalization rate among patients who had an initial telehealth visit (17 hospitalization events among 1,036 patients in the in-person group [1.6 percent] versus 3 hospitalization events among 334 patients in the telehealth group [0.9 percent]).

The fourth study, a cohort study with serious risk of bias owing to concerns regarding inadequate adjustment for confounders, assessed hospitalization rates among rheumatology patients (mean age of 55 years).[82] The study identified a lower hospitalization rate among patients who had an initial telehealth visit (33 hospitalization events among 1,286 patients in the in-person group [2.6 percent] versus 15 hospitalization events among 1,493 patients in the telehealth group [1 percent], p=0.002).

The fifth study, a cross-sectional study with serious risk of bias owing to issues with patient selection, assessed the hospitalization rates among adult patients with chest pain (median age of 44 years) in primary care clinics during the COVID-19 era.[85] The study identified a lower hospitalization rate among patients who had an initial in-person visit (27 hospitalization events among 455 patients in the in-person group [5.9 percent] versus 29 hospitalization events among 455 patients in the telehealth group [6.4 percent]).

The sixth study, a cohort study with serious risk of bias owing to concerns with addressing confounders, was conducted in the United Kingdom. This study assessed hospitalization rates among adult and elderly patients with stroke (median age of 65 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[83] The study identified a slightly lower hospitalization rate among patients who had an initial telehealth visit (3 hospitalization events owing to recurrent transient ischemic attack or stroke among 180 patients in the in-person group [1.67 percent] versus 2 hospitalization events among 136 patients in the telehealth group [1.47 percent], p=0.445).

The seventh study, a cohort study with critical risk of bias owing to issues with confounders and reporting bias, assessed hospitalization rates among adult and elderly patients with stroke (mean age of 66.7 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[84] The study identified a higher hospitalization rate among patients who had an initial telehealth visit (66 hospitalization events for inpatient thrombolytic treatment among 15,226 patients in the in-person group [4 percent] versus 70 hospitalization events among 11,105 patients in the telehealth group [5.7 percent], p=0.033).

The eighth study, a cross-sectional study with serious risk of bias because of concerns with confounders, was conducted in Australia. This study assessed hospitalization rates among adult and elderly patients with cancer (mean age of 62.77 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[65] The study identified a slightly higher hospitalization rate among patients who had an initial telehealth visit (18 of 814 patients [2.21 percent] in the in-person group versus 22 of 910 patients [2.42 percent] in the telehealth group, in 24 hours after the first visit, p=0.531).

The ninth study was a cohort study with moderate risk of bias. This study assessed hospitalization rates among adult and elderly patients with asthma (mean age not reported) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[64] The study identified a slightly lower mean of hospitalization events among patients who had an initial telehealth visit (mean of <0.001, SE 0.062 among patients in the in-person group versus mean of 0, SE 0 among patients in telehealth-only group, p comparing the two groups not reported), but the difference was not clinically meaningful.

The nine studies showed conflicting results. Different patient populations, clinical conditions, followup periods (ranging from 1 to 497 days), and data collection periods (early period in the COVID-19 era [82] versus the comparison between pre-COVID-19 and the COVID-19 era[62, 64, 65, 80, 81, 83, 84]) may have resulted in conflicting results among these studies. Moreover, there were other critical confounders, such as COVID-19 infection as a risk of hospitalization event among the telehealth group (the COVID-19 era), and no risk in the in-person group (pre-COVID-19 era), that have not been taken into consideration in the reported comparison. The difference in hospitalization rates was much larger in one study than in the others. For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care care), those who receive an initial telehealth visit may have lower hospitalization rates compared with those who receive in-person care (SOE: Low) (Figure 5, Table 4).

3.3.3.6. Surgical Care

One cohort study with moderate risk of bias assessed hospitalization rates among adult and elderly patients who underwent surgery (mean age of 56.6 years) and compared an in-person versus telehealth visit for post-operation followup. This study enrolled 437 patients who had in-person visits and 98 patients who had telehealth visits.[86] The study identified slightly lower hospitalization rates among those who had an initial telehealth visit than among those with an in-person visit (2 postoperative intensive care unit [ICU] admissions [0.5 percent] among those in the in-person group versus 0 postoperative ICU admissions [0 percent] among those in telehealth group). For patients receiving surgical care, those who receive an initial telehealth visit may have lower hospitalization rates compared with those who receive in-person care (SOE: Low) (Table 4).

3.3.4. Readmission

We identified six observational studies that compared in-person with telehealth care and evaluated readmission rates (see Appendix D, Evidence Table D.5.5). The difference in readmission rates between in-person and telehealth care reported in these studies was not meaningful. Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 5 and Figure 6). We also identified one study with no comparison that reported a readmission rate of 0.3 percent among patients with COVID-19 who received telehealth care (see Appendix D, Evidence Tables D.5.5 and D.5.6).[75]

3.3.4.1. Care for Specific Conditions, COVID-19

Among patients with COVID-19, two observational studies reported readmission rates after an in-person or telehealth visit. One cohort with moderate risk of bias assessed readmission rates for patients in in-person and telehealth groups (mean age of 58 years).[58] This study reported slightly lower readmission rates among those in the telehealth group compared with those in the in-person group (26 readmission events [4.4 percent] among 593 patients in the in-person group versus 4 events [3.5 percent] among 114 patients in the telehealth group, p=0.67) in the 30 days following the initial assessment. The much smaller sample size for the telehealth group may have resulted in the detection of fewer readmission events in this group.

Another cohort study, with a serious risk of bias owing to concern about the handling of confounders and missing data, assessed readmission rates among patients with COVID-19 (mean age of 39 years) after an in-person or telehealth visit.[87] The study identified lower readmission rates related to COVID-19 complications among those who had an initial telehealth visit (1 readmission event [8 percent] among those in the in-person group versus 0 events among those in telehealth group) in the 72 hours following the initial assessment, but the difference was not meaningful. The short followup period may have resulted in the detection of fewer readmission events. For patients who receive specialized COVID-19 care, those who receive an initial telehealth visit may have similar readmission rates compared with those who receive in-person care (SOE: Low) (Table 5).

3.3.4.2. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

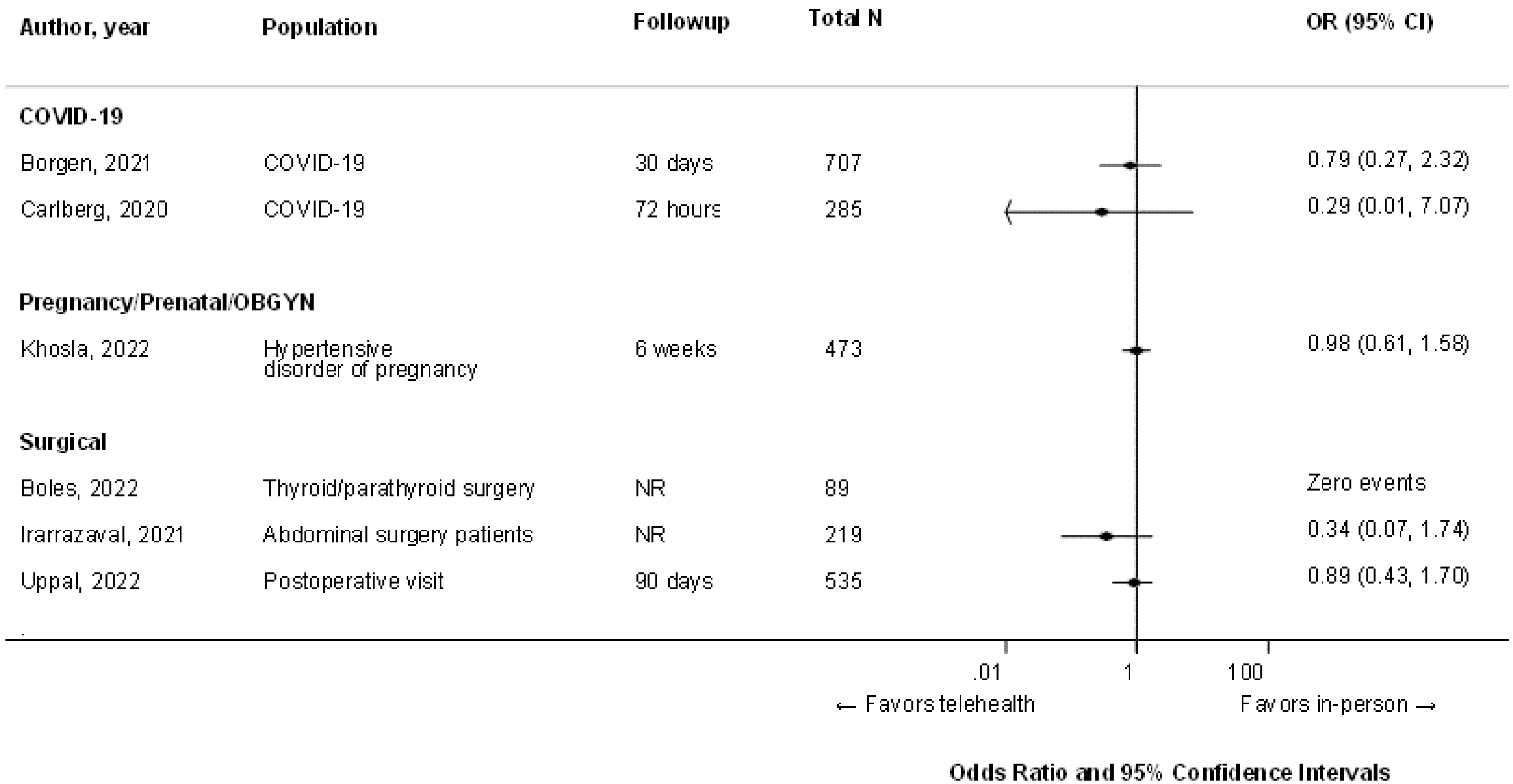
One cohort study, with moderate risk of bias, assessed 6-week readmission rates among patients with hypertensive disorder of pregnancy who received in-person or telehealth prenatal care (mean age of 30 years) and compared the pre-COVID-19 era (mainly in-person visits) with the COVID-19 era (mainly telehealth visits).[88] The study enrolled 215 patients who had in-person visits and 258 patients who had telehealth visits and reported slightly lower readmission rates among those who had an initial telehealth visit (38 readmissions [17.8 percent] among those in the in-person group versus 45 readmissions [17.4 percent] among those in the telehealth group, p=0.91). For patients who receive specialized pregnancy/prenatal/gynecological care,

Table 5. Summary of findings: readmission rates for patients receiving telehealth versus in-person care (N=6 studies)

Clinical Area/Condition	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
General medical care, Adults	NA	NA	NA	NA	NA	NA
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	NA	NA	NA	NA	NA	NA
Care for specific conditions, COVID-19	2 studies (N=992) Cohort 2 studies[58, 87] (N=992)	NA	NA	Cohort 2 studies[58, 87] (N=992)	High Direct Precise Consistent Undetected	For patients who receive specialized COVID-19 care, those who receive an initial telehealth visit may have similar readmission rates compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Pregnancy/prenatal/gynecological care	1 study (N=473) Cohort 1 study[88] (N=473)	NA	NA	Cohort 1 study[88] (N=473)	High Direct Precise Unknown consistency Undetected	For patients who receive pregnancy/prenatal/gynecological care, readmission rates may be similar for those receiving telehealth compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Other conditions	NA	NA	NA	NA	NA	NA
Surgical care	3 studies (N=843) Cohort 3 studies[66, 86, 89] (N=843)	Cohort 1 study[66] (N=219)	Cohort 1 study[89] (N=89)	Cohort 2 studies[66, 86] (N=754)	High Direct Precise Consistent Undetected	For patients receiving surgical care, those who receive an initial telehealth visit may have similar readmission rates compared with those who receive in-person care (SOE: Low).
General behavioral/Mental health	NA	NA	NA	NA	NA	NA
Physical rehabilitation/Functional impairment	NA	NA	NA	NA	NA	NA

NA = not applicable/no studies; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting.

Figure 6. Forest plot presenting readmissions for patients who had an initial telehealth visit versus an initial in-person visit*



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

readmission rates may be similar for those receiving telehealth compared with those who receive in-person care (SOE: Low) (Table 5).

3.3.4.3. Surgical Care

Among patients who received surgical care, three observational studies reported readmission rates after an in-person or telehealth visit. One cohort study with serious risk of bias, owing to issues with confounders, assessed readmission rates among adult and elderly patients who underwent thyroid/parathyroid surgery (mean age of 47.1 years) and had an in-person versus telehealth visit for post-operation followup. This study enrolled 66 patients who had in-person visits and 23 patients who had telehealth visits.[89] The study identified no difference in readmission rates among those who had an initial telehealth visit than among those with an in-person visit (0 readmission [0 percent] among those in the in-person group versus 0 [0 percent] among those in telehealth group). Another cohort study with serious risk of bias, owing to concerns with lack of adjustment for confounders, was conducted in Chile. It assessed readmission rates among adult and elderly patients who underwent abdominal surgery (mean age of 49 years) and had an in-person versus telehealth visit for post-operation followup. The study enrolled 113 patients who had in-person visits and 106 patients who had telehealth visits.[66] The study identified lower readmission rates for elective surgery among those who had an initial telehealth visit than among those who had an in-person visit (2 readmission events [1.9 percent] among those in the in-person group versus 6 [5.3 percent] among those in telehealth group, p=0.32). But the readmission rates for urgent/emergency surgery among those who had an initial telehealth visit was higher than among those who had an in-person visit (3 readmission events [2.7 percent] among those in the in-person group versus 4 readmission events [3.8 percent] among those in telehealth group, p=0.32]. The third study was a cohort study with moderate risk of bias that assessed readmission rates among adult and elderly surgical patients (mean age of 56.6 years) that had an in-person versus telehealth visit for post-operation followup. This study enrolled 437 patients who had in-person visits and 98 patients who had telehealth visits.[86] The study identified slightly lower 90-day readmission rates among those who had an initial telehealth visit than among those who had an in-person visit [OR: 0.89; 95% CI, 0.43 to 1.7, p=0.77].

Different patient populations, clinical conditions, and followup periods may have resulted in conflicting results among these studies. The difference in readmission rates was larger in the study and in clinical setting favoring telehealth, however these were not meaningful. For patients receiving surgical care, those who receive an initial telehealth visit may have similar readmission rates compared with those who receive in-person care (SOE: Low) (Table 5).

3.3.5. Clinical Outcomes

3.3.5.1. Mortality

We identified seven observational studies that compared in-person and telehealth care and evaluated mortality rates (see Appendix D, Evidence Table D.6.1). For five of the studies, the differences of mortality rates between in-person and telehealth care were small and not clinically meaningful. For patients with cardiac conditions, telehealth seemed to have lower mortality rates compared with in-person care. For surgical patients using telehealth for post-operation followup, telehealth seemed to result in higher mortality rates compared with in-person care. Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 6 and Figure 7).

There were another nine studies that reported mortality rates for patients who received telehealth care (with no comparison).[49, 51, 54, 68-72, 90] These studies generally reported mortality rates of 0.3 percent to 12.5 percent after receipt of telehealth care. Studies varied in their patient and provider characteristics and clinical conditions which resulted in a wide range of mortality rates (see Appendix D, Evidence Tables D.6.1 and D.6.2).

3.3.5.1.1. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

Among patients who received specialized care for pregnancy/prenatal/gynecological care, two observational studies reported mortality rates after an in-person versus a telehealth visit. One cross-sectional study with a moderate risk of bias assessed successful medical abortion rates among patients who received an in-person versus a telehealth medical abortion visit (mean age of 28 years). This study enrolled 22,158 patients who had in-person visits and 29,984 patients who had telehealth visits.[91] The study identified no difference in mortality rates between the two groups (no deaths in the 59 days after the visit in the in-person group and no deaths in the 85 days after the visit in the telehealth group). A cohort study with a moderate risk of bias assessed neonatal intensive care nursery mortality rates for infants of patients who received in-person versus telehealth postpartum care (median age of 30.35 years). The study enrolled 780 patients who had in-person visits and 799 patients who had telehealth visits.[79] It identified slightly lower mortality rates among those who had an initial in-person visit (11 deaths [1.4 percent] among those in the in-person group versus 13 deaths [1.6 percent] among those in the telehealth group, p=0.72).

For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have similar mortality rates compared with those who receive in-person care (SOE: Low) (Table 6).

3.3.5.1.2. Care for Specific Conditions, Other Conditions

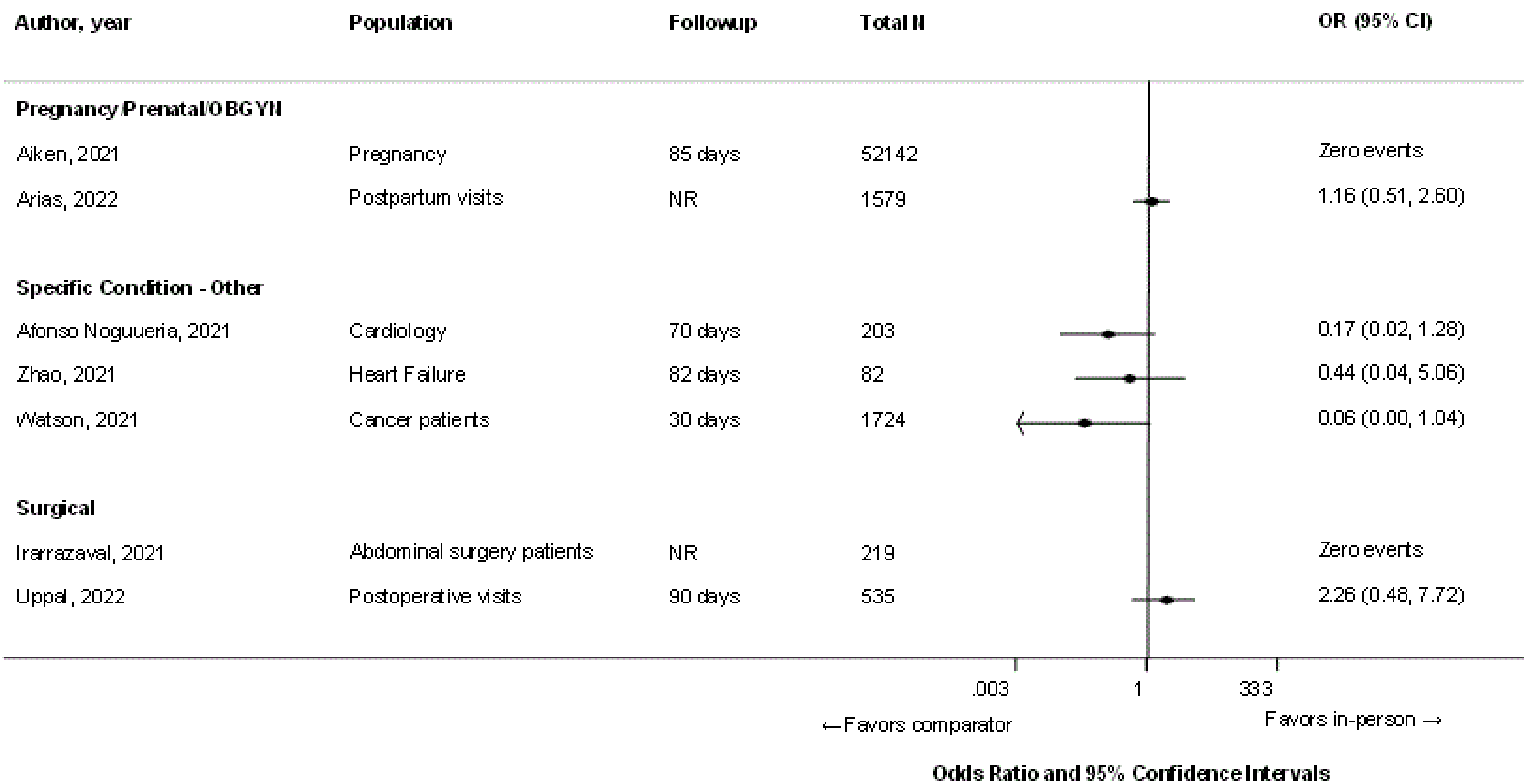
Among patients who received care for specific conditions, excluding COVID-19 and pregnancy/prenatal/gynecological care, three observational studies reported mortality rates after an in-person versus a telehealth visit. One study, a cohort study with critical risk of bias owing to substantial concerns about how time-varying confounders were addressed, was conducted in Portugal. This study assessed mortality rates among elderly patients with chronic heart failure (mean age of 71 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[62] The study identified a lower mortality rate among patients who had an initial telehealth visit (20 deaths among 160 patients in the in-person group [12.5 percent] versus 1 death among 43 patients in the telehealth group [2.3 percent]). The death events were assessed in the 497 days after the initial visit in the in-person group and in the 70 days after the initial visit in the telehealth group. A small sample size and a much shorter followup period for the telehealth group may have contributed to the detection of fewer death events in this group.

Table 6. Summary of findings: mortality for patients receiving telehealth versus in-person care (N=7 studies)

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains	Conclusion
General medical care, Adults	NA	NA	NA	NA	NA	NA
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	NA	NA	NA	NA	NA	NA
Care for specific conditions, COVID-19	NA	NA	NA	NA	NA	NA
Care for specific conditions, Pregnancy/prenatal/gynecological care	2 studies (N=53,721) Cohort 1 study[79] (N=1,579) Cross-sectional 1 study[91] (N=52,142)	Cohort 1 study[79] (N=1,579)	Cross-sectional 1 study[91] (N=52,142)	NA	High Direct Precise Consistent Undetected	For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have similar mortality rates compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Other conditions	3 studies (N=2,009) Cohort 2 studies[62, 80] (N=285) Cross-sectional 1 study[65] (N=1,724)	NA	NA	Cohort 2 studies[62, 80] (N=285) Cross-sectional 1 study[65] (N=1,724)	High Direct Precise Consistent Undetected	For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower mortality rates compared with those who receive in-person care (SOE: Low).
Surgical care	2 studies (N=754) Cohort 2 studies[66, 86] (N=754)	Cohort 1 study[66] (N=219)	NA	Cohort 1 study[86] (N=535)	High Direct Precise Inconsistent Undetected	For patients receiving surgical care, those who receive an initial telehealth visit may have higher mortality rates compared with those who receive in-person care (SOE: Low).
General behavioral/Mental health	No studies	NA	NA	NA	NA	NA
Physical rehabilitation/ Functional impairment	No studies	NA	NA	NA	NA	NA

NA = not applicable/no studies; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.

Figure 7. Forest plot presenting mortality outcomes for patients who had an initial telehealth visit versus an initial in-person visit*



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

The second study was a cohort study with a moderate risk of bias among older adults with heart failure (mean age of 71 years) enrolling 39 patients who had in-person visits and 43 who had telehealth visits.[80] The study identified lower mortality rates among those who had an initial telehealth visit (5.1 percent mortality rate among those in the in-person group versus 2.33 percent mortality rate among those in the telehealth group, p=0.60).

The third study, a cross-sectional study with serious risk of bias owing to lack of information on adjusting for confounders, was conducted in Australia. This study assessed mortality rates among adult and elderly patients with cancer (mean age of 62.77 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[65] The study identified a slightly higher mortality rate among patients who had an initial in-person visit (7 death events among 814 patients [0.86 percent] in the in-person group versus 0 death events among 910 patients [0 percent] in the telehealth group in 30 days after the first visit, p=0.008). A short followup period may have resulted in the small difference in death events between the two groups. For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower mortality rates compared with those who receive in-person care (SOE: Low) (Table 6).

3.3.5.1.3. Surgical Care

Among patients who received surgical care, two observational studies reported mortality rates after an in-person versus a telehealth visit. One cohort study with serious risk of bias, owing to concerns with confounders, assessed mortality rates among patients who underwent abdominal surgery (median age of 49 years) and had an in-person versus telehealth visit for post-operation followup. This study enrolled 113 patients who had in-person visits and 106 patients who had telehealth visits.[66] The study identified no difference in mortality rates between the two groups [0 death events among those in the in-person group versus 0 death events among those in telehealth group].

Another cohort study with moderate risk of bias assessed mortality rates among adult and elderly patients who underwent surgery (mean age of 56.6 years) and had an in-person versus telehealth visit for post-operation followup. This study enrolled 437 patients who had in-person visits and 98 patients who had telehealth visits.[86] The study identified higher mortality rates among those who had an initial telehealth visit compared with those who had an in-person visit [OR: 2.26; 95% CI, 0.48 to 7.72, p=0.32]. The study favoring in-person visits was larger and the mortality rates were assessed in the 90 days after the surgery, which may have contributed to the detection of a clinically meaningful difference between the two groups. For patients receiving surgical care, those who receive an initial telehealth visit may have higher mortality rates compared with those who receive in-person care (SOE: Low) (Table 6).

3.3.6. Patient-Reported Outcomes

We identified five observational studies that compared in-person care with telehealth care and evaluated patient-reported outcomes (see Appendix D, Evidence Table D.6.3). For three of the studies, the differences in patient-reported outcomes between in-person and telehealth care were small and not clinically meaningful. For patients who receive weight management care, those who receive an initial telehealth visit may have better patient-reported outcomes compared with those who receive in-person care. For patients receiving pregnancy/postnatal care, those who receive an initial telehealth visit may have worse patient-reported outcomes compared with those who receive in-person care. Our confidence in our conclusion is low, owing to weak study design, issues with risk of bias, and a limited number of studies (see Table 7 and Figure 8).

Another four studies reported patient-reported outcomes for patients who received telehealth (with no comparisons).[92-95] These studies generally reported changes in different types of pain (i.e., headache, neuropathic, and shoulder pain), mobility, and self-care from baseline. The change in pain scores ranged considerably from 0.2 to -28.9. Patients showed higher rates of full mobility and ability for self-care after participating in a telehealth home-based program versus before participation (see Appendix D, Evidence Tables D.6.2 and D.6.3).[95]

3.3.6.1. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

Among patients who received pregnancy/prenatal/gynecological care, one cohort study with moderate risk of bias, performed postpartum depression screening among patients who received in-person or telehealth postpartum care (median age of 30.35 years). The study enrolled 780 patients who had in-person visits and 799 patients who had telehealth visits.[79] It identified higher rates of postpartum depression among those who had an initial telehealth visit (368 patients [65.1 percent] in the in-person group versus 571 patients [86.3 percent] in the telehealth group, OR: 4.61; 95% CI, 3.38 to 6.28, p=0.32]. p<0.001). For patients who receive pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have worse patient-reported outcomes compared with those who receive in-person care (SOE: Low) (Table 7).

3.3.6.2. Care for Specific Conditions, Other Conditions

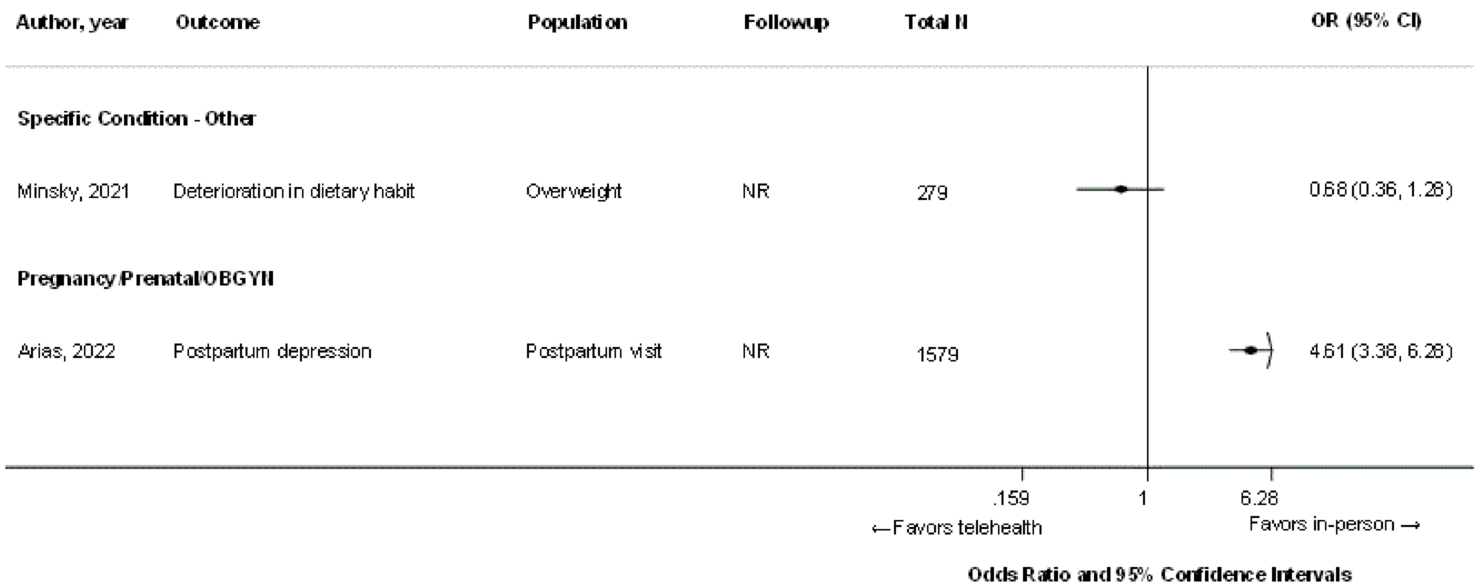
Among patients who received care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), one observational study reported patient-reported outcomes after an in-person versus a telehealth visit. The prospective cohort, with a serious risk of bias owing to concerns about adjustment for confounders and missing data, assessed weight loss among patients who received telehealth versus in-person visits in a weight management clinic.[96] The study enrolled 228 obese patients in the in-person group and 51 obese patients in the telehealth group. It identified lower rates of deterioration in the dietary habit score among patients in the telehealth group (97 of 228 patients [42.54 percent] in the in-person group versus 17 of 51 patients [33.33 percent] in the telehealth group). The smaller sample size in the telehealth group compared with the in-person group may have resulted in the detection of fewer patients with deterioration in their dietary habit score. For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have better patient-reported outcomes compared with those who receive in-person care (SOE: Low) (Table 7).

Table 7. Summary of findings: patient-reported outcomes for patients receiving telehealth care versus in-person care (N=5 studies)

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
General medical care, Adults	NA	NA	NA	NA	NA	NA
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	NA	NA	NA	NA	NA	NA
Care for specific conditions, COVID-19	NA	NA	NA	NA	NA	NA
Care for specific conditions, Pregnancy/prenatal/gynecological care	1 study (N=1,579) Cohort 1 study[79] (N=1,579))	Cohort 1 study[79] (N=1,579))	NA	NA	High Direct Precise Unknown consistency Undetected	For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have worse patient-reported outcomes compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Other conditions	1 study (N=279) Cohort 1 study[96] (N=279))	NA	NA	Cohort 1 study[96] (N=279)	High Direct Precise Unknown consistency Undetected	For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have better patient-reported outcomes compared with those who receive in-person care (SOE: Low).
Surgical care	NA	NA	NA	NA	NA	NA
General behavioral/Mental health	3 studies (N=515) Cohort 3 studies[97-99] (N=515)	Cohort 1 study[97] (N=93))	NA	Cohort 2 studies[98, 99] (N=422)	High Direct Precise Consistent Undetected	For patients receiving care for general behavioral and mental health conditions, those who receive an initial telehealth visit may have better patient-reported outcomes compared with those who receive in-person care (SOE: Low).
Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA

NA = not applicable/no studies; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.

Figure 8. Forest plot presenting patient-reported outcomes for patients who had an initial telehealth visit versus an initial in-person visit*



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

3.3.6.3. Care for General Behavioral and Mental Health Conditions

Among patients who received care for general behavioral and mental health conditions, three observational studies reported patient-reported outcomes after an in-person versus a telehealth visit. One cohort, with serious risk of bias owing to serious concerns with addressing confounders, assessed eating disorders among adult patients (mean age of 24.52 years) enrolled in a multidisciplinary intensive outpatient program receiving care through in-person (N=60) or telehealth (N=33) visits.[97] Patients who had an in-person visit experienced more improvement in their eating disorder (larger change in the overall score of the Eating Disorder Examination Questionnaire v4 comparing the followup to baseline score) than those who had a telehealth visit (mean of 4.1; standard deviation (SD) 1.07 in the overall score at baseline and mean of 2.37; SD 1.24 in the followup for patients in the in-patient group versus mean of 3.56; SD 1.42 in the overall score at baseline and mean of 2.56; SD 1.14 in the followup for patients in the telehealth group). On average, the patients stayed in this eating disorder program for 11.32 weeks (SD 7.64) and the mean of stay did not differ between the two groups (p=0.762).

A second cohort study with moderate risk of bias among adult patients (age range of 18 to 87 years) assessed overall psychological functioning and adjustment among patients with psychiatric diseases and compared those from the pre-COVID-19 era (mainly in-person visits) with those from the COVID-19 era (mainly telehealth visits).[98] This study reported that patients who had a telehealth visit experienced better general psychological adjustment (a lower score in the Brief adjustment scale-6; a 6-item self-report scale designed to address overall psychological functioning and adjustment) than those who had an in-person visit (mean of 23.91 in the scale for 196 patients in the in-patient group versus mean of 21.01 for 196 patients in the telehealth group, p=<0.00).

A third cohort study, with serious risk of bias owing to issues with addressing confounders, assessed general mental health among caregivers and children (mean age of 47.17 years for caregivers and 11.08 for children) and compared data from the pre-COVID-19 era (mainly in-person visits) with data from the COVID-19 era (mainly telehealth visits).[99] It identified that, among the 12 patients enrolled in the study, general mental health improved 20 weeks after enrolling in the focused group parenting intervention via telehealth compared with mental health before enrollment (baseline mean of the Patient Health Questionnaire–9 [PHQ-9] score 7.8; SD 5.96 versus followup mean of the PHQ-9 score 3.1; SD 2.02, Cohen's d: -0.75; 95% CI: -0.62 to 8.78, with higher PHQ-9 score indicating greater severity of depressive symptoms).

Different patient populations, clinical conditions, and followup periods may have resulted in conflicting results among these studies. The studies also used different questionnaires with varying degrees of accuracy to assess the mental health status of their patients. The sample size and difference between in-person and telehealth groups were small in the study favoring in-person visits.[97] For patients receiving care for general behavioral and mental health conditions, those who receive an initial telehealth visit may have better patient-reported outcomes compared with those who receive in-person care (SOE: Low) (Table 7).

3.3.7. Condition-Specific Clinical Outcomes

We identified 11 observational studies that compared in-person care with telehealth care and evaluated a variety of condition-specific clinical outcomes (see Appendix D, Evidence Table D.6.5). Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 8 and Figure

9). There were also two studies with no comparison: one study that included 663 patients reported a successful, complete abortion in 650 patients (98 percent) who received medical abortion through telehealth visits;[74] one study assessed rotator cuff–related shoulder pain and identified improvement in 40 percent of 11 patients who received only advice during their telehealth visit, in 50 percent of 12 patients who received care and exercise recommendations during their telehealth visit, and in 75 percent of 12 patients who received telerehabilitation in addition to care and exercise recommendations during their telehealth visit (see Appendix D, Evidence Tables D.6.5 and D.6.6).[93]

3.3.7.1. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

Among patients who received specialized care for pregnancy/prenatal/gynecological care, two observational studies reported clinical outcomes after an in-person versus a telehealth visit. One cross-sectional study, with a moderate risk of bias, assessed successful medical abortion rates among patients who received an in-person (N=22,158) or telehealth visit (N=29,984) (mean age of 28 years).[91] This study identified a slightly higher success rate for patients in the telehealth group compared with those in the in-person group (21,769 [98.2 percent] successful abortions among those in the in-person group in the 59 days after the initial visit versus 29,618 [98.8 percent] successful abortions among those in the telehealth group in the 85 days after the initial visit, p=1.0), but the difference was not clinically meaningful. The shorter followup period for the in-person group may have resulted in the identification of a slighter lower success rate in this group. Another cohort study, with moderate risk of bias, assessed breast feeding practice among patients who received in-person (N=780) versus telehealth (N=799) postpartum care (median age of 30.35 years).[79] It identified slightly higher rates of breast feeding among those who had an initial in-person visit (420 [75.3 percent] patients in the in-person group versus 473 [72.3 percent] patients in the telehealth group practicing breast feeding, p=0.45 OR: 0.09; 95% CI: 0.68 to 1.18, p=0.25). Different patient populations and clinical conditions may have resulted in conflicting results between the two studies. The difference between in-person and telehealth groups was larger and clinically more meaningful in the study favoring in-person visits.[79] For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial in-person visit may have slightly better clinical outcomes compared with those who receive telehealth care (SOE: Low) (Table 8).

3.3.7.2. Care for Specific Conditions, Other Conditions

We identified seven observational studies that reported different condition-specific outcomes among patients who received care for specific conditions. Four of the studies reported results favoring telehealth compared with in-person care. One was a cohort study, with serious risk of bias owing to concerns regarding inadequate adjustment for confounders and missing data, among children with epilepsy (mean age not reported) enrolling 101 patients who had in-person visits and 16 who had telehealth visits.[100] The study identified a higher remission rate among those who had an initial telehealth visit compared with those who had an in-person visit (70 percent remission rate in 1 month and 75 percent in 3 months in the in-person group versus 88 percent remission rate in 1 and 3 months in the telehealth group). The second study, a cohort

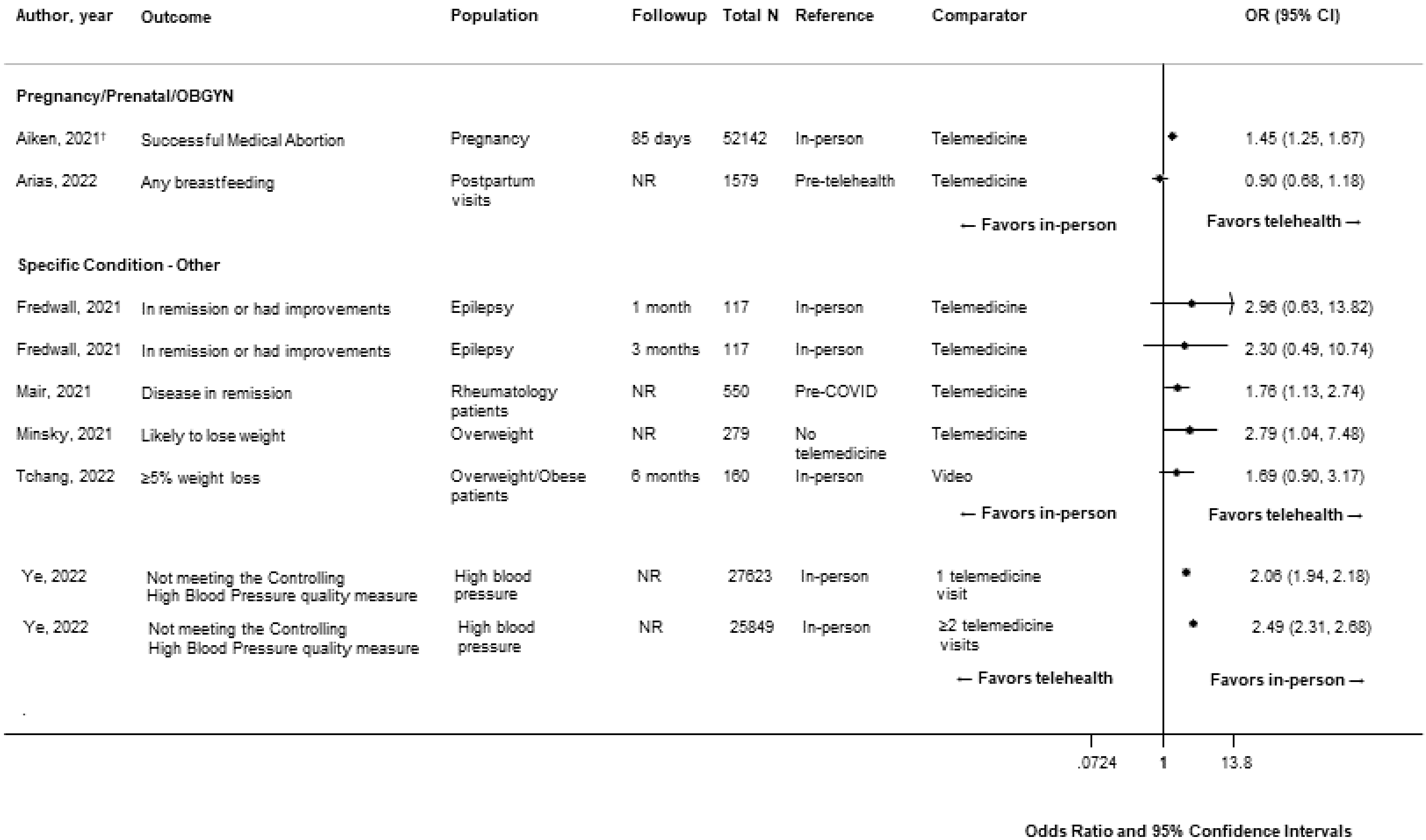
Table 8. Summary of findings: condition-specific clinical outcomes for patients receiving telehealth versus in-person care (N=11 studies)

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Tele-health	Strength of Evidence Domains*	Conclusion
General medical care, Adults	NA	NA	NA	NA	NA	NA
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	NA	NA	NA	NA	NA	NA
Care for specific conditions, COVID-19	NA	NA	NA	NA	NA	NA
Care for specific conditions, Pregnancy/prenatal/gynecological care	2 studies (N=53,721) Cohort 1 study[79] (N=1,579) Cross-sectional 1 study[91] (N=52,142)	Cohort 1 study[79] (N=1,579)	NA	Cross-sectional 1 study[91] (N=52,142)	High Direct Imprecise Inconsistent Undetected	For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have worse condition-specific clinical outcomes compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Other conditions	7 studies (N=42,172) Cohort 7 studies[64, 96, 100-104] (N=42,172)	Cohort 3 studies[64, 103, 104] (N=40,736)	NA	Cohort 4 studies[96, 100-102] (N=1,436)	High Direct Precise Inconsistent Undetected	For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have worse condition-specific clinical outcomes compared with those who receive in-person care (SOE: Low).
Surgical care	1 study (N=94) Cohort 1 study[89] (N=94)		NA	Cohort 1 study[89] (N=94)	High Direct Imprecise Unknown consistency Undetected	For patients receiving surgical care, those who receive an initial telehealth visit may have better condition-specific clinical outcomes compared with those who receive in-person care (SOE: Low).
General behavioral/Mental health	1 study (N=93) Cohort 1 study[97] (N=93)	NA	NA	Cohort 1 study[97] (N=93)	High Direct Imprecise	For patients receiving care for general behavioral and mental health conditions, those who receive an initial telehealth visit may have

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Tele-health	Strength of Evidence Domains*	Conclusion
					Unknown consistency Undetected	better condition-specific clinical outcomes compared with those who receive in-person care (SOE: Low).
Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA

NA = not applicable/no studies; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.

Figure 9. Forest plot presenting condition specific outcomes for patients who had an initial telehealth visit versus an initial in-person visit*



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.
†The odds ratio for the outcome of successful medical abortion from Aiken, 2021[91] was calculated by the authors of this report. The confidence interval of the odds ratio does not match the statistical significance of the original article owing to additional adjustments in the calculation of the p-value in the paper.

study with serious risk of bias owing to concerns regarding adjustment for confounders and missing data, assessed weight loss among patients who had in-person visits versus those who had telehealth visits in a weight management clinic. This study, which enrolled 228 obese patients in the in-person group and 51 obese patients in the telehealth group, reported significantly higher weight loss among patients in the telehealth group (OR: 2.79; 95% CI, 1.04 to 7.48, p=0.042).[96] The third study with results favoring telehealth was a cohort study with moderate risk of bias that assessed disease remission rates among rheumatology patients (mean age of 55 years).[101] This study identified a higher remission rate among patients who had an initial telehealth visit (162 of 210 patients [77.1 percent] who had an initial in-person visit and 291 of 340 patients [85.6 percent] who had an initial telehealth visit, with the difference in risk of: 0.08; 95% CI, 0.02 to 0.15, p<0.05). The fourth study, a cohort study with serious risk of bias owing to serious concerns about addressing confounders, assessed weight management among overweight/obese patients who received wellness and health education (median age of 49 years).[102] This study identified a higher rate of at least 5 precent weight loss among patients who had an initial telehealth visit compared with those who had an in-person visit (32 of 69 patients [46.4 percent] with an initial in-person visit and 54 of 91 patients [59.3 percent] with an initial telehealth visit, p=0.26). The difference was also clinically meaningful. The weight loss was assessed 6 months after receiving the education.

The remaining three studies were larger and reported results favoring in-person compared with telehealth care. A cohort study with moderate risk of bias assessed meeting the "controlling high blood pressure quality measure" among patients with hypertension (mean age of 65.4 years).[103] This study compared patients who had an in-person visit (N=20,745) with those who had one telehealth visit (N=6,878) and those who had two or more telehealth visits (N=5,104). The study identified a higher rate of patients not meeting the "controlling high blood pressure quality measures" among patients who had an initial telehealth visit (OR: 2.06; 95% CI, 1.94 to 2.18, p=<0.001 for those with one telehealth visit and OR: 2.49; 95% CI, 2.31 to 2.68, p=<0.001 for those with two or more telehealth visits compared with those with an in-person visit). This difference was also clinically meaningful.

Another cohort study with low risk of bias assessed asthma exacerbations among adult and elderly patients and compared data from the pre-COVID-19 era (mainly in-person visits) with data from the COVID-19 era (mainly telehealth visits).[64] The study identified a lower mean of exacerbation events among patients who had an initial in-person visit (mean of 0.127, SE 0.015 among patients in the in-person group [N=1792] versus mean of 0.161, SE 0.018 among patients in telehealth group [N=1952], p comparing the two groups not reported). Finally, a cohort study with 204 patients with keratoconus (mean age of 29.36 years), and with serious risk of bias owing to issues with confounders, assessed the diagnostic accuracy and reliability of telehealth visits in detecting keratoconus progression compared with in-person visits.[104] This study found that the telehealth visit was not suitable as a substitute to an in-person visit, with the telehealth visit having lower rates of detection of keratoconus progression (Specificity: 95.8, Sensitivity: 69.2, Positive Predictive Value: 52.9, and Negative Predictive Value: 97.9 comparing telehealth to in-person visit).

Different patient populations and clinical conditions may have resulted in conflicting results among these studies. The difference between in-person and telehealth groups was larger and clinically meaningful in studies favoring in-person visits. For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have worse condition-specific clinical outcomes compared with those who receive in-person care (SOE: Low) (Table 8).

3.3.7.3. Surgical Care

Among patients who received surgical care, one cohort study, with serious risk of bias owing to lack of information on adjusting for confounders, was conducted among adult and elderly patients who underwent thyroid/parathyroid surgery (mean age of 47.1 years) and had an in-person versus telehealth visit for post-operation followup.[89] The study reported that patients in the telehealth group (N=28) experienced less intraoperative blood loss compared with those in the in-person group (N=66) (mean: 35.5; SD 56.7 among those in the in-person group versus mean: 19.4; SD 26.4 among those in telehealth group, p=0.06). For patients receiving surgical care, those who receive an initial telehealth visit may have better condition-specific clinical outcomes compared with those who receive in-person care (SOE: Low) (Table 8).

3.3.7.4. Care for General Behavioral and Mental Health Conditions

Among patients who received care for general behavioral and mental health conditions, one cohort study, with serious risk of bias owing to concerns about addressing confounders and patient selection, assessed eating disorders among adult patients (mean age of 24.52 years) enrolled in a multidisciplinary intensive outpatient program and receiving care through in-person (N=60) or telehealth (N=33) visits. [97] It identified that patients who had a telehealth visit experienced more improvement in their eating disorder (weight gain presented as an increased body mass index [BMI]) than those with an in-person visit (BMI mean of 24.78; SD 7.63 for patients in the in-patient group versus BMI mean of 26.26; SD 10.39 for patients in the telehealth group). On average the patients stayed in this eating disorder program for 11.32 weeks (SD 7.64) and the mean of stay did not differ between two groups (p=0.762). For patients receiving care for general behavioral and mental health conditions, those who receive an initial telehealth visit may have better condition-specific clinical outcomes compared with those who receive in-person care (SOE: Low) (Table 8).

3.3.8. Adverse Events

We identified nine observational studies and one randomized controlled trial (RCT) that compared in-person and telehealth care and reported adverse events (see Appendix D, Evidence Table D.6.7). For the majority of the studies, the differences of reported adverse events between in-person and telehealth care were small. We were unable to make a general statement about performance of in-person versus telehealth, as the clinical conditions, patient/ provider characteristics, and type of assessment performed during the visit varied across the small number of studies included in this evidence synthesis. All of these factors impacted the outcome of the visit and the possibility of an adverse event being reported. Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 9 and Figure 10). Another four studies reported adverse events for patients who received telehealth care (with no comparison).[93, 105-107] These studies reported adverse events rates after receipt of telehealth care of 13 percent to 86 percent. Studies varied in their patient and provider characteristics and clinical conditions, which resulted in a wide range of adverse event rates (see Appendix D, Evidence Tables D.6.7 and D.6.8).

Table 9. Summary of findings: adverse events for patients receiving telehealth versus in-person care (N=10 studies)

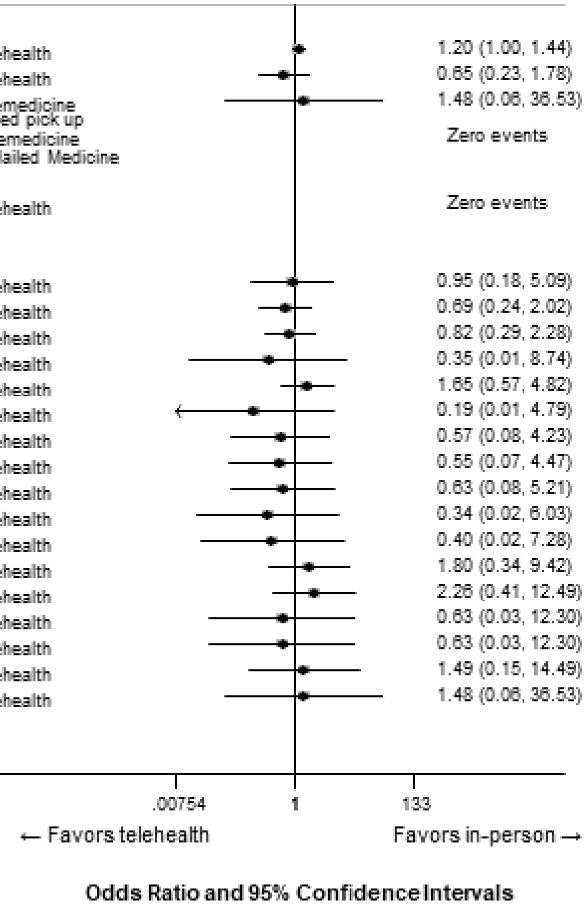
Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/ Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
General medical care, Adults	1 study (N=492) Cohort 1 study[108] (N=492)	Cohort 1 study[108] (N=492)	Cohort 1 study[108] (N=492)	Cohort 1 study[108] (N=492)	High Direct Precise Unknown consistency Undetected	For adult patients receiving general medical care, patients who receive an initial in-patient visit may have higher rates of adverse events compared with those who receive in-person care (SOE: Low).
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	NA	NA	NA	NA	NA	NA
Care for specific conditions, COVID-19	NA	NA	NA	NA	NA	NA
Care for specific conditions, Pregnancy/prenatal/gynecological care	3 studies (N=65,036) Cohort 3 studies [60, 78, 91] (N=65,036)	Cohort 1 study[60] (N=287)	NA	Cohort 2 studies [78, 91] (N=64,749)	High Direct Precise Consistent Undetected	For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have slightly lower adverse events rates compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Other conditions	1 study (N=23,268) Cohort 1 study[109] (N=23,268)	Cohort 1 study[109] (N=23,268)	NA	No studies	High Direct Precise Unknown consistency Undetected	For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have a slightly lower adverse events rate compared with those who receive in-person care (SOE: Low).
Surgical care	4 studies (N=65,036) RCT 1 study[110] (N=95) Cohort 3 studies[66, 86, 89] (N=65,036)	NA	RCT 1 study[110] (N=95)	RCT 1 study[110] (N=95) Cohort 3 studies[66, 86, 89] (N=65,036	High Direct Precise Consistent Undetected	For patients receiving surgical care, those who receive an initial telehealth visit may have similar rates of adverse events compared with those who receive in-person care (SOE: Low).

General behavioral/Mental health	1 study (N=74) Cohort 1 study[111]† (N=74)	NA	Cohort 1 study[111] (N=74)	NA	High Direct Imprecise Unknown consistency Undetected	For patients receiving care for general behavioral and mental health conditions, those who receive an initial telehealth visit may have similar rates of adverse events compared with those who receive in-person care (SOE: Low).
Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA

NA = not applicable/no studies; RCT = randomized controlled trial; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.
†The original study is a randomized clinical trial, however the participants were not randomized for the comparison arms (in-person versus virtual care) reported in Fortier et al. 2022.[111]

Figure 10. Forest plot presenting adverse events for patients who had an initial telehealth visit versus an initial in-person visit*

Author, year	Outcome	Population	Followup	Total N	Reference	Comparator	OR (95% CI)
Pregnancy/Prenatal/OBGYN							
Duryea, 2021	Need for transfusion	Need for transfusion	183 days	12607	In-person	Telehealth	1.20 (1.00, 1.44)
Aiken, 2021	Hemorrhage	Pregnancy	85 days	52142	In-person	Telehealth	0.65 (0.23, 1.78)
Kerestes, 2021	Blood Transfusion	Family Planning	246 days	218	In-person	Telemedicine + med pick up	1.48 (0.06, 36.53)
Kerestes, 2021	Blood Transfusion	Family Planning	246 days	163	In-person	Telemedicine + Mailed Medicine	Zero events
Behavioral/Mental health							
Fortier, 2022	Adverse events	U.S. Veterans mental health treatment	24 weeks	74	In-person	Telehealth	Zero events
Surgical							
Boles, 2022	Postoperative complication	Thyroid/parathyroid	NR	89	In-person	Telehealth	0.95 (0.18, 5.09)
Irarrazaval, 2021	Postoperative morbidity	Abdominal surgery	NR	219	In-person	Telehealth	0.69 (0.24, 2.02)
Irarrazaval, 2021	Minor complications	Abdominal surgery	NR	219	In-person	Telehealth	0.82 (0.29, 2.28)
Irarrazaval, 2021	Major complications	Abdominal surgery	NR	219	In-person	Telehealth	0.35 (0.01, 8.74)
Irarrazaval, 2021	Perioperative infection	Abdominal surgery	NR	219	In-person	Telehealth	1.65 (0.57, 4.82)
Helmes, 2022	Taste of blood	Dentoalveola surgery	NR	95	In-person	Telehealth	0.19 (0.01, 4.79)
Helmes, 2022	Swelling of surgical area	Dentoalveolar surgery	NR	95	In-person	Telehealth	0.57 (0.08, 4.23)
Uppal, 2022	Anastomic leak	Postoperative visit	90 days	535	In-person	Telehealth	0.55 (0.07, 4.47)
Uppal, 2022	Acute kidney injury	Postoperative visit	90 days	535	In-person	Telehealth	0.63 (0.08, 5.21)
Uppal, 2022	Venous thrombosis	Postoperative visit	90 days	535	In-person	Telehealth	0.34 (0.02, 6.03)
Uppal, 2022	Pancreatic leak	Postoperative visit	90 days	535	In-person	Telehealth	0.40 (0.02, 7.28)
Uppal, 2022	Wound infection	Postoperative visit	90 days	535	In-person	Telehealth	1.80 (0.34, 9.42)
Uppal, 2022	Other infection	Postoperative visit	90 days	535	In-person	Telehealth	2.26 (0.41, 12.49)
Uppal, 2022	Cardiopulmonary	Postoperative visit	90 days	535	In-person	Telehealth	0.63 (0.03, 12.30)
Uppal, 2022	Bleeding	Postoperative visit	90 days	535	In-person	Telehealth	0.63 (0.03, 12.30)
Uppal, 2022	Bowel obstruction	Postoperative visit	90 days	535	In-person	Telehealth	1.49 (0.15, 14.49)
Uppal, 2022	Stroke	Postoperative visit	90 days	535	In-person	Telehealth	1.48 (0.06, 36.53)



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

3.3.8.1. General Medical Care, Adults

One cohort study with moderate risk of bias assessed adverse events among adult and elderly patients (mean age of 62.52 years) who had an in-person (N=341) or telehealth pharmacy visit (N=151).[108] This study identified higher average medication related problems per visit among patients who had an initial in-person visit (mean: 1.65; SD 1.56 in the in-person group versus 1.06; SD 1.21 among patients in the telehealth group, p=<0.01). For adult patients receiving general medical conditions, patients who receive an initial in-patient visit may have higher rates of adverse events compared with those who receive in-person care (SOE: Low) (Table 9).

3.3.8.2. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

Among patients who received specialized pregnancy/prenatal/gynecological care, three observational studies reported adverse events rates after an in-person or telehealth visit. One cohort study with a moderate risk of bias among patients in a family planning clinic (mean age of 28 years) assessed adverse event rates among those who received an in-person or telehealth medical abortion service in the 249-251 days after the medical abortion. This study enrolled 94 patients who had in-person visits, 124 patients who had telehealth visits and picked up their medication from the clinic, and 69 patients who had telehealth visits and received their medication in the mail.[60] The study identified no adverse events among those who had an initial in-person visit and those who had a telehealth visit and received their medication in the mail. Patients who received a telehealth visit and picked up their medication from the clinic experienced adverse events (2 patients [1.6 percent] required blood transfusion).

The second study was a cohort study, with a serious risk of bias owing to possible issues with confounders, that assessed adverse events among pregnant individuals (mean age of 28 years) who received in-person or telehealth prenatal care. This study enrolled 6,559 patients who had in-person visits and 6,084 patients who had telehealth visits.[78] The study identified slightly lower adverse events rates among those who had an initial telehealth visit compared with those who had an initial in-person visit (26 patients [0.4 percent] who needed hysterectomies in the in-person group versus 13 patients [0.2 percent] who needed hysterectomies in telehealth group, and 279 patients [0.43 percent] who needed blood transfusion in the in-person group versus 216 patients [0.36 percent] in the telehealth group, p-0.07).

The third study was a cross-sectional study, with a moderate risk of bias, which assessed successful medical abortion rates among patients who received an in-person or telehealth medical abortion visit (mean age of 28 years).[91] This study enrolled 22,158 patients who had in-person visits and 29,984 patients who had telehealth visits and reported slightly higher adverse event rates for patients in the in-person group compared with those in the telehealth group (8 hemorrhagic events that required transfusion [0.04 percent] among those in the in-person group in 59 days after the initial visit versus 7 [0.02 percent] among those in telehealth group in 85 days after the initial visit, p=0.56), but the difference was neither significantly nor clinically meaningful. The shorter followup period for the in-person group may have resulted in the study missing some adverse events in this group.

Even though the first cohort study[60] showed slightly higher adverse event rates in one of the telehealth groups (the group who received a telehealth visit and picked up their medication from the clinic), we found the results to be consistent overall, as the other telehealth group in this study (those who had a telehealth visit who received their medication in the mail) had similar adverse events rates compared with the in-person group; and, the other studies with much larger patient populations found lower adverse events rates for those in the telehealth group. For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have slightly lower adverse events rates compared with those who receive in-person care (SOE: Low) (Table 9).

3.3.8.3. Care for Specific Conditions, Other Conditions

Among patients who received care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), one cohort study, with serious risk of bias owing to concerns about inadequate adjustment for confounders and selection of results, reported adverse events for patients who received in-person training about an insulin pump in a diabetic center versus virtual training via telehealth visit (the type of adverse event not reported).[109] This study followed 14,284 patients in the in-person group and 8,984 patients in the telehealth group. Patients in the telehealth group had slightly fewer adverse events compared with those in the in-person group (mean number of adverse events: 0.04; SD 0.24 for patients in the in-person group and 0.03; SD 0.2 for those in the telehealth group, p=0.003), but the difference was not clinically meaningful. For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have a slightly lower adverse events rate compared with those who receive in-person care (SOE: Low) (Table 9).

3.3.8.4. Surgical Care

Among patients who received surgical care, one RCT and three observational studies reported adverse events. One RCT with some concerns for risk of bias, owing to concerns with baseline differences between comparison arms, was conducted among adult patients who underwent dental surgery (mean age of 51.6 years) and had an in-person (N=35) versus telehealth (N=60) visit for post-operation followup.[110] The study reported that patients in the telehealth group experienced fewer adverse events compared with those in the in-person group [3.3 percent taste of blood and 6.7 percent swelling of surgical area among those in the in-person group versus 0 percent taste of blood and 3.3 percent swelling of surgical among those in telehealth group, p=0.317 and 0.557, respectively). Other adverse events such as fever, chills with sweat, and dysphagia or difficulty breathing were not detected in either group.

One cohort study, with serious risk of bias owing to concerns with confounders, was conducted among adult and elderly patients who underwent thyroid/parathyroid surgery (mean age of 47.1 years) and had an in-person or telehealth visit for post-operation followup.[89] The study reported that patients in the telehealth group (N=23) experienced fewer postoperative complications compared with those in the in-person group (N=66) (6 patients [9.1 percent] among those in the in-person group versus 2 patients [7.1 percent] among those in telehealth group, p=1).

A second cohort study, with serious risk of bias owing to concerns with confounders, was conducted among patients who underwent abdominal surgery (median age of 49 years) and had an in-person (N=113) or telehealth (N=106) visit for post-operation followup.[66] The study reported lower rates of adverse events among those who had an initial telehealth visit than among those with an in-person visit (9 patients [7.9 percent] with postoperative morbidity, 9 patients [7.9 percent] with minor complications, and 1 patient [0.9 percent] with major complications among those in the in-person group versus 6 patients [5.7 percent] with postoperative morbidity, 7 patients [6 percent] with minor complications, and 0 patients [0 percent] with major complications among those in telehealth group, p=0.5, 0.79, =>0.99). But, patients in the telehealth group experienced higher rates of perioperative COVID-19 infection (6 patients [5.3 percent] among those in the in-person group versus 9 patients [8.5 percent] among those in the telehealth group, p=0.35), which may have contributed to patients receiving more telehealth care than in-person care.

A third cohort study with moderate risk of bias was conducted among adult and elderly patients who underwent surgery (mean age of 56.6 years) and had an in-person (N=437) or telehealth (N=98) visit for post-operation followup.[86] The study reported slightly lower rates of adverse events in the 90 days after the surgery among those who had an initial telehealth visit than among those who had an in-person visit (the following rates for in-person versus telehealth, respectively, apply: 8 patients [1.8 percent] versus 1 patient [1 percent] for anastomic leak, 7 patients [1.6 percent] versus 1 patient [1 percent] for acute kidney injury, 6 patients [1.4 percent] versus 0 patients [0 percent] for venous thrombosis, 5 patients [1.1 percent] versus 0 patients [0 percent] for pancreatic leak, 3 patients [0.7 percent] versus 0 patients [0 percent] for cardiopulmonary, 3 patients [0.7 percent] versus 0 patients [0 percent] for bleeding, and 1 patient [0.2 percent] versus 0 patients [0 percent] for stroke; none of the differences were statistically significant). Other adverse events were reported as slightly higher among those who had a telehealth visit (the following rates for in-person versus telehealth, respectively, apply: 3 patients [0.7 percent] for bowel obstruction versus 1 patient [1 percent], 5 patients [1.1 percent] versus 2 patients [2 percent] for wound infection, 4 patients [0.9 percent] versus 2 patients [2 percent] for other infection; none of the differences were statistically significant). The differences were not clinically meaningful.

Studies varied in their patient populations and clinical conditions and the difference between in-person and telehealth groups were small and clinically not meaningful. For patients receiving surgical care, those who receive an initial telehealth visit may have similar rates of adverse events compared with those who receive in-person care (SOE: Low) (Table 9).

3.3.8.5. Care for General Behavioral and Mental Health Conditions

One cohort study, with serious risk of bias owing to concerns on addressing confounders, assessed any adverse events, including nonfatal suicide-related behaviors, suicides, psychiatric hospitalizations, emergency room visits, and any other behaviors resulting in crisis intervention among U.S. Veterans 24 weeks after receiving mental health treatment (mean age of 41.8 years) through in-person (N=29) or telehealth (N=45) visits.[111] This study reported no adverse events among patients who had a telehealth visit or with an in-person visit. For patients receiving care for general behavioral and mental health conditions, those who receive an initial telehealth visit may have similar rates of adverse events compared with those who receive in-person care (SOE: Low) (Table 9).

3.3.9. Process Outcomes

3.3.9.1. Missed Visits

We identified seven observational studies that compared in-person care with telehealth care and evaluated missed visits (see Appendix D, Evidence Table D.7.1). The difference in missed visit rates between in-person and telehealth care reported in these studies was large. Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 10 and Figure 11). We identified an additional study with no comparison group that reported a missed visit rate of 8.3 percent to 22.3 percent for patients who received telehealth care for different types of outpatient visits (e.g., clinical visits, ultrasounds, laboratory workups) among patients who received telehealth care (see Appendix D, Evidence Tables D.7.1 and D.7.2).[112]

3.3.9.2. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

Among patients who received specialized care for pregnancy/prenatal/gynecological care, one cohort study, with moderate risk of bias, assessed the postpartum visit attendance rates among patients who received in-person (N= 780) versus telehealth (N= 799) postpartum care (median age of 30.35 years).[79] The study reported higher postpartum attendance rates among those who had an initial in-person visit (565 [72.4 percent] among those in the in-person group versus 662 [82.9 percent] among those in the telehealth group, OR: 1.9; CI, 1.47 to 2.46, p=<0.001 for all postpartum visits). In addition, for patients diagnosed with a hypertensive disorder during pregnancy, the study reported a higher postpartum cardiology follow-up attendance rates among those who had an initial in-person visit (29 of 56 patients [51.8 percent] among those in the in-person group versus 36 of 59 [61 percent] among those in the telehealth group, OR: 1.8; CI, 0.79 to 4.11, p=0.32).

For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have higher attendance rates compared with those who receive in-person care (SOE: Low) (Table 10).

3.3.9.3. Care for Specific Conditions, Other Conditions

Among patients who received care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), four observational studies reported missed visits rates. The first study, a cohort study with serious risk of bias owing to concerns with confounders, assessed missed visits rates among rheumatology patients (mean age of 55 years).[82] The study reported a lower missed visit rate among patients who had an initial telehealth visit (157 missed visits [10.9 percent] among 1,443 patients in the in-person group versus 104 [6.5 percent] among 1,597 patients in the telehealth group, OR: 0.57; 95% CI, 0.44 to 0.74, p<0.001). A smaller cohort study, with serious risk of bias owing to concerns with confounding, assessed missed visits rates among adult patients with thyroid cancer (mean age of 46 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[113] The study identified higher missed visit rates during the COVID-19 era compared with the pre-COVID-19 era (15 percent drop in outpatient visits during the COVID-19 era indicated higher missed visit rates for telehealth visits compared with in-person visits). The third study, a cohort study with serious risk of bias owing to concerns about addressing confounders, assessed cancellation rates for a colonoscopy appointment among adult and elderly patients with inflammatory bowel disease (mean age of 47.6 years) and compared rates from the pre-COVID-19 era (mainly in-person visits) with rates from the COVID-19 era (mainly telehealth visits).[114] The study reported a slightly higher cancellation rate among patients who had an initial telehealth visit (13 of 814 patients [1.5 percent] in the in-person group versus 22 of 910 patients [2.5 percent] in the telehealth group, p=0.14). The last study, a cross-sectional study with

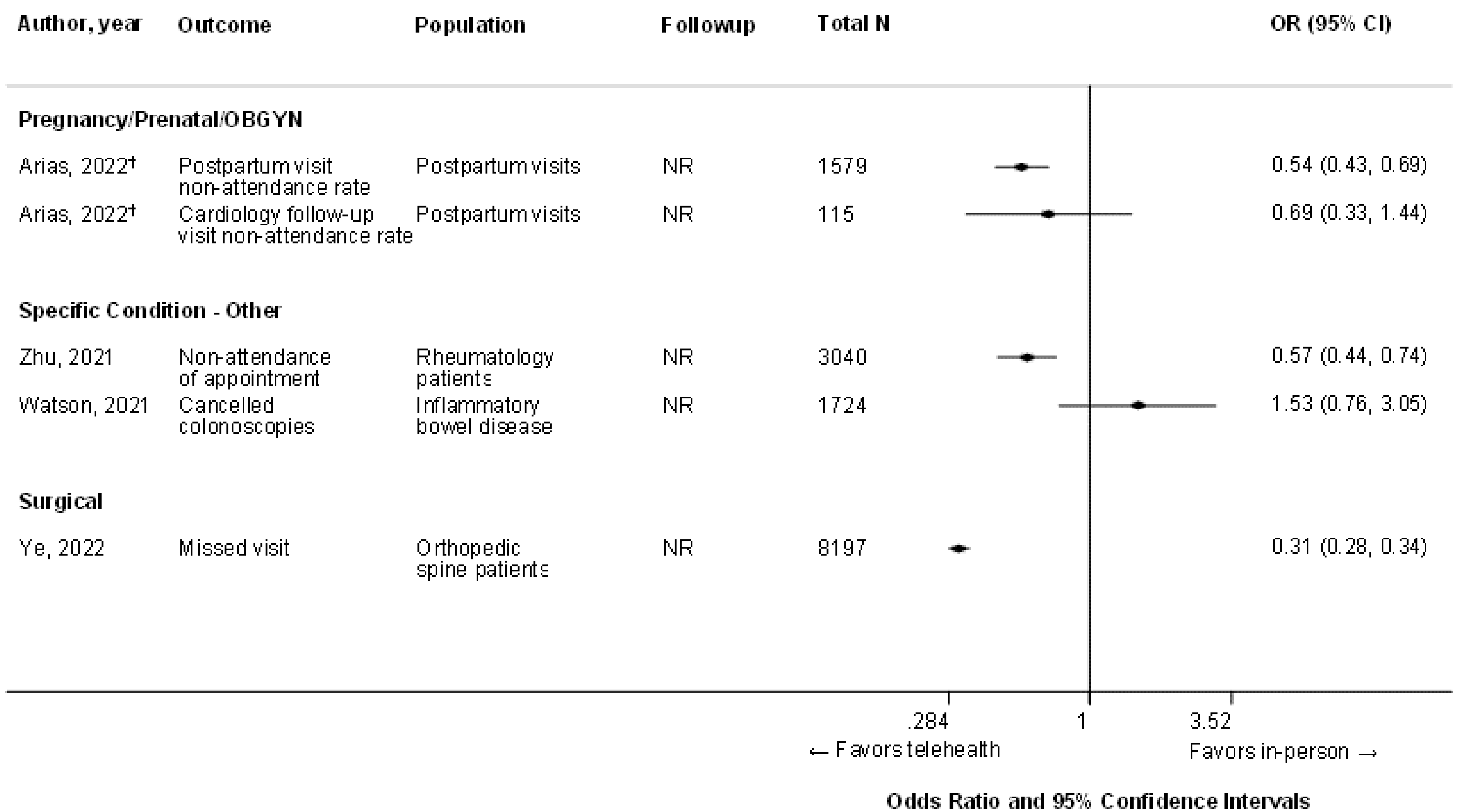
Table 10. Summary of findings: missed visits for patients receiving telehealth versus in-person care (N=7 studies)

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
General medical care, Adults	NA	NA	NA	NA	NA	NA
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	NA	NA	NA	NA	NA	NA
Care for specific conditions, COVID-19	NA	NA	NA	NA	NA	NA
Care for specific conditions, Pregnancy/prenatal/gynecological care	1 study (N=1,579) Cohort 1 study[79] (N=1,579)	NA	NA	Cohort 1 study[79] (N=1,579)	High Direct Precise Unknown consistency Undetected	For patients who receive specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have lower missed visit rates compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Other conditions	4 studies (N=6,108) Cohort 3 studies[82, 113, 114] (N=5,734) Cross-sectional 1 study[115] (N=374)	Cohort 2 studies[113, 114] (N=2,694)	NA	Cohort 1 study[82] (N=3,040) Cross-sectional 1 study[115] (N=374)	High Direct Precise Inconsistent Suspected	For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care care), those who receive an initial telehealth visit may have lower missed visit rates compared with those who receive in-person care (SOE: Low).
Surgical care	1 study (N=8,197) Cross-sectional 1 study[116] (N=8,197)	NA	NA	Cross-sectional 1 study[116] (N=8,197)	High Direct Precise Unknown consistency Undetected	For patients receiving surgical care, those who receive an initial telehealth visit may have lower missed visit rates compared with those who receive in-person care (SOE: Low).
General behavioral/Mental health	1 study (N=12) Cohort 1 study[99] (N=12)	Cohort 1 study[99] (N=12)	NA	NA	High Direct Imprecise Unknown consistency Undetected	Insufficient

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA

NA = not applicable/no studies; SOE=strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.

Figure 11. Forest plot presenting missed events for patients who had an initial telehealth visit versus an in-person visit*



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.
†The odds ratio of the outcomes reported by Arias et al. 2022[79] was recalculated by the authors of this report to correspond the direction of effect sizes in the forest plot. Arias et al. 2022[79] reported higher attendance rates among participants who had an initial telehealth visit.

moderate risk of bias, assessed appointment adherence rates for adult patients with HIV (mean age of 44.2 years).[115] The study reported higher appointment adherence rates, thus lower missed visit rates, among patients who had an initial telehealth visit (332 visits [70.8 percent] in the in-person group versus 246 visits [79.2 percent] in the telehealth group, p=<0.001). The difference in missed visit rates was much larger in the small study favoring in-person visits.[113] Different patient populations and clinical conditions may have resulted in the difference among these studies. For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower missed visit rates compared with those who receive in-person care (SOE: Low) (Table 10).

3.3.9.4. Surgical Care

One cross-sectional study, with moderate risk of bias, assessed missed visit rates among adult patients (mean age of 55.6 years) that had an in-person (N= 3,810) or telehealth (N= 4,387) visit for post-operation followup after an orthopedic spine surgery.[116] The study reported lower missed visit rates among those who had an initial telehealth visit than among those with an in-person visit (1,953 patients [51.3 percent] in the in-person group versus 1,080 [24.7 percent] in the telehealth group, OR: 0.311; 95% CI, 0.284 to 0.342, p=<0.001), and this difference is clinically meaningful. For patients receiving surgical care, those who receive an initial telehealth visit may have lower missed visit rates compared with those who receive in-person care (SOE: Low) (Table 10).

3.3.9.5. Care for General Behavioral and Mental Health Conditions

A small cohort study (N=12) with serious risk of bias owing to concerns about addressing confounders, assessed general mental health among caregivers and children (mean age of 47.17 years for caregivers and 11.08 for children) and compared data from the pre-COVID-19 era (mainly in-person visits) with data from the COVID-19 era (mainly telehealth visits).[99] This study reported that the mean no-show rates for those in the telehealth group was higher than those in the in-person group 20 weeks after enrolling in the focused group parenting intervention (mean no-show rate of 0.23; SD 0.23 among patients in the in-person group versus mean no-show rate of 0.32; SD 0.25 among patients in the telehealth group, indicating higher missed visit rates for telehealth visits compared with in-person visits).

For patients receiving care for general behavioral and mental health conditions, evidence was insufficient to draw conclusions owing to the existence of only one study with a small sample size and concerns with risk of bias (Table 10).

3.3.9.6. Case Resolution/Duplication of Services

We defined case resolution as a patient’s chief complaint being addressed in an initial visit and duplication of service as the need for a followup visit immediately after an initial visit (e.g., telehealth followed immediately by in-person visit). We identified 12 observational studies that compared in-person care with telehealth care and evaluated case resolution/duplication of services (see Appendix D, Evidence Table D.7.3). We are unable to make a general statement about relative performance of in-person or telehealth care, as the clinical conditions, patient/provider characteristics, and type of assessment performed during the visit varied across the small number of studies included in this evidence synthesis. All these factors impacted the case resolution during the initial visits and the need for duplication of services. Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 11 and Figure 12).

We identified an additional 12 studies with no comparison groups that reported case resolution/duplication of services for patients who received telehealth care (with no comparison). These studies reported the need for followup visits (duplication of services) from 3 percent to 69 percent of patients (see Appendix D, Evidence Tables D.7.3 and D.7.4).[48, 50, 68, 71, 90, 117-123]

3.3.9.6.1. General Medical Care, All Ages

Among patients of all ages who received care for general medical conditions, two observational studies reported case resolution/duplication of services rates after an in-person or telehealth visit. One cross-sectional study, with serious risk of bias owing to concerns about potential confounders, among adults (median age of 26 years) reported the need for a followup visit with the health system for those who received an in-person, outpatient primary care visit versus those who received a telephone or video telehealth primary care visit.[124] This study identified higher rates of followup visits among those who had an initial telehealth visit than those with an in-person visit (e.g., mean number of followup telephone calls of 3.56, SD 2.46 in the in-person group versus 5.29, SD 2.6 in the telephone telehealth group and 4.39, SD 2.5 in the video telehealth group, p=0.002).

A cohort study with low risk of bias reported followup visits of any kind for patients with general medical care (all ages) with a diagnosis of acute or chronic ambulatory care sensitive conditions (i.e., conditions that would avoid healthcare utilization with proper ambulatory management of the disease). Among patients with acute ambulatory care sensitive conditions, the study analyzed claims data on 493,716 patients who had in-person visits and 113,857 patients who had telehealth visits.[3] The study reported higher followup visit rates among those who had an initial telehealth visit than those who had an initial in-person visit (OR: 1.44; 95% CI, 1.42 to 1.46, with in-person visit as the reference). Among patients with chronic ambulatory care sensitive conditions, the study analyzed claims data on 410,743 patients with in-person visits and 94,481 patients with telehealth visits, reporting lower followup visit rates among those who had an initial telehealth visit than those who had an initial in-person visit (OR: 0.94; 95% CI: 0.92 to 0.95, with in-person visit as the reference). The study only identified followup visits that occurred within 14 days after the initial visit, which may have contributed to the modest difference between the two groups.

The two studies showed conflicting results. The difference in the type of clinical conditions that the studies assessed may have resulted in the conflicting results between the two studies. The study favoring telehealth care for a sub-population of patients (lower rates of followup visits for patients with chronic ambulatory care sensitive conditions)[3] was larger and assessed followup visits separately for those with acute and chronic ambulatory care sensitive conditions, which may have resulted in more accurate parsing out of the difference in followup visit patterns. For patients of all ages who receive care for general medical conditions, those who receive an initial telehealth visit for an acute condition may have higher rates of followup visits compared with those who receive in-person care, and those who receive an initial telehealth visit for a chronic condition may have lower rates of followup visits compared with those who receive in-person care (SOE: Moderate) (Table 11).

Table 11. Summary of findings: case resolution/duplication of services for patients receiving telehealth versus in-person care (N=12 studies)

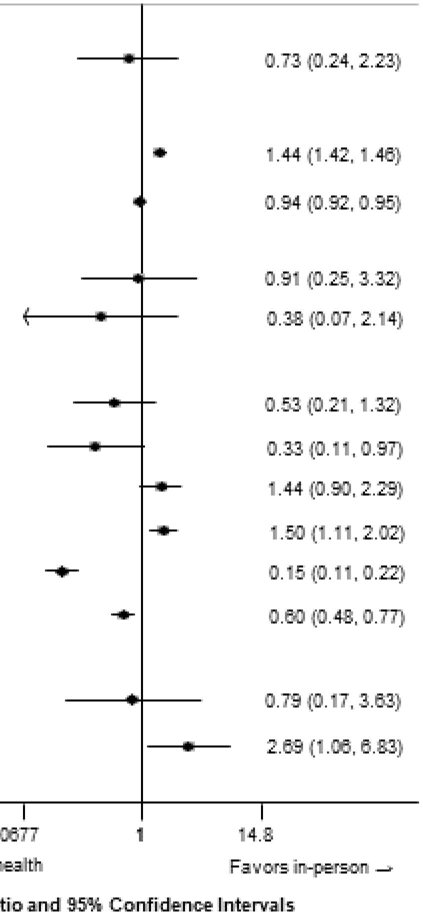
Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
General medical care, Adults	NA	NA	NA	NA	NA	NA
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	2 studies (N=607,717) Cohort 1 study[3] (N=607,573) Cross-sectional 1 study[124] (N=144)	Cohort 1 study[3] (N=607,573) Cross-sectional 1 study[124] (N=144)	NA	Cohort 1 study[3] (N=505,224)	Medium Direct Precise Inconsistent Undetected	For patients of all ages who receive care for general medical conditions, those who receive an initial telehealth visit for an acute condition may have higher rates of followup visits compared with those who receive in-person care, and those who receive an initial telehealth visit for a chronic condition may have lower rates of followup visits compared with those who receive in-person care (SOE: Moderate).
Care for specific conditions, COVID-19	1 study (N=285) Cohort 1 study[87] (N=285)	NA	NA	Cohort 1 study[87] (N=285)	High Direct Imprecise Unknown consistency Undetected	(SOE: Insufficient).
Care for specific conditions, Pregnancy/prenatal/gynecological care	1 study (N=218) Cohort 1 study[60] (N=218)	NA	NA	Cohort 1 study[60] (N=218)	High Direct Imprecise Unknown consistency Undetected	(SOE: Insufficient).
Care for specific conditions, Other conditions	7 studies (N=8,735) Cohort 7 studies[54, 82, 100, 114, 125-127] (N=8,735)	Cohort 3 studies[54, 82, 114] (N=5,948)	NA	Cohort 4 studies[100, 125-127] (N=2,787)	High Direct Precise Inconsistent Suspected	For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have higher rates of case resolution and lower rates of duplicated services compared with

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
						those who receive in-person care (SOE: Low).
Surgical care	1 study (N=219) Cohort 1 study[66] (N=219)	Cohort 1 study[66] (N=219)	NA	NA	High Direct Imprecise Unknown consistency Undetected	For patients receiving surgical care, those who receive an initial telehealth visit may have lower rates of case resolution and higher rates of duplicated services compared with those who receive in-person care (SOE: Low).
General behavioral/Mental health	No studies	NA	NA	NA	NA	NA
Physical rehabilitation/ Functional impairment	No studies	NA	NA	NA	NA	NA

NA = not applicable/no studies; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.

Figure 12. Forest plot presenting case resolution for patients who had an initial telehealth visit versus an in-person visit*

Author, year	Outcome	Population	Followup	Total N	Reference	Comparator	OR (95% CI)
COVID-19							
Carlberg, 2020	Return to healthcare	COVID-19	72 hours	285	In-person	Telehealth	0.73 (0.24, 2.23)
General medical care -All Ages							
Hatef, 2022	Any followup encounter	Dementia (acute ambulatory care)	14 days	607573	In-person	Telehealth	1.44 (1.42, 1.46)
Hatef, 2022	Any followup encounter	Dementia (chronic ambulatory care)	14 days	505224	In-person	Telehealth	0.94 (0.92, 0.95)
Pregnancy/Prenatal/OBGYN							
Kerestes, 2021	Abortion completion	Family Planning	244 days	218	In person	Telemedicine + med pick up	0.91 (0.25, 3.32)
Kerestes, 2021	Abortion completion	Family Planning	244 days	163	In person	Telemedicine + Mailed Medicine	0.38 (0.07, 2.14)
Specific Condition - Other							
Kolb, 2021	Routine Follow-up Recommended	Otolaryngology	42 days	100	In-person	Telehealth	0.53 (0.21, 1.32)
Fredwall, 2021	Linked with counseling	Epilepsy	1 month	117	In-person	Telehealth	0.33 (0.11, 0.97)
Zhu, 2021	Follow-up phone Call required	Rheumatology patients	NR	2779	In-person	Telehealth	1.44 (0.90, 2.29)
Rowe, 2021	Follow-up appointment	Cardiology	148 days	1445	In-person	Telehealth	1.50 (1.11, 2.02)
Li, 2021	Need in-person ophthalmologic review	Ophthalmology	NR	854	In-person	Telehealth	0.15 (0.11, 0.22)
Offiah, 2022	Return clinic	Cardiology patients	NR	1716	Traditional clinic	Virtual clinic	0.60 (0.48, 0.77)
Surgical							
Irarrazaval, 2021	Required a second in-person visit	Dementia	30 days	219	In-person	Telehealth	0.79 (0.17, 3.63)
Irarrazaval, 2021	Required a second telemedicine visit	Dementia	30 days	219	In-person	Telehealth	2.69 (1.06, 6.83)



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

3.3.9.6.2. Care for Specific Conditions, COVID-19

One cohort study, with serious risk of bias owing to concern about the handling of confounders and missing data, assessed case resolution/duplication of services among patients with COVID-19 (mean age of 39 years) after an in-person or telehealth visit.[87] The study reported lower rates of followup visits (i.e., duplication of services) among those who had an initial telehealth visit (7 of 132 patients [5.3 percent] in the in-person group versus 6 of 153 patients [3.9 percent] in the telehealth group returned to the health system in the 72 hours following the initial assessment). The short followup period may have resulted in the detection of fewer followup events in both groups. Owing to the limited number of studies, small sample size, and concerns with risk of bias, there is insufficient evidence that patients who receive an initial telehealth visit may have different rates of case resolution and followup visits compared with those who receive in-person care (SOE: Insufficient) (Table 11).

3.3.9.6.3. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

One cohort study with a moderate risk of bias among patients in a family planning clinic (mean age of 28 years) assessed case resolution/duplication of services among those who received an in-person or telehealth medical abortion service. This study enrolled 94 patients who had in-person visits, 124 patients who had telehealth visits and picked up their medication from the clinic, and 69 patients who had telehealth visits and received their medication in the mail.[60] The study reported higher rates of case resolution (i.e., completed medical abortion with no need for surgery) among those in the telehealth group compared with those in the in-person group (88 of 94 patients [93.6 percent] who received an in-person visit versus 120 of 124 patients [96.8 percent] who received a telehealth visit and picked up their medication from the clinic and 67 of 69 patients [97.1 percent] who received a telehealth visit and received their medication in the mail). The small sample size across the three groups may have resulted in small differences in case resolutions among them. Owing to the limited number of studies, small sample size, and some concerns with risk of bias, there is insufficient evidence that those who receive an initial telehealth visit may have different rates of case resolution compared with those who receive in-person care (SOE: Insufficient) (Table 11).

3.3.9.6.4. Care for Specific Conditions, Other Conditions

Among patients who received care for specific conditions, excluding COVID-19 and pregnancy/prenatal/gynecological care, seven observational studies reported case resolution/duplication of services after an in-person or telehealth visit.

Three studies reported findings favoring in-person visits. One was a cohort with a serious risk of bias owing to concerns with confounders. This study assessed followup telephone visits among rheumatology patients (mean age of 55 years old).[82] The study reported a lower rate of followup phone calls among patients who had an initial in-person visit compared with those who had a telehealth visit (29 of 1,286 patients [2.3 percent] in the in-person group versus 48 of 1,493 patients [3.2 percent] in the telehealth group, p=0.13). Another cohort study, with serious risk of bias owing to concerns about confounding and intervention classification, among adult patients (median age of 67 years) in a cardiology clinic, assessed the need for followup appointments after an in-person or telehealth visit.[54] This study identified a lower rate of followup appointments among those who received in-person visits (196 of 1,118 patients [16.5 percent] in the in-person group versus 79 of 327 patients [24.2 percent] in the telehealth group, p=0.015). The difference in followup visit rate was much larger in one study than in the other. Different patient populations and clinical conditions, as well as different followup periods, might have resulted in this wide range of followup visits between the two studies. A third cohort study, with serious risk of bias owing to concerns with adjusting for confounders, was conducted in Sweden. This study assessed unplanned telephone contact with the physician among adult and elderly patients with inflammatory bowel disease (mean age of 47.6 years) and compared data from the pre-COVID-19 era (mainly in-person visits) with data from the COVID-19 era (mainly telehealth visits).[114] The study reported a slightly higher number of unplanned telephone contacts among patients who had an initial telehealth visit (mean of 0.88; SD 1.89 contacts per patient among 814 patients in the in-person group versus mean of 0.9; SD 1.9 contacts per patient among 910 patients in the telehealth group, p=0.379).

Four studies reported findings in favor of telehealth visits. One was a cohort study, with serious risk of bias owing to concerns with adequate adjustment for confounders, among children with epilepsy (mean age not reported) enrolling 101 patients who had in-person visits and 16 patients who had telehealth visits.[100] The study reported a higher rate of case resolution among those who had an initial telehealth visit (75 percent of patients in the in-person group required a followup counseling visit in the 1 month after the initial visit versus 35 percent of patients in the telehealth group) and the difference was clinically meaningful. The much smaller sample size in the telehealth group compared with the sample size in the in-person group might have resulted in the identification of a smaller number of patients with followup visits in the telehealth group. The second study was a cohort study, with serious risk of bias owing to concerns with inadequate adjustment for confounders, among children in an otolaryngology clinic (mean age of 24 months) enrolling 50 patients who had in-person visits and 50 patients who had telehealth visits.[125] This study identified lower rates of recommended followups among those who had an initial telehealth visit compared with those who had an initial in-person visit (16 followup visits [32 percent] among those in the in-person group versus 10 followup visits [20 percent] among those in telehealth group, p=0.25). The third study, a cohort study with serious risk of bias owing to concerns with inadequate adjustment for confounders, was conducted in an eye hospital. This study assessed the need for an in-person ophthalmology assessment among patients who were triaged in-person or via telehealth for an ophthalmic issue (median age of 49 years).[126] The study identified a lower rate of followup visits among patients who had an initial telehealth visit (40 followup visits among 451 patients [88.7 percent] in the in-person group versus 220 among 403 patients [54.6 percent] in the telehealth group, p<0.001). The fourth study, a cohort study with serious risk of bias owing to concerns with adjusting for confounders and patient selection, was conducted among patients with cardiac diseases in Ireland. This study assessed the return to clinic among adult and elderly patients who received in-person care (N=1,220) or telehealth care (N= 496) (mean age of 60 years).[127] The study reported a lower rate of return to clinic among patients who had an initial telehealth visit (980 patients [80.3 percent] in the in-person group versus 353 patients [71.2 percent] in the telehealth group, p=0.0003).

Studies varied in their patient populations and clinical conditions, which may have resulted in this wide range of followup visits among the studies. Although three studies showed higher case resolution in the in-person group, the four studies favoring telehealth presented more consistent results and clinically meaningful differences between the two groups (Table 11). For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have higher rates of case resolution and a lower rate of duplicated services compared with those who receive in-person care (SOE: Low).

3.3.9.7. Surgical Care

One cohort study, with serious risk of bias owing to lack of information about adjusting for confounders, reported case resolution/duplication of services among patients who underwent abdominal surgery (median age of 49 years) and had an in-person (N= 113) or telehealth (N= 106) visit for post-operation followup.[66] The study reported higher rates of 30-day followup visits among those who had an initial telehealth visit than among those with an in-person visit (4 in-person followup visits [3.5 percent] and 7 telehealth followup visits [6.2 percent] among those in the in-person group versus 3 in-person followup visits [2.8 percent] and 16 telehealth followup visits [14.9 percent] among those in telehealth group). For patients receiving surgical care, those who receive an initial telehealth visit may have lower rates of case resolution and a higher rate of duplicated services compared with those who receive in-person care (SOE: Low) (Table 11).

3.3.9.8. Change in Therapy/Medication

We identified eight observational studies that compared in-person with telehealth care and reported changes in therapy/medication (see Appendix D, Evidence Table D.7.5). The difference between in-person and telehealth care reported in these studies was mainly small and not clinically meaningful. Across the eight studies, changes in therapy/medication happened more often for patients in the in-person group compared with those in the telehealth group. Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 12 and Figure 13). Another two studies reported changes in therapy/medication for patients receiving telehealth (with no comparison). These studies reported the change in therapy/medication for 13 percent to 58 percent of patients (see Appendix D, Evidence Tables D.7.5 and D.7.6).[90, 106]

3.3.9.8.1. General Medical Care, Adults

Among adult patients who received care for general medical conditions, two observational studies reported changes in therapy/medication after an in-person or telehealth visit. One cohort study, with low risk of bias conducted in Australia, assessed change in therapy/medication among adult and elderly patients who received professional general practitioner consultations for standard attendance, chronic disease management, and/or mental health service in an in-person (N=8,303,233) or telehealth visit (N=5,304,983).[128] This study reported higher rates of change in medication among patients who had an initial in-person visit, compared with patients who had a telehealth visit, presented as the number of consultations with at least one prescribed medication (3,264,748 patients [39.3 percent] in the in-person group versus 1,751,878 patients [33 percent] in the telehealth group, OR: 1.38; 95% CI, 1.379 to 1.381). Another cohort study with moderate risk of bias assessed change in therapy/medication among adult and elderly patients (mean age of 62.52 years) who had an in-person (N=341) or telehealth pharmacy visit (N=151).[108] This study reported higher average

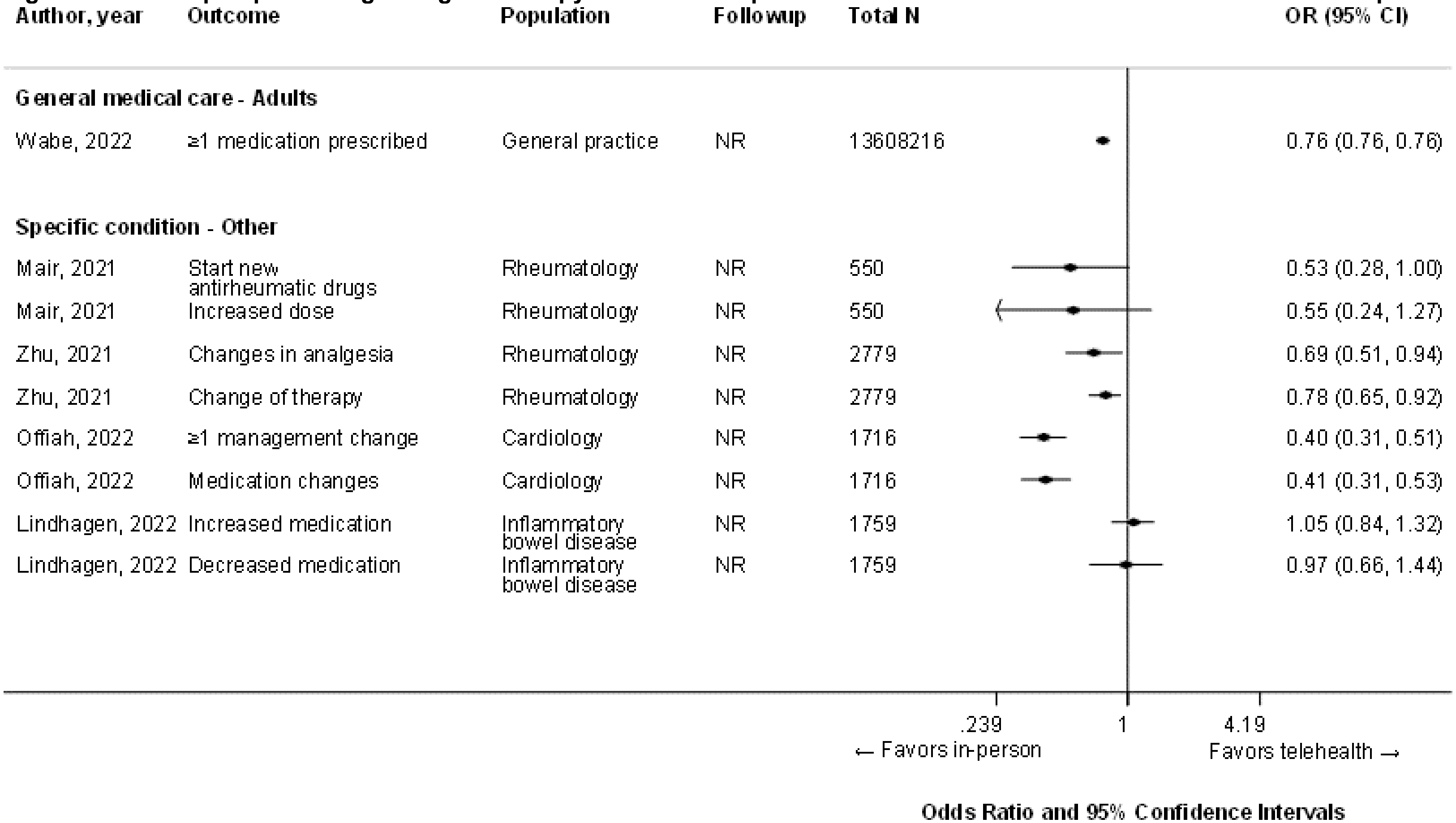
Table 12. Summary of findings: change in therapy/medication for patients receiving telehealth versus in-person care (N=8 studies)

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domain*	Conclusion
General medical care, Adults	2 studies (N=13,608,708) Cohort 2 studies[108, 128] (N=13,608,708)	Cohort 2 studies[108, 128] (N=13,608,708)	NA	NA	Medium Direct Precise Consistent Undetected	For adult patients who receive care for general medical conditions, patients who receive an initial in-person visit may have higher rates of change in therapy/medication compared with those who receive telehealth (SOE: Moderate).
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	NA	NA	NA	NA	NA	NA
Care for specific conditions, COVID-19	NA	NA	NA	NA	NA	NA
Care for specific conditions, Pregnancy/prenatal/gynecological care	NA	NA	NA	NA	NA	NA
Care for specific conditions, Other conditions	6 studies (N=6,899) Cohort 5 studies[81, 82, 101, 114, 127, 129] (N=6,899)	Cohort 4 studies[82, 101, 127, 129] (N=5,045)	NA	Cohort 2 studies[81, 114] (N=1,854)	High Direct Precise Consistent Suspected	For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower rates of change in therapy/medication compared with those who receive in-person care (SOE: Low).
Surgical care	NA	NA	NA	NA	NA	NA
General behavioral/Mental health	NA	NA	NA	NA	NA	NA
Physical rehabilitation/	NA	NA	NA	NA	NA	NA

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domain*	Conclusion
Functional impairment						

NA = not applicable/no studies; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.

Figure 13. Forest plot presenting change in therapy outcomes for patients who had an initial telehealth visit versus an in-person visit*



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

additional or different medications per visit among patients who had an initial in-person visit than among those who had a telehealth visit (mean: 0.37; SD 0.7 in the in-person group versus 0.12; SD 0.4 among patients in the telehealth group, p=0.527 for needing additional medications and mean: 0.09; SD 0.31 in the in-person group versus 0.06; SD 0.23 among patients in the telehealth group, p=0.423 for needing different medications). The two studies were different in their patient populations and clinical conditions. For adult patients receiving general medical conditions, patients who receive an initial in-person visit may have higher rates of change in therapy/medication compared with those who receive telehealth care (SOE: Moderate) (Table 12).

3.3.9.8.2. Care for Specific Conditions, Other Conditions

Among patients who received care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), six observational studies reported changes in therapy/medication after an in-person or telehealth visit.

One cohort study with moderate risk of bias assessed changes in therapy/medication among rheumatology patients (mean age of 55 years).[101] This study reported a higher rate of change in therapy/medication among patients who had an initial in-person visit (22 of 210 patients [10.5 percent]) compared with patients who had an initial telehealth visit (20 of 340 patients [5.9 percent]) for those patients who had a new disease-modifying antirheumatic drug started for them, with the following difference in proportion: -0.05 (95% CI, -0.1 to 0, p>0.05); the study also reported a higher rate of change in therapy/medication among patients who had an initial in-person visit (12 of 210 [5.7 percent] and patients who had an initial telehealth visit (11 of 340 [3.2 percent]) for those patients who had an increase in the dose of their disease-modifying antirheumatic drug, with the following difference in proportion: -0.02 (95% CI, -0.07 to 0.01, p>0.05).

Another cohort study, with a serious risk of bias owing to concerns regarding inadequate adjustment for confounders, assessed changes in therapy/medication among rheumatology patients (mean age of 55 years).[82] The study reported a higher rate of change in therapy/medication among patients who had an initial in-person visit compared with those who had a telehealth visit (352 of 1,286 patients [27.4 percent] in the in-person group versus 338 of 1,493 patients [22.6 percent] in the telehealth group had a change in their immunosuppressive therapy, p=0.004, and 96 of 1,286 patients [7.5 percent] in the in-person group versus 79 of 1,493 patients [5.3 percent] in the telehealth group had a change in their analgesic medication, p=0.019).

The third study, a cohort study with serious risk of bias owing to inadequate reporting for adjustment of confounding factors, assessed change in therapy/medication among adult patients with irritable bowel syndrome (age range from 22 to 76 years; median age of 36 years).[81] This study reported a higher rate of change in therapy/medication among patients who had an initial telehealth visit (19 of 50 patients [38 percent] in the in-person group versus 29 of 45 patients [64 percent] in the telehealth group had a biologic agent started for them, p=0.01; and, 8 of 50 patients [16 percent] in the in-person group versus 8 of 45 patients [18 percent] in the telehealth group had a dose escalation in their medication, p>0.99.)

The fourth study, a cohort study with serious risk of bias owing to concerns with adjusting for confounders and patient selection, was conducted in Ireland among patients with cardiac diseases. This study assessed changes in medication or management of disease among adult and elderly patients who had an initial in-person visit (N= 1,220) or telehealth visit (N= 496) (mean age of 60 years old).[127] This study reported a higher rate of change among patients who had an initial in-person visit (470 patients [38.5 percent] in the in-person group versus 99 patients [19.9 percent] in the telehealth group had at least one change in the clinical management of their disease, p=<0.00001, and 390 patients [31.9 percent] in the in-person group versus 80 patients [16.1 percent] in the telehealth group had a medication change, p=<0.00001).

The fifth study, a cohort study with serious risk of bias owing to concerns about addressing confounders, was conducted among patients with inflammatory bowel disease and assessed changes in medication or management of disease among adult patients who had an initial in-person visit (N= 868) or telehealth visit (N= 891) (mean age of 47.6 years old).[114] The study reported a higher rate of change in medication among patients who had an initial telehealth visit (21.3 percent in the in-person group versus 22.2 percent in the telehealth group had a medication increase, p=0.641; 6.1 percent in the in-person group versus 5.9 percent in the telehealth group had a medication decrease, p=0.914; and 76.1 percent in the in-person group versus 75.3 percent in the telehealth group had no change in medication, p=0.713). The difference between the two groups was small and clinically not meaningful.

The sixth study was a cohort study, with serious risk of bias owing to concerns about addressing confounders, conducted in Spain. This study assessed the mean number of prescribed medications among patients with multiple sclerosis (mean age not reported).[129] The study reported a higher number of prescribed medications among patients who had an initial in-person visit (mean of 30.0, SE 7 among patients in the in-person group versus mean of 23.2, SD 5.5 among patients in telehealth group, p=0.805). The difference was small and not clinically meaningful.

The six studies were different in their patient populations, clinical conditions, and the type of treatment/medication. One of the studies favoring telehealth was conducted in the later months of the pandemic (January 1 to May 31, 2021) when telehealth utilization was stabilized across healthcare systems.[129] Four of the studies showing a lower rate of change in therapy or medication in the telehealth group were larger studies, with one study assessed as a moderate risk of bias. For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower rates of change in therapy/medication compared with those who receive in-person care (SOE: Low) (Table 12).

3.3.9.9. Therapy/Medication Adherence

We identified nine observational studies that compared in-person and telehealth care and reported therapy/medication adherence (see Appendix D, Evidence Tables D.7.7). The difference, if any, between in-person and telehealth care reported in these studies was mostly small. Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 13 and Figure 14). There was another study reporting therapy/medication adherence (i.e., exercise adherence) for patients who received telehealth care (with no comparison). This study reported an exercise adherence rate of 67 percent to 92 percent for patients who received internet-based recommendations or telerehabilitation (see Appendix D, Evidence Tables D.7.7 and D.7.8).[93]

3.3.9.9.1. General Medical Care, Adults

Among adult patients who received care for general medical conditions, two observational studies reported therapy/medication adherence after an in-person or telehealth visit.

Table 13. Summary of findings: therapy/medication adherence for patients receiving telehealth versus in-person care (N=9 studies)

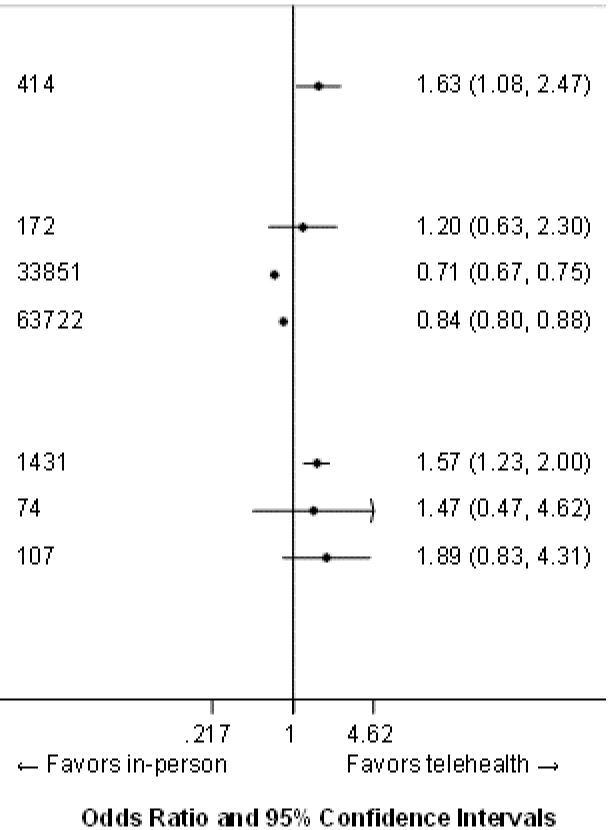
Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
General medical care, Adults	2 studies (N=906) Cohort 2 studies[77, 108] (N=906)	NA	Cohort 1 study[108] (N=492)	Cohort 1 study[77] (N=414)	High Direct Precise Inconsistent Undetected	For patients of all ages who receive care for general medical conditions, those who receive an initial telehealth visit may have higher rates of therapy/medication adherence compared with those who receive in-person care (SOE: Low).
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	NA	NA	NA	NA	NA	NA
Care for specific conditions, COVID-19	NA	NA	NA	NA	NA	NA
Care for specific conditions, Pregnancy/prenatal/gynecological care	NA	NA	NA	NA	NA	NA
Care for specific conditions, Other conditions	4 studies (N=144,378) Cohort 3 studies[64, 130, 131] (N=144,202) Cross-sectional 1 study[132] (N=176)	Cohort 1 study[131] (N= 127,444)	Cohort 1 study[130] (N=270)	Cohort 1 study[64] (N=3,744 Cross-sectional 1 study[132] (N=176))	High Direct Precise Consistent Undetected	For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower rates of therapy/medication adherence compared with those who receive in-person care (SOE: Low).
Surgical care	NA	NA	NA	NA	NA	NA
General behavioral/Mental health	3 studies (N=1,612) Cohort 3 studies[111, 133, 134] (N=1,612)	NA	NA	3 studies[111, 133, 134] (N=1,612)	High Direct Precise Consistent Undetected	For patients receiving care for general behavioral and mental health conditions, those who receive an initial telehealth visit may have higher rates of therapy/medication adherence

Clinical Area	Number of Studies and N	Direction of Findings: Favors In-Person	Direction of Findings: No Difference/Unclear	Direction of Findings: Favors Telehealth	Strength of Evidence Domains*	Conclusion
						compared with those who receive in-person care (SOE: Low).
Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA

NA = not applicable/no studies; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.

Figure 14. Forest plot presenting treatment adherence for patients who had an initial telehealth visit versus an in-person visit*

Author, year	Outcome	Population	Followup	Total N	OR (95% CI)
General medical care - Adults					
Zimmerman, 2021	Completed treatment	General	NR	414	1.63 (1.08, 2.47)
Specific condition - Other					
McCoy, 2022	Surgery performed performed	Pediatric otolaryngology	NR	172	1.20 (0.63, 2.30)
Baughman, 2021	Adherent to treatment	Type 2 diabetes	6 months	33851	0.71 (0.67, 0.75)
Baughman, 2021	Adherent to treatment	Diabetes (Total population)	6 months	63722	0.84 (0.80, 0.88)
Behavioral/Mental health					
Ripp, 2022	Completed followup visits	Behavioral pediatric	NR	1431	1.57 (1.23, 2.00)
Fortier, 2022	Treatment completed	U.S. Veterans	24 weeks	74	1.47 (0.47, 4.62)
Cunningham, 2022	Treatment retention	Opioid use disorder	90 days	107	1.89 (0.83, 4.31)



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

A cohort study, with serious risk of bias owing to lack of proper adjustment for confounders and handling of missing data, assessed therapy/medication adherence among younger, mostly White females in the United States (mean age of 38 years).[77] This study identified a higher rate of therapy/medication adherence among patients who had an initial telehealth visit (129 of 207 patients [62.3 percent] in the in-person group versus 151 of 207 patients [72.9 percent] in the telehealth group, p<0.05), and the difference was clinically meaningful.

Another cohort study with moderate risk of bias assessed therapy/medication adherence among adult and elderly patients (mean age of 62.52 years) who had an in-person (N=341) or telehealth pharmacy visit (N=151).[108] This study reported that the average therapy/medication adherence per visit among patients who had an initial in-person visit was the same as those who had a telehealth visit (mean: 0.01; SD 0.14 for non-adherence in the in-person group versus 0.01; SD 0.08 among patients in the telehealth group, p=1). Between the two studies, the study favoring a telehealth visit identified a large and clinically meaningful difference between the two groups. For adult patients receiving care for general medical conditions, patients who receive an initial telehealth visit may have higher rates of therapy/medication adherence compared with those who receive in-person care (SOE: Low) (Table 13).

3.3.9.9.2. Care for Specific Conditions, Other Conditions

Among patients who received care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), four studies assessed therapy/medication adherence after an in-person or telehealth visit. A cohort study, with moderate risk of bias, assessed therapy/medication adherence (i.e., continuous positive airway pressure [CPAP] compliance) among patients with sleep apnea (mean age not reported).[130] This study reported similar rates of CPAP compliance among 193 patients in the in-person group and 77 patients in the telehealth group (p=0.099).

A second cohort study, with moderate risk of bias, assessed therapy/medication adherence among adult and elderly patients with diabetes (mean age of 62 years) who had an initial in-person (N= 54,872) or telehealth (N= 8,850) visit.[131] This study reported higher rates of medication adherence among those in the in-patient group (33,053 patients [60.2 percent] in the in-person group versus 4,960 patients [56 percent] patients in the telehealth group p=<0.001). The medication adherence rates were also slightly higher among patients with and without type 2 diabetes who had an initial in-person visit (19,775 patients [68.1 percent] in the in-person group versus 2,904 patients [60.2 percent] patients in the telehealth group, p=<0.001, among those with type 2 diabetes; and 13,278 patients [51.4 percent] in the in-person group versus 2,056 patients [51 percent] patients in the telehealth group, p=0.64, among those without type 2 diabetes). The outcomes were assessed 6 months after the initial visits.

The third cohort study, with low risk of bias, assessed the adherence to inhaled corticosteroids, which was defined as the proportion of days covered (a proportion between 0.0 and 1.0) among adult and elderly patients with asthma (mean age not reported).[64] The study reported slightly higher adherence among patients who had an initial telehealth visit (mean of 0.446, SE 0.008 among 1,792 patients in the in-person group versus mean of 0.476, SE 0.008 among 1,952 patients in the telehealth-only group, p comparing the two groups not reported). The difference was small and not clinically meaningful.

The fourth study was a cross-sectional study, with serious risk of bias owing to concerns with addressing confounders, that reported the number of physician recommended surgeries that were completed after a telehealth or in-person visit among pediatric otolaryngology patients (mean age of 6.15 years).[132] The study reported a slightly higher adherence to physician recommendation among patients who had an initial telehealth visit (41 patients [36.3 percent] in the in-person group vs 24 patients [40.7 percent] in the telehealth group, p-value not reported).

The four studies were different in their patient populations, clinical conditions, and the type of treatment/medication. They also used different definitions of medication adherence. The study favoring in-person visits had a much larger sample size and the difference between two groups in the whole population was slightly bigger than the other studies.[131] For patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower rates of therapy/medication adherence compared with those who receive in-person care (SOE: Low) (Table 13).

3.3.9.10. Care for General Behavioral and Mental Health Conditions

Among patients receiving care for general behavioral and mental health conditions, three observational studies assessed therapy/medication adherence after an in-person or telehealth visit. One cohort study with moderate risk of bias assessed completed followup visits among children in a developmental behavioral pediatric practice (mean age of 9.3) through in-person (N=1,077) or telehealth (N=354) visits.[133] The study reported higher rates of completed visits among patients in the telehealth group (OR: 1.57; 95% CI: 1.23 to 2, p=<0.001).

Another cohort study, with serious risk of bias owing to concerns about confounding, assessed therapy/medication adherence among U.S. Veterans 24 weeks after receiving mental health treatment (mean age of 41.8 years) through in-person (N=29) or telehealth (N=45) visits.[111] The study reported higher rates of treatment completion among patients in the telehealth group (22 patients [76 percent] among patients in the in-person group versus 37 patients [82 percent] among patients in the telehealth group, p=0.506).

The last cohort study, with serious risk of bias owing to concerns with addressing confounders, assessed therapy/medication adherence among adult and elderly patients with opioid use disorder (mean age of 46.9 years).[134] The study reported higher rates of 90-day treatment retention among patients in the telehealth group (24 of 72 patients [33.3 percent] in the in-person group versus 17 of 35 patients [48.6 percent] in the telehealth group).

The three studies were different in their patient populations, clinical conditions, and the type of treatment/medication. They also used different definitions of therapy/medication adherence. All three studies identified clinically meaningful differences between in-person and telehealth groups. For patients receiving care for general behavioral and mental health conditions, those who receive an initial telehealth visit may have higher rates of therapy/medication adherence compared with those who receive in-person care (SOE: Low) (Table 13).

3.3.9.11. Up-to-Date Labs and Paraclinical Assessment

We identified seven observational studies that compared in-person and telehealth care and reported rates of up-to-date labs and paraclinical assessment, including imaging and pathology assessment (see Appendix D, Evidence Tables D.7.9). The difference between in-person and telehealth care reported in these studies was mostly large. Among the seven studies, up-to-date labs and paraclinical assessment were mostly at a higher rate among patients in the telehealth group compared with those in the in-person group. Our confidence in our conclusions across the clinical conditions is low owing to weak study designs, issues with risk of bias, and a limited number of studies (see Table 14 and Figure 15). There was another study that reported up-to-date labs (i.e., COVID-19 test) for patients receiving telehealth (with no comparison) and a COVID-

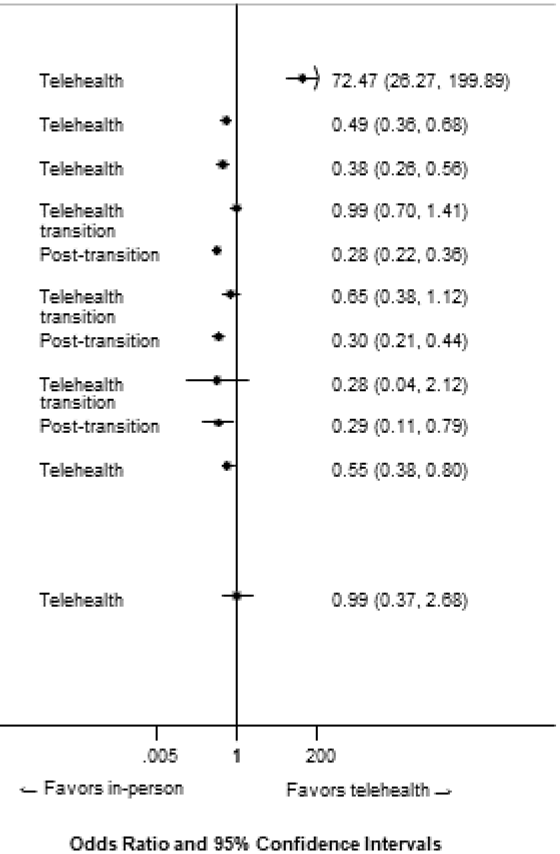
Table 14. Summary of findings: up-to-date labs and paraclinical assessment for patients receiving telehealth versus in-person care (N=7 studies)

		Direction of Findings (Number of Studies)				
Clinical Area	**Number of Studies and N**	**Direction of Findings: Favors In-Person**	**Direction of Findings: No Difference/Unclear**	**Direction of Findings: Favors Tele-health**	**Strength of Evidence***	**Conclusion**
General medical care, Adults	NA	NA	NA	NA	NA	NA
General medical care, Children	NA	NA	NA	NA	NA	NA
General medical care, All ages	NA	NA	NA	NA	NA	NA
Care for specific conditions, COVID-19	NA	NA	NA	NA	NA	NA
Care for specific conditions, Pregnancy/prenatal/gynecological care	1 study (N=104) Cohort 1 study[79] (N=104)	Cohort 1 study[79] (N=104)	NA	NA	High Direct Imprecise Unknown consistency Undetected	For patients receiving specialized pregnancy/prenatal/ gynecological care, those who receive an initial telehealth visit may have similar rates of up-to-date labs and paraclinical assessment compared with those who receive in-person care (SOE: Low).
Care for specific conditions, Other conditions	6 studies (N=5,661) Cohort 5 studies[63, 114, 129, 135, 136] (N=4,751) Cross-sectional 1 study[85] (N=910)	Cohort 3 studies [63, 129, 136] (N=4,542)	Cross-sectional 1 study[85] (N=910)	Cohort 1 study[135] (N=209)	High Direct Precise Inconsistent Undetected	For patients receiving care for specific conditions (excluding COVID-19 and pregnancy/prenatal/ gynecological care), those who receive an initial telehealth visit may have lower rates of up-to-date labs and paraclinical assessment compared with those who receive in-person care (SOE: Low).
Surgical care	NA	NA	NA	NA	NA	NA
General behavioral/Mental health	NA	NA	NA	NA	NA	NA
Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA

NA = not applicable/no studies; NR = not reported; SOE = strength of evidence.
*The strength of evidence domains (as listed in descending order): study limitations, directness, precision, consistency, reporting bias.

Figure 15. Forest plot presenting up-to-date laboratory and assessment outcome for patients who had an initial telehealth visit versus an in-person visit*

Author, year	Outcome	Population	Followup	Total N	Reference	Comparator	OR (95% CI)
Specific condition - Other							
Parise, 2021	Continuous glucose monitoring	Type-1 diabetes	NR	209	In-person	Telehealth	72.47 (26.27, 199.89)
Liu, 2021	Pathology Test/Consultation Completed	Gastroenterology/Rheumatology	5 days	1074	In-person	Telehealth	0.49 (0.36, 0.68)
Liu, 2021	Radiology Test/Consultation Completed	Gastroenterology/Rheumatology	5 days	640	In-person	Telehealth	0.38 (0.26, 0.56)
Reddy, 2021	Laboratory testing	Cancer patients	1 week during transition	931	Pre-telehealth	Telehealth transition	0.99 (0.70, 1.41)
Reddy, 2021	Laboratory testing	Cancer patients	4 weeks after transition	1576	Pre-telehealth	Post-transition	0.28 (0.22, 0.36)
Reddy, 2021	Diagnostic imaging	Cancer patients	1 week during transition	931	Pre-telehealth	Telehealth transition	0.65 (0.38, 1.12)
Reddy, 2021	Diagnostic imaging	Cancer patients	4 weeks after transition	1576	Pre-telehealth	Post-transition	0.30 (0.21, 0.44)
Reddy, 2021	Procedures	Cancer patients	1 week during transition	931	Pre-telehealth	Telehealth transition	0.28 (0.04, 2.12)
Reddy, 2021	Procedures	Cancer patients	4 weeks after transition	1576	Pre-telehealth	Post-transition	0.29 (0.11, 0.79)
Watson, 2021	Proportion with surveillance colonoscopy	Inflammatory bowel disease	NR	1724	Pre-telehealth	Telehealth	0.55 (0.38, 0.80)
Pregnancy/prenatal/OBGYN							
Arias,	Completion of postpartum glucose tolerance test	Postpartum visits	NR	104	Pre-telehealth	Telehealth	0.99 (0.37, 2.68)



CI = confidence interval; N = sample size; NR = not reported; OBGYN = obstetrics and gynecology; OR = odds ratio.
*Included studies reported categorical data from which an odds ratio was able to be calculated.

19 test rate of 33 percent to 62 percent for patients triaged in a respiratory clinic (see Appendix D, Evidence Tables D.7.9 and D.7.10).[51]

3.3.9.11.1. Care for Specific Conditions, Pregnancy/Prenatal/Gynecological Care

Among patients who received specialized pregnancy/prenatal/gynecological care, one cohort study, with moderate risk of bias, assessed completion of postpartum glucose tolerance test among patients with diabetes who received in-person (N= 45) or telehealth (N= 59) postpartum care (median age of 30.35 years).[79] The study reported slightly lower rates of completed glucose tolerance test among patients who had an initial telehealth visit compared with those who had an in-person visit (12 patients [26.7 percent] among those in the in-person group versus 15 patients [25.4 percent] among those in the telehealth group, OR: 0.99; 95% CI: 0.37 to 2.68, p=0.89), but the difference was not clinically meaningful. For patients receiving specialized pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have similar rates of up-to-date labs and paraclinical assessment compared with those who receive in-person care (SOE: Low) (Table 14).

3.3.9.11.2. Care for Specific Conditions, Other Conditions

Among patients who received care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), six observational studies reported rates of up-to-date labs and paraclinical assessment after an in-person or telehealth visit.

One cohort study, with serious risk of bias owing to concerns about handling confounders and missing data, included patients in a diabetes care center (mean age of 37 years).[135] Patients in the telehealth group had a higher rate of continuous glucose monitoring compared with those in the in-person group (7 of 43 patients [16 percent] in the in-person group versus 155 of 166 patients [93.4 percent] in the telehealth group, p<0.001).

A second study was a cohort study, with serious risk of bias owing to concerns about handling confounders and missing data, among patients in a gastroenterology/rheumatology clinic (mean age of 55 years).[136] Patients in the in-person group had a higher rate of completion of pathology consults and radiology assessments ordered for them compared with those in the telehealth group (426 of 492 patients [86.6 percent] in the in-person group versus 443 of 582 patients [76.1 percent] in the telehealth group completed their pathology consult, p<0.001; and 247 of 295 patients [83.7 percent] in the in-person group versus 229 of 345 patients [66.4 percent] in the telehealth group completed the radiology assessment, p<0.001), and the difference between the two groups was clinically meaningful.

The third cohort study, with serious risk of bias owing to issues with addressing confounders, assessed up-to-date labs and paraclinical assessment among adult and elderly patients with cancer (median age of 60 years) compared the care prior to (N= 763) and during transition to telehealth (mainly in-person visits) (N=168) with the post-transition period (mainly telehealth visits) (N= 813).[63] The study reported a lower rate of up-to-date labs and paraclinical assessment among patients who had an initial visit in 1 week during the transition and in 4 weeks after the transition compared with those who had an initial visit in 4 weeks prior to the transition (265 patients [34.7 percent] in the pre-transition group versus 58 patients [34.5 percent] in the during transition group and 105 patients [12.9 percent] in the post-transition group, p=<0.0001, for up-to-date laboratory testing; 112 patients [14.7 percent] in the pre-transition group versus 17 patients [10.1 percent] in the during-transition group and 40 patients [4.9 percent] in the post-transition group, p=<0.0001, for up-to-date diagnostic imaging; and 16 patients [2.1 percent] in the pre-transition group versus 1 patient [0.6 percent] in the during-transition group and 5 patients [0.6 percent] in the post-transition group, p=0.0223, for up-to-date procedures such biopsy, paracentesis, acupuncture, endoscopy, and catheter exchanges).

The fourth cohort study, with serious risk of bias owing to concerns with addressing confounders, was conducted in Spain. This study assessed the completion of magnetic resonance (MR) scan among patients with multiple sclerosis (mean age not reported).[129] The study reported higher monthly number of MR scans performed among patients who had an initial in-person visit versus patients who had telehealth care (mean of 196, SD 17.5 among patients in the in-person group versus mean of 183.5, SD 68.9 among patients in telehealth group, p=0.538).

The fifth study, a cross-sectional study with serious risk of bias owing to concerns with patient selection, assessed the number of lab and imaging orders placed in the system for adult patients with chest pain (median age of 44 years) in primary care clinics during the COVID-19 era.[85] The study identified similar rates of placed orders between the two groups (median of 1; interquartile rate (IQR): 0 to 1 for imaging in the in-person group versus median of 1; IQR: 1 to 1 in the telehealth group, p=0.006; and median of 6; IQR: 4 to 8 orders for labs in the in-person group versus median of 6; IQR: 5 to 8 in the telehealth group, p=0.02). But it did not report the completion rates of the placed orders between the two groups.

The sixth study was a cohort study with serious risk of bias owing to concerns with confounders that assessed the proportion of inflammatory bowel disease patients with surveillance or activity control colonoscopies (mean age of 47.6 years).[114] The study reported a higher proportion of surveillance colonoscopies performed among patients who had an initial in-person visit (76 of 814 patients [15 percent] in the in-person group versus 49 of 910 patients [9.4] in the telehealth group, p=0.007).

The six studies were different in their patient populations, clinical conditions, and the type of lab/paraclinical assessment. For patients receiving care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have lower rates of up-to-date labs and paraclinical assessment compared with those who receive in-person care (SOE: Low) (Table 14).

3.3.10. Results for Key Question 2a

Key Question 2a. Do the benefits and harms of telehealth during the COVID-19 era vary by type of telehealth intervention?

One study directly compared types of telehealth for ED visits and mortality in cardiology patients.[54] This study compared patients receiving either a telephone-only or a video intervention. The study reported higher rates of ED visits in the telephone-only group compared with the video intervention group (9.9 percent versus 5.5 percent, respectively, p=0.165). Similar results were reported for mortality, with higher rates in the telephone group compared with the video intervention group (all-cause mortality: 0.35 percent versus 0.30 percent, respectively, p=0.759; cardiac mortality: 1.1 percent versus 0.6 percent, respectively, p=0.806).[54] Although both outcomes were not statistically significant, the difference in ED visits may be meaningful, showing lower rates in patients who received a video intervention and suggesting telehealth care via video visits as a more appropriate mode of care delivery for complex conditions such as cardiovascular diseases. Owing to the low number of events reported for mortality, we cannot determine if there is a meaningful difference between telephone-only and video interventions (For further details, see Appendix D, Evidence Table D.5.2).

In studies that compared in-person with telehealth visits, most studies did not directly address the association of benefits and harms outcomes of telehealth by the type of telehealth intervention or conduct a subgroup analysis by telehealth type. We only saw an inconsistency of results, which may be associated with the different types of telehealth assessed, in the eight studies that reported hospitalization rates in patients who needed care for specific conditions (excluding COVID-19 and pregnancy, prenatal, and gynecological care patients).[62, 64, 65, 80-83, 85] Three studies included both a telephone and a video component in their protocol,[64, 80, 85] with results favoring the in-person arm, whereas four studies that used only telephone calls reported results favoring the telehealth care[62, 81, 83] or showed no difference with in-person visits.[65] The eighth study did not specify the type of telehealth used but also showed lower hospitalization rates among those who had telehealth care compared with those who had in-person care (for further details, see Appendix D, Evidence Table D.5.3).[82]

We identified no studies that provided information about the association of telehealth type for most of the outcomes of interest and there are inconsistent results in the studies that are available. We cannot determine if benefits and harms outcomes vary by type of telehealth.

3.3.11. Results for Key Question 2b

Key Question 2b. Do the benefits and harms of telehealth during the COVID-19 era vary by patient characteristics?

Four studies that reported on ED, hospitalization rates, readmission, adverse events, and missed visits provided subgroup analysis on patient characteristics.[52, 56, 59, 67, 76, 88, 108, 115] Three studies were conducted in patients undergoing care for general medical conditions,[56, 76, 108] three studies were conducted in patients being treated for COVID-19,[52, 59, 67] one study was conducted among pregnant patients,[88] and one study was conducted in a specific HIV population.[115] Seven of the eight studies were cohort observational studies, and one was a cross-sectional study.[115]

3.3.11.1. Patient Characteristics: Age

Seven studies provided some information about differences in benefits or harms from telehealth by age of the patient.[52, 56, 59, 67, 76, 108, 115] Six of the studies were retrospective cohort studies and one was a cross-sectional study.[115] Outcomes reported were ED visits, hospitalization, adverse events, and missed visits.

Two cohort studies examined the number of ED visits for patients who received telehealth versus in-person care.[56, 59] One cohort study looking at patients receiving care for general medical conditions found no significant association between age and ED visits when the initial visit was telehealth (OR: 1.00; 95% CI, 0.99 to 1.02).[56] The other study looked at rate of ED visits for COVID-19 patients, showing a statistically significant lower number of ED visits in patients below the age of 30 ($p=0.04$).[59] This is in contrast to the other age groups the study investigated ranging from 31 years to 80 years and older, which showed no statistical difference between in-person and telehealth visits.[59]

Five studies reported on age subgroups and hospitalization events. Two studies assessed hospitalization events for patients receiving care for general medical conditions. One cohort study found a significant association between increasing age of the patient who received telehealth care and hospitalizations (OR: 1.04; 95% CI, 1.01 to 1.06).[56] The other cohort care study investigated the impact of age on hospitalizations, but only among older patients (ages 65 to 84 years and 85 years and older).[76] Although this study did not find a statistically significant difference when it compared patients who were 75 to 84 years of age (OR: 1.02; 95% CI, 0.79 to 1.30) or 85 years of age and older (OR: 1.26; 95% CI, 0.91 to 1.73) with those between 65 to 74 years of age, there was a noticeable increase in hospitalization rates for older patients compared with the reference group. This study only analyzed the impact of age in the telehealth group, and the analysis was not repeated for in-person care.

Of the three cohort studies investigating hospitalization rates for COVID-19 patients, one of the studies found a significant increase in hospitalization rates in the age group older than 60 years in comparison to patients 30 to 39 years of age (HR: 4.89; 95% CI, 1.42 to 16.79).[67] Comparing other age groups to patients who were 30 to 39 years of age, the study did not find a statistically significant difference. Another cohort study showed a statistically significant difference, with lower hospitalization in the telehealth group, for patients with COVID-19 who were ages 60 to 69 years ($p=0.032$).[59] Other age groups in the analysis, ranging from below 30 years of age to above 80 years of age, did not show any significant difference between in-person and telehealth visits. The third study of COVID-19 patients found a non-statistically significant difference between age groups (OR: 1.09; 95% CI, 0.77 to 1.54).[52]

Two studies investigated age subgroups: one cohort study for adverse events and one cross-sectional study for missed visits. For adverse events, the cohort study that compared in-person versus telehealth visits for care addressing general medical conditions found a significantly lower average of medication-related problems per visit in the telehealth group compared with in-person care for patients younger than 65 years of age ($p\leq0.01$) but not for patients older than 65 years of age ($p=0.24$).[108] For the outcome of missed visits, the cross-sectional study of HIV patients showed appointment adherence was significantly higher in the telehealth group compared with the in-person group for patients 25 to 34 years of age ($p=0.046$), patients 45 to 54 years of age ($p=0.01$), and for patients 65 years of age and older ($p=0.027$).[115]

The results from these studies suggest that age may have an effect on health outcomes among patients utilizing telehealth. Telehealth reduced ED visits and adverse events, and increased appointment adherence, but only for certain age groups and there was no direct comparison between age groups. For direct comparison between age groups, in hospitalization, older patients with COVID-19 receiving telehealth care may have higher rates of hospitalization (for further outcome details, see Appendix D, Evidence Tables D.5.1 and D.5.3).

3.3.11.2. Patient Characteristics: Gender

Seven studies provided gender subgroup analyses.[52, 56, 59, 67, 76, 108, 115] Six of the studies were retrospective cohort studies and one was a cross-sectional study.[115] Outcomes reported were ED visits, hospitalization, adverse events, and missed visits.

Of the two studies reporting on ED visits, one cohort study that assessed in-person versus telehealth visits for care addressing general medical conditions found no significant association between gender and ED visits (OR: 0.61; 95% CI, 0.33 to 1.13) when the initial visit was telehealth.[56] The other cohort study that assessed in-person versus telehealth visits for COVID-19 patients found no significant association between in-person versus telehealth visits and ED visits for either males (OR: 0.29; 95% CI, 0.08 to 1.1) or females (OR: 0.75; 95% CI, 0.31 to 1.82).[59]

Five studies reported on gender and hospitalization events. Of the two studies that assessed in-person versus telehealth visits for care addressing general medical conditions, one cohort study found no significant association with gender (OR: 0.61; 95% CI, 0.33 to 1.13) when the initial visit was telehealth.[56] The other study also found no statistically significant difference in hospitalization rates for patients based on their gender (OR: 0.96; 95% CI, 0.76 to 1.21).[76] Similarly, three studies that investigated patients with COVID-19 showed no statistically different rate of hospitalization based on gender: one cohort study compared in-person with telehealth visits (males: OR 0.23; 95% CI, 0.03 to 2.00; females: OR 1.01; 95% CI, 0.28 to 3.64),[59] and two cohort studies compared patients who all received an intervention with a telehealth component (HR: 1.76; 95% CI, 0.91 to 3.43[67] and OR: 0.7; 95% CI, 0.22 to 2.25[52]).

One study analyzed gender subgroups for adverse events and missed visits. For adverse events, a cohort study looking at in-person or telehealth visits for care addressing general medical conditions found a significantly lower average of medication-related problems per visit in the telehealth group compared with the in-person group for males ($p \leq 0.01$) and for females ($p=0.01$).[108] For the outcome of missed visits, one cross-sectional study of HIV patients showed appointment adherence was higher in the telehealth group compared with the in-person group for both males ($p=0.029$) and females ($p \leq 0.0001$).[115]

Overall, the results from these seven studies suggest that there is not a difference for those who receive telehealth in ED visits, hospitalization, adverse events, or missed visits based on gender (For further outcome details, see Appendix D, Evidence Table D.5.1).

3.3.11.3. Patient Characteristics: Race and Ethnicity

Seven studies provided data and analysis on gender subgroups.[52, 59, 67, 76, 88, 108, 115] Six of the studies were retrospective cohort studies and one was a cross-sectional study.[115] Outcomes reported were ED visits, hospitalization, readmission, adverse events, and missed visits.

One cohort study reported on ED visits and assessed in-person versus telehealth visits for the care of COVID-19 patients. This study found no significant association between telehealth and ED visits for patients who were White, non-Hispanic (OR: 0.66; 95% CI, 0.31 to 1.41); Black, non-Hispanic (OR: 0.80; 95% CI, 0.05 to 13.81); other race (0 events, in-person care and telehealth); and Hispanic (0 events, in-person care and telehealth).[59] There was no direct comparison between the race and ethnicity subgroups.

Four studies reported subgroup analyses for race and ethnicity on hospitalization, one of patients receiving care for general medical conditions and three of patients being treated for COVID-19.[52, 59, 67, 76] The study of people receiving general medical care found no statistically significant difference in hospitalization rates for patients by race and ethnicity: compared with patients who were White, patients who were Black (OR: 1.01; 95% CI, 0.79 to 1.29), Asian (OR: 0.97; 95% CI, 0.42 to 2.25), or Other races (OR: 1.1; 95% CI, 0.64 to 1.91) showed non-statistically significant difference in hospitalization rates when receiving telehealth visits.[76] For patients who were Hispanic, compared with those who were non-Hispanic, there was also no statistically significant difference in hospitalization rates (OR: 1.79; 95% CI, 0.94 to 3.41). Two of the studies in patients with COVID-19 similarly reported non-statistically significant differences based on race/ethnicity: patients who were White or African-American compared with Other races (White: HR: 2.59; 95% CI, 0.96 to 7.01; African-American: HR: 1.5; 95% CI, 0.63 to 4.01);[67] and patients who were White, non-Hispanic compared with patients who were African-American, non-Hispanic (OR: 0.85; 95% CI, 0.28 to 2.6), Hispanic (OR: 1.19; 95% CI, 0.14 to 9.8), or Other races (OR: 1.17; 95% CI, 0.14 to 9.67).[52]

The third study on COVID-19 patients showed no statistical difference between in-person and telehealth groups for patients who were White non-Hispanic, Black non-Hispanic, Other races, and Hispanic. No direct comparison of race and ethnicity subgroups was conducted.[59]

One cohort study reported on readmission and assessed in-person or telehealth visits for care of pregnant patients. This study found no significant association between telehealth and readmission for patients who were White, non-Hispanic (OR: 0.85; 95% CI, 0.16 to 4.64) and Black, non-Hispanic (OR: 1.01; 95% CI, 0.6 to 1.71).[88]

For both adverse events and missed visits outcomes, the included studies showed a statistical difference between the in-person and telehealth arms by race and ethnicity. One cohort study looking at patients receiving care for general medical conditions showed a statistically significant lower average of medication-related issues in the telehealth group for people who were Black ($p \leq 0.01$), Asian ($p=0.03$), and Hispanic ($p=0.02$).[108] One cross-sectional study looking at HIV patients showed a statistically significant higher appointment adherence rate among people who were Black (0.001) or Hispanic (0.015) and had a telehealth visit.[115]

Benefits and harms of telehealth may vary by race and ethnicity for adverse events and missed visits, but we were unable to make a determination for ED visits, hospitalization, and readmission (for further outcome details, see Appendix D, Evidence Table D.5.3).

3.3.11.4. Patient Characteristics: Presence of Comorbidities

Five cohort studies reported a subgroup analysis of outcomes from telehealth visits and the number of patients' comorbidities and reported on ED visits, hospitalizations, and adverse events. Three studies were conducted among patients receiving care for general medical conditions,[56, 76, 108] and two studies reported this analysis among patients with COVID-19.[59, 67]

For ED visits, one study on care for general medical conditions reported that an increase in the number of comorbidities among telehealth patients was associated with an increase in ED visits, although no statistically significant difference was observed (ED visits [OR: 1.09; 95% CI: 0.89 to 1.33].[56] Comorbidity subgroup analysis was not repeated for patients receiving in-person care. The second study that reported ED visits among patients with COVID-19 showed a lower rate of ED visits in the telehealth arm compared with the in-person arm for overweight and obese patients; however, the results were not statistically significant (overweight: $p=0.10$; obese: $p=0.14$).[59]

Four studies reported on hospitalization outcomes for patient subgroups with comorbidities. In the care for general medical conditions, one cohort study reported that an increase in the number of comorbidities among telehealth patients was associated with an increase in hospitalization, although no statistically significant difference was observed (OR: 1.09; 95% CI: 0.85 to 1.38]).[56] Comorbidity subgroup analysis was not repeated for patients receiving in-person care. The second study on care for general medical conditions, using the Charlson Comorbidity Index, reported higher rates of hospitalization for those receiving telehealth for patients with more comorbidities (OR: 1.74; 95% CI, 1.67 to 1.81).[76] Comorbidity subgroup analysis was not repeated for patients receiving in-person care. The two studies conducted among patients with COVID-19 included analysis of overweight and obese subgroups. One study compared hospitalization rates of obese patients who received telehealth care versus non-obese patients who received telehealth, finding a significantly higher rate of hospitalization in obese patients (HR: 2.27; 95% CI, 1.17 to 4.41).[67] This analysis was not repeated for patients receiving in-person care however. The second study that reported hospitalization among patients with COVID-19 showed a slightly lower rate of hospitalization in the telehealth arm compared with the in-person arm for overweight and obese patients; however, the results were not statistically significant (overweight: p=0.21; obese: p=0.47).[59]

One study analyzed comorbidity subgroups for adverse events and compared in-person care with telehealth care for patients with general medical conditions. This cohort study reported a statistically significant lower average of medication-related issues in the telehealth group compared with the in-person group on several comorbidity subgroups: patients with high blood pressure (in-person: mean 2.1 [SD 1.78]; telehealth: mean 0.86 [SD 0.94], p≤0.01), diabetes (in-person: mean 2.1 [SD 1.61]; telehealth: mean 1.29 [SD 1.11], p≤0.01), end-organ damage (in-person: mean 2.09 [SD 1.61]; telehealth: mean 1.11 [SD 1.02], p≤0.01), and chronic kidney disease (in-person: mean 2.92 [SD 1.38]; telehealth: mean 0.75 [SD 0.71], p≤0.01).[108] Similar effects were seen for other comorbidities reported but were not statistically significant: patients on dialysis, and those with acquired immunodeficiency syndrome, congestive heart failure, chronic obstructive pulmonary disease, dementia, connective tissue disorder, and malignant lymphoma.[108]

The benefits and harms of using telehealth care did not show a significant difference for ED visits. Among patients receiving telehealth care, patients with more comorbidities may have higher hospitalization rates but a lower average of medication-related issues for certain comorbidities (for further outcome details, see Appendix D, Evidence Tables D.5.1 and D.5.2).

3.3.12. Results for Key Question 2c

Key Question 2c. Do the benefits and harms of telehealth during the COVID-19 era vary by provider and health system characteristics?

The providers represented a variety of specialties treating a wide range of clinical conditions. These services included clinical care for abortion and antenatal care, cardiology, diabetes, irritable bowel disease, rheumatology, primary care, and multidisciplinary clinics, as well as home-care services, to name a few. Among the 63 studies that compared in-person and telehealth interventions, three studies were conducted in nationally representative populations, 10 studies were conducted at a large regional health network, 24 were conducted at a large single center, 29 were conducted at single centers but did not specify if they were part of a larger health system, and one study did not provide enough information to determine the type of health system (see Appendix C, Results Table C.2 for further details). No studies directly addressed the association of benefits and harms outcomes of telehealth with provider or health system characteristics. Most of the reported outcomes were consistent for the specific clinical area or there was not any inconsistency in results that may be associated with provider or healthcare system characteristics.

3.4. Results for Key Question 3

Key Question 3. What is considered a successful telehealth intervention, and what are the barriers and facilitators of these interventions during the COVID-19 era:

- From the patient or caregiver perspective?
- From the provider perspective?

3.4.1. Key Points and Summary

- Both patients and providers reported that telehealth is more convenient, provides greater access for many patients, provides patient and provider flexibility, is more efficient in terms of time and utilization of office space, allows for remote work, supports greater inclusion of family caregivers, and increases patient appointment compliance.
- Patients and providers felt that telehealth may not be suitable for specific patient populations, such as those who are more difficult to reach and engage via telehealth or those requiring complex care.
- Telehealth raises concerns about maintaining privacy and confidentiality in the digital environment, especially if patients access telehealth in public places or multi-person homes.
- Access to telehealth is felt by patients and providers to be unequally distributed and is especially inaccessible for patients of low socio-economic status, vulnerable populations, those with digital literacy problems, older adults, and non-native English speakers.
- Some patients perceive telehealth as a barrier to improved health outcomes owing to the absence of a physical exam and challenges in developing rapport and communicating with their care team, potentially resulting in delayed or missed diagnoses.
- Providers noted that the cost of telehealth can be a barrier to care owing to limits of insurance reimbursement.
- Providers felt that future use of telehealth should be considered in combination with traditional, in-person visits to ensure regular and appropriate followups, especially for specific patient populations (e.g., those who live far away from in-person care).
- Providers reported being more exhausted by telehealth and noted a potential drop in productivity as a result.

We identified 412 studies that addressed what we considered to be successful telehealth interventions (measured as user satisfaction or dissatisfaction) and barriers and facilitators of use of these interventions during the COVID-19 era. One hundred and eighty-seven studies were synthesized and included qualitative data from interviews, focus groups, and open-ended survey questions. One hundred and thirty-eight studies included quantitative data from surveys. Thirty-seven studies included both qualitative and quantitative data. For the draft report, we synthesized the qualitative research and considered whether the survey data supported or was in contrast with the findings from the qualitative research. For the update, we synthesized qualitative studies which added new information or identified new themes, but did not include new surveys (Appendix D, Evidence Table D.11, and Evidence Tables D.12 through D.17, Tables 15 and 16).

Table 15. Overview of synthesized qualitative studies (N=187 studies)*

Population, Number of Studies	Country, Number of Studies	Study Design, Number of Studies	Time Period, Number of Studies†	Other, Number of Studies
Provider/Healthcare system, 114	US, 62 UK, 11 Australia, 10 The Netherlands, 5 Multiple‡, 6 Canada, 4 Israel, 2 Ireland, 1 Latvia, 1 New Zealand, 1 Switzerland, 2 Other, 7	Survey: open-ended, 44 Interview, 54 Focus group, 7 Mixed: focus group and survey, 1 Mixed interview and survey, 3 Other (online chat), 1	Early COVID-19 era, 39 Late COVID-19 era, 36 General COVID-19 era, 38 Pre-COVID-19 versus COVID-19 eras,1	Urban setting, 15 Mixed urban, suburban, rural settings, 10 Telephone-only interventions, 5
Patient, 66	US, 22 Australia, 13 UK, 11 Canada, 9 Multiple‡, 5 Other, 5	Interview, 39 Survey, 18 Focus group, 3 Mixed: interview and survey, 5 Other (recorded therapy session), 1	Early COVID-19 era, 18 Late COVID-19 era, 18 General COVID-19 era, 26 Pre-COVID-19 versus COVID-19 eras, 4	Urban setting, 15 Suburban setting, 1 Mixed rural and urban settings, 1 “remoteness”, 2 Telephone-only interventions, 6
Caregiver, 5	US, 2 UK, 2 France, 1	Interview, 1 Survey: open-ended, 1 Mixed: interview and survey, 1 Other (online forum), 1 Other (yoga session recording), 1	Early COVID-19 era, 2 Late COVID-19 era, 2 General COVID-19 era, 2	Urban setting, 1
Provider and Patient, 4	US, 2 UK, 1 Canada, 1	Survey: open-ended, 2 Interview, 2	Early COVID-19 era, 4	Urban setting, 3
Patient and Caregiver, 4	US, 2 UK, 1 Israel, 1	Focus group, 1 Survey: open-ended, 1 Interview, 1 Other (yoga session recording), 1	Early COVID-19 era, 2 Late COVID-19 era, 1 General COVID-19 era, 1	Urban setting, 3
Provider, Patient, and Caregiver, 1	US, 1	Interview, 1	Early COVID-19 era, 1	
Patient and Other‖, 1	US, 1	Survey: open-ended, 1	General COVID-19 era, 1	Urban setting, 1
Other§, 1	US, 1	Document analysis, 1	Early COVID-19 era, 1	Urban setting, 1

UK = United Kingdom; US = United States.
*Study total is greater than 187, some studies reported on more than one population.
† Early COVID-19 era = March through June 2020; Later COVID-19 era = June 2020 and beyond; General COVID-19 era = any time during the era of COVID-19.
‡As described by study authors.
‖Hospital administration staff.
§Medical records (notes) review.

Table 16. Overview of surveys (N=138 studies)*

Population, Number of Surveys	Country, Number of Surveys	Time Period, Number of Surveys†	Other, Number of Surveys
Provider/Healthcare system, 43	Australia, 1 Austria, 1 Canada, 2 Germany, 2 Israel, 1 Lithuania, 1 Multiple countries‡, 4 Norway, 1 South Korea, 1 Switzerland, 3 The Netherlands, 2 UK, 3 US, 22	Early COVID-19 era, 26 Late COVID-19 era, 12 General COVID-19 era, 5	Urban setting, 13 Suburban setting, 1 Telephone-only interventions, 4
Patient, 67	Australia, 2 Belgium, 1 Canada, 1 France, 3 Germany, 1 Israel, 1 Italy, 4 South Korea, 2 Multiple‡, 1 New Zealand, 1 Spain, 1 Switzerland, 1 The Netherlands, 2 UK, 8 US, 37 Not reported, 1	Early COVID-19 era, 41 Late COVID-19 era, 9 General COVID-19 era, 15 Pre-COVID-19 versus COVID-19 eras, 2	Urban setting, 30 Suburban setting, 1 Rural setting, 1 Telephone-only interventions, 13
Provider and Patient, 5	Australia, 4 Canada, 1	Early COVID-19 era, 2 Late COVID-19 era, 2 General COVID-19 era, 1	None
Patient and Caregiver, 16	Australia, 1 Canada, 1 Israel, 1 Italy, 1 New Zealand, 1 Spain, 1 UK, 3 US, 7	Early COVID-19 era, 8 Late COVID-19 era, 2 General COVID-19 era, 6	Urban setting, 2 Rural setting, 1
Caregiver, 5	Australia, 2 Denmark, 1	Early COVID-19 era, 2 General COVID-19 era, 1 Pre-COVID-19 versus COVID-19 eras, 2	Urban setting, 3 Telephone-only, 1

UK = United Kingdom; US = United States.
*Study total is greater than 138, some studies reported on more than one population.
† Early COVID-19 era = March through June 2020; Later COVID-19 era = June 2020 and beyond; General COVID-19 era = any time during the era of COVID-19.
‡As described by study authors.

We classified information in each individual qualitative study into the major themes of barriers or facilitators and satisfaction or dissatisfaction. We also classified subthemes, such as ease of use, access, and communication. Facilitators are considered factors that make a process, such as using telehealth, easier to initiate or use. Barriers are considered obstacles that make a process, such as using telehealth, more difficult to initiate or use. We defined satisfaction as the fulfillment of a want or need and dissatisfaction as not having a want or need fulfilled or being discontent with something, such as telehealth (Appendix D, Evidence Tables D.18 through D.21).

3.4.2. Barriers and Facilitators to Telehealth

3.4.2.1. Patient Perspective of Barriers and Facilitators to Telehealth

3.4.2.1.1. Telehealth Literacy

Three qualitative studies conducted in the United States, Canada, and Australia described the patient perspective, highlighting the limitations of using technology as a barrier to use,[137] as well as general lack of skill reducing the comfort level of using newer technology.[138] Specifically, two studies highlighted that older individuals may have difficulty with new technology.[138, 139]

A small survey of 34 patients in the United States identified telehealth as convenient and well-integrated, with a few survey respondents noting that the system was unnecessarily complex.[140] The survey data differ from the qualitative data in that the populations are from different countries; the survey included heart failure patients versus general care in the qualitative study; and the qualitative data were collected in the later COVID-19 era, whereas the survey data were collected during the general COVID-19 era (Appendix C, Results Table D.11).

We have high confidence, based on three studies with minor methodological concerns, that telehealth literacy among patients is a barrier to care. This statement is supported by a survey with similar results (Appendix C, Results Table C.4; Appendix D, Evidence Table D.22; Table 17).

3.4.2.1.2. Cost

No studies described cost from the perspective of patients as a barrier or a facilitator to telehealth.

3.4.2.1.3. Privacy

Seven qualitative studies described issues of privacy from patient perspectives. Patients raised concerns about confidentiality and privacy during the virtual visit,[141-147] describing concerns about not having caller ID, being overheard, and issues of background noise. Because of these types of noted issues, there was a preference for telephone consultations that would allow patients to write notes.

Two surveys of patients noted shorter waiting periods, and participants felt that their privacy was secured and respected.[148, 149] The survey data may differ from the qualitative data as the specific type of telehealth was not reported in the surveys; patient conditions or clinical needs were different between the two types of studies; and the qualitative data were collected primarily during the early and general COVID-19 eras, whereas the surveys were conducted in the early COVID-19 era (Appendix C, Results Table C.3.).

Table 17. Summary of the evidence for patient perspectives of barriers and facilitators (N=23)

Theme Conclusion	Number of Studies	Methodologic Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment
Telehealth literacy: Telehealth literacy amongst patients is a barrier to care.	3[137-139]	No or very minor concerns	No or very minor concerns	No or very minor concerns	No or very minor concerns	High Confidence
Cost:	NA	NA	NA	NA	NA	NA
Privacy: Issues surrounding privacy are a patient-perceived barrier to care via telehealth.	7[141, 142, 144-147, 150]	Minor concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Outcomes: Patients believe telehealth may be a barrier to improved health.	5[142, 143, 151-153]	Minor concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Communication: Telehealth can act as both a barrier to care and a facilitator to care from a patient's perspective.	6[137, 142, 147, 150, 154, 155]	Minor concerns	No or very minor concerns	No or very minor concerns	No or very minor concerns	High confidence
Technical issues: From the perspective of patients, technical issues present a barrier to care.	9[140, 142, 143, 147, 155-159]	Minor concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Inequity: Access to telehealth care is problematic for patients with low socioeconomic status, including vulnerable populations, older adults, and non-native English speakers.	6[137, 141, 160-163]	Minor concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Suggestions: Patients can provide suggestions for better telehealth implementation.	5[157, 158, 163-165]	Minor concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Advantages: Patients feel that telehealth improves access to care, services, and convenience.	4[142, 145, 166, 167]	Minor concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Appropriateness of fit: Unable to draw a conclusion based on conflicting evidence.	7[141, 158, 162, 168-171]	Minor concern	No or very minor concerns	No or very minor concerns	No or very minor concerns	Moderate confidence
Changes to practice: Telehealth can lead to changes in practice that facilitate care.	1[172]	Minor concerns	No or very minor concerns	Serious concerns	No or very minor concerns	Low confidence

Theme Conclusion	Number of Studies	Methodologic Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment
Future use: Patients do not believe using telehealth in the future is a good option.	3[173-175]	Minor concerns	No or very minor concerns	Minor concerns	Minor concerns	Moderate confidence

CASP = Critical Appraisal Skills Programme; CERQual = Confidence in the Evidence from Reviews of Qualitative Research; NA = not applicable.

We have moderate confidence, based on the seven qualitative studies, that issues surrounding privacy are a patient-perceived barrier to care via telehealth. Our confidence is not high owing to the limited information available across the studies and the overall heterogeneity of the populations (Appendix C, Results Table C.4; Appendix D, Evidence Table D.22; Table 17). Information collected from surveys, in contrast, suggests that privacy is not a patient-perceived barrier to care via telehealth.

3.4.2.1.4. Health Outcomes

Five qualitative studies described health outcomes associated with telehealth from the patient perspective. Patients felt that telehealth compromised their healthcare by letting their care “fall through the cracks” as a result of not having a physical exam, missed diagnoses, and discomfort discussing symptoms over the telephone.[143, 151, 152] Patients expressed concerns about possible disease progression,[142] citing challenges with remote assessment that included decreased clinical monitoring and ability to develop rapport – both of which could undermine the therapeutic relationship, exacerbate ‘secretive’ disorders (e.g., anorexia nervosa), and decrease overall clinical efficacy.[153]

There were no surveys of patients that collected data about telehealth as being a barrier or facilitator to better health outcomes.

We have moderate confidence that patients perceive telehealth as a barrier to improved health outcomes. Our confidence is limited owing to inadequate description of qualitative methods in 40 percent of the studies, as well as the overall heterogeneity of the populations (Appendix C, Results Table C.4; Appendix D, Evidence Table D.22; Table 17).

3.4.2.1.5. Communication

Six qualitative studies addressed communication barriers and facilitators from the patient perspective. When compared with in-person evaluations, patient participants cited communication via telehealth as limited[142, 147] and not as effective or resulting in reduced confidence in the provider’s expertise.[137] In particular, patients perceived telehealth as less thorough and more rushed[147] and impersonal.[155] Patients reported difficulties building rapport, especially via telephone, owing to the lack of eye-to-eye contact and physical examination,[142] and they expressed dislike for the formality of telephone appointments and the lack of nonverbal communication.[154] Patients described facilitators, such as the use of video conferencing, as more beneficial than a telephone appointment, as it allows the use of nonverbal communication.[154] Patients valued the ‘step-by-step’ approach staff took in explaining the process; they also emphasized that it was important that information be presented clearly, without the use of medicalized language, and that ample time be provided to ask questions.[150]

One survey[176] noted that, when accessing telehealth, patients felt they had a better understanding of their need for a consultation and had adequate opportunity to discuss their concerns with the doctor. This survey differs from the qualitative studies in that the intervention was via telephone, only, rather than via telephone plus video. Populations also differed between this survey and the qualitative studies with the survey data focused on older (65+ years) patients (Appendix C, Results Table C.3).

We have high confidence that telehealth can act as both a barrier and a facilitator to communication from a patient perspective. We have minor concerns related to the adequacy of the findings in the studies, as well as the possibly skewed population providing input on outcomes in one study; however, we did not feel that these concerns sufficiently biased the findings in this area (Appendix C, Results C.4; Appendix D, Evidence Table D.22; Table 17). The survey pointed to telehealth having a positive impact on communication between patients and providers.

3.4.2.1.6. Technical Issues

We identified nine qualitative studies that addressed technical issues. From the patient perspective, technology-related barriers[137, 147, 155, 158] included joining the online appointment[159] and utilizing the technology.[142, 160] Patients felt intimidated by the technology; many were concerned that online technological aspects would be too difficult, [156] and this was further affected by the abrupt transition to telehealth.[157] Other issues that patients noted were difficulties obtaining prescriptions and pathology results, reduced confidence in the doctor, and an added burden for complex medical care.[137] Other patient groups described issues with having to take their own vitals or an overall preference for in-person visits.[140] Concerns specific to the method of telehealth included feeling that communication was not as effective,[137] feeling like it was hard to hear during the appointment,[142] and lack of access to the Internet or a video-conferencing device.[142]

Fourteen surveys provided patient perspectives on technical issues with telehealth.[140, 149, 176-187] Although many participants rated video and audio quality as "good," greater than 15 percent of populations surveyed were neutral-to-negative about video and audio quality.[149, 180, 181] One survey reported that 28 percent of the participants required technical assistance with the telehealth visit.[184] The survey data are similar to the qualitative data in that video (audio-visual appointments) was the primary mode of delivery and at least half of the data were from a U.S. population. However, the survey and qualitative data differ in patient health concern (Appendix C, Results Table C.3).

We have moderate confidence that patients perceive technical issues as a barrier to telehealth care. There was a lack of methodologic rigor and description of findings across studies, resulting in a lack of clarity about and confidence in the findings. Additionally, there was overall heterogeneity of the populations (Appendix C, Results Table C.4; Appendix D, Evidence Table D.22; Table 17). Information collected via patient survey supported the finding that technical issues can be a barrier to telehealth care from the patient perspective.

3.4.2.1.7. Inequity

We identified five qualitative studies that addressed inequity and its impact on access to telehealth care. Access was noted as problematic by patients with low socio-economic status or those lacking adequate resources, such as a stable internet connection.[143, 157, 188] One study pointed to technology experience and lack of support surrounding it as an issue.[188] These issues were especially problematic for specific subgroups, presenting an issue of health equity.[141, 142] These subgroups included vulnerable populations, those with digital literacy problems, older adults, and non-native English speakers.[143, 174]

Two surveys[178, 183] asked patients about telehealth access inequity. One survey highlighted that, while most patients have access to laptops, smartphones, or other devices that are video conference compatible, patients who are retired (i.e., older) have less access to these devices.[178]

The other survey reported that patients often opt for telephone rather than video visits owing to a lack of access to video-capable devices.[183] These surveys differ from the qualitative studies in the populations studied. Additionally, all qualitative data were gathered in the early COVID-19 era, whereas survey data were collected in both the early and later COVID-19 eras. When reported, the mode of telehealth delivery was audio-visual for nine of the 15 surveys, and six of the qualitative studies (Appendix C, Results Table C.3).

We have moderate confidence that access to telehealth is problematic for patients in specific subgroups, including those of low socioeconomic status, vulnerable populations, older adults, and non-native English speakers. There were poor descriptions of qualitative data collection and analyses and heterogeneity in the populations studied (Appendix C, Results Table C.4; Appendix D, Evidence Table D.22; Table 17). Information collected via patient surveys supports our conclusion that access to telehealth can be a source of inequity.

3.4.2.1.8. Suggestions

We identified five qualitative studies from the patient perspective that included suggestions for better telehealth implementation, including greater technology integration support, as well as a provision for larger screens or better bandwidth.[163, 164] Providing technical instruction or assistance to improve adoption of virtual care for elderly clients and others who struggled with this technology was suggested,[157] as was training for staff so they could provide support to patients.[157] Mental health and physical health were noted as important to patients, particularly for pre-, ante-, and postnatal populations; this population in particular felt that mental health was not addressed well by telehealth, and suggested that mental health care be included as a standard of care during telehealth visits.[165] Further, some patients receiving mental health prior to the COVID-19 era wanted additional online services, such as group therapy via video and more options for online counseling.[158]

There were no surveys that collected patient suggestions on telehealth implementation.

We have moderate confidence that patients provided suggestions that are useful for better telehealth implementation. We had concerns with poor reporting of methodology and descriptions of findings. Additionally, there is overall heterogeneity of the populations studied (Appendix C, Results C.4; Appendix D, Evidence Table D.22; Table 17).

3.4.2.1.9. Advantages

Four qualitative studies identified some of the positive aspects of telehealth noted by patients: improved access to care,[145, 166] availability of services during the pandemic,[142, 167] convenience and cost savings associated with accessing care,[166] and easier access to general practice services.[167]

There were no surveys that reported patient perspectives on the advantages of telehealth.

We have moderate confidence that patients perceive that telehealth improves access to care, services, and convenience. Our confidence was lower primarily owing to limited details on methodology and descriptions of findings and heterogeneity of the populations studied (Appendix C, Results C.4; Appendix D, Evidence Table D.22; Table 17).

3.4.2.1.10. Appropriateness of Fit

We identified seven qualitative studies addressing appropriateness of fit (i.e., whether telehealth is a good fit for end users based on abilities and understanding). While some patients noted a preference for in-person visits in general,[141, 162] they also acknowledged the need for telehealth during the pandemic. Staying at home was the primary reason that telehealth was cited as a good fit, including preferring the comfort and convenience of home,[168, 169] the care and home-life balance,[168, 170] and relief of financial stress owing to travel.[168] One study noted that patients reported an ease of effectively communicating their concerns with their providers during phone appointments; they did not perceive any decrease in quality of care.[141] There were situations where patients felt that telehealth was not a good fit, including first appointments, appointments for new symptoms, or long-term management of chronic conditions.[162, 171] Patients described not feeling comfortable using tele-mental health, not being able to connect to their provider, feeling that there was a decrease in the number of sessions, and that the phone was less effective.[158, 169]

There were no surveys that collected data on appropriateness of fit.

We have moderate confidence in the varying opinions patients have about the appropriateness of telehealth. The seven qualitative studies provided findings both in favor of and against the use of telehealth for their specific concerns. The primary methodological concerns of these studies were insufficient detail about how the data were collected or analyzed. (Appendix C, Results C.4; Appendix D, Evidence Table D.22; Table 17).

3.4.2.1.11. Changes to Practice

One study, conducted later in the COVID-19 era, addressed changes to practice as a facilitator to care. This study concerned people with opioid/substance use disorder and identified new procedures that limited patient exposure to others while providing the same level of service, including reduced requirements for in-person treatment, increased doses of medication to take home, and medication delivery systems.[172] This was a new theme identified during the update for our review; we did not include surveys for the update.

We have low confidence that telehealth can lead to changes in practice that facilitate care. One small study of 37 individuals with opioid use disorder discussed changes in care. This study did not describe aims, recruitment, or data analysis sufficiently (Appendix C, Results C.4; Appendix D, Evidence Table D.22; Table 17).

3.4.2.1.12. Future of Telehealth

Information was also gathered regarding the future of telehealth in three qualitative studies. Obstetric patients were not interested in the continuation of telehealth.[173] Patients receiving mental health noted that telehealth was convenient, but they were not interested in using it in the future.[174, 175] This was a new theme identified during the update for our review; we did not include surveys for the update.

We have moderate confidence that patients do not consider telehealth in the future as a good option. The three included studies had minor methodologic concerns but, most importantly, only gathered information from patients receiving care for mental health or obstetrics, which may have biased opinions (Appendix C, Results C.4; Appendix D, Evidence Table D.22; Table 17).

3.4.2.2. Provider Perspective of Barriers and Facilitators to Telehealth

3.4.2.2.1. Telehealth Literacy

Eight qualitative studies discussed issues of telehealth literacy from the provider perspective. Four studies noted telehealth literacy as a barrier to using the telehealth platform that included connectivity issues,[189] the initial setup of the telehealth platform,[190] and patient knowledge.[189, 191,

[192] Providers across five studies noted various barriers in patients using telehealth, the most common of which were issues related to patient knowledge[192] and digital literacy levels,[189, 193] especially among specific geographic, aging, and racial/ethnic groups.[194] Mitigating digital literacy barriers was noted as a concern.[195] Suggested facilitators to implementing telehealth services were noted by providers in three studies and included online or paper modules for using and interacting with the telehealth platform,[190] online modules that are specifically targeted to support staff,[190] more training and time dedicated to learning to use telehealth,[196] and calls made ahead of telehealth appointments to help patients navigate inside the portal.[189]

Six surveys[190, 193, 196-199] identified telehealth literacy as a barrier, with providers citing concern about patients' ability to use telehealth[193, 196, 197, 199] and concerns about their own ability or time to learn new systems.[190] Three surveys identified telehealth literacy as a facilitator,[197, 200, 201] with providers identifying their own telehealth ability as *good* to *very good* and noting their comfort using telehealth. The survey data are similar to the qualitative data in that the populations are predominantly based in the United States and the telehealth was primarily delivered via video. However, healthcare system data are lacking in both types of study and practice type/or specialty, and the timing of the studies was heterogeneous in both the qualitative and quantitative studies (Appendix C, Results Table C.5).

We have moderate confidence that providers find the telehealth literacy of their patients to be a barrier to care and that their own telehealth literacy can be increased through training. Our concerns with the studies were lack of transparency in data collection and limited presentations of findings. Additionally, there is overall heterogeneity of the populations studied (Appendix C, Results Table C.6; Appendix D, Evidence Table D.22; Table 18). Surveys identified additional barriers for patients from the provider perspective; however, surveys reported that providers were confident in their own telehealth literacy.

3.4.2.2.2. Cost

Nineteen qualitative studies elicited provider feedback about costs associated with telehealth. While providers found the telehealth model desirable and sustainable, the most consistently noted barrier was financial limitations related to charges for service delivery or reimbursements and revenue.[190, 192, 202-206] Conversely, some providers described the financial impact of converting to telehealth as minimal[207] with an added benefit of reducing the financial burden to patients experiencing health disparities.[208-211] In addition, providers expressed concern that telehealth might be overused in the future as a cost- and time-saving measure, even if not in the best interest of patients.[212, 213]

Concerns about the time and work involved with checking each patient's medical coverage were noted,[189] as was the inability to conduct physical assessments.[189] Opioid treatment programs in one study offered telehealth services either for medication management and/or psychosocial services only.[202] Results from two studies questioned whether the telehealth model

Table 18. Summary of the evidence for provider perspectives of barriers and facilitators (N=60)

Theme Conclusion	Number of Studies	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment
Telehealth literacy: Telehealth literacy of patients is considered a barrier to care by providers. Providers noted that their own telehealth literacy can be increased through training.	8[189-196]	Minor concerns (barriers); moderate concerns (facilitators)	No or very minor concerns	Moderate concerns	No or very minor to minor concerns	Moderate confidence
Cost: The cost of telehealth can be a barrier to care owing to limitations of reimbursement.	19[189, 190, 192, 202-217]	Minor concerns (barriers); serious concerns (facilitators)	No or very minor concerns	Moderate concerns	No to very minor concerns	Moderate confidence
Privacy: Privacy, in the context of maintaining confidentiality, is a concern for providers, although some benefits were noted.	10[171, 218-226]	Moderate concerns (barriers); minor concerns (facilitators)	No or very minor concerns	No to very minor concerns	No to very minor concerns	Moderate confidence
Outcomes: Telehealth can be a barrier to health outcomes owing to lack of physical interaction with patients. However, providers noted that telehealth can also give a more holistic view of patients and their environment and could improve quality of care. Further, telehealth access impacts provider ability to deliver care, which impacts patient outcomes.	33[143, 182, 190-192, 195, 196, 198, 218, 227-250]	Minor concerns (facilitators); moderate concerns (barriers)	No or very minor concerns	Moderate concerns	No to very minor concerns	Moderate confidence
Communication: Telehealth can impede communication between provider and patient, while also facilitating it through patient education and increased patient comfort from receiving care at home.	16[190-192, 198, 214, 215, 231, 233, 237, 244, 246, 248, 250-253]	Minor concerns	No or very minor concerns	Moderate concerns	Minor concerns	Moderate confidence
Inequity: Inequity, in the context of access to telehealth,	19[189, 192, 198, 214, 218, 228, 230, 231,	Minor concerns	No or very minor concerns	Minor concerns.	No to very minor concerns	High confidence

is a concern of providers across specialty areas.	[240-242, 245, 248, 250, 252, 254-257]					
Technology issues: Providers feel that technology issues can negatively impact access to care across specialty areas.	27[143, 182, 190, 192, 202, 206, 215, 230, 232, 233, 240-242, 244, 246-248, 250, 255, 258-265]	Minor concerns	No or very minor concerns	Minor concerns	No to very minor concerns	High confidence
Appropriateness of fit: Telehealth can be used appropriately as long as alternative delivery of care is considered.	4[182, 191, 196, 202]	Minor concerns	No or very minor concerns	Minor concerns	No to very minor concerns	High confidence
Future use Providers stressed the need for flexible modes of care delivery based on patient suitability and patient/provider preference, citing a blended/hybrid model as the best approach for future care delivery.	16[210, 216, 223, 225, 249, 266-276]	Minor concerns	No or very minor concerns	Minor concerns	No to very minor concerns	High confidence
Preparedness for future implementation: Providers and their practices felt that they were prepared for telehealth and its future use.	3[209, 277, 278]	Moderate concerns	No to very minor concerns	Minor concerns	No to very minor concerns	Moderate confidence
Change in practice Telehealth was largely regarded positively but necessitated changes to workflow, better orientation for patients, and aligning of expectations of therapy.	7[172, 208, 217, 223, 270, 272, 275]	Minor concerns	No or very minor concerns	Minor concerns	No to very minor concerns	High confidence

CASP = Critical Appraisal Skills Programme; CERQual = Confidence in the Evidence from Reviews of Qualitative Research.

is sustainable.[214, 215] A suggested facilitator was to designate one person to validate coverage/billings costs for certain visits (e.g., nutrition telehealth visits).[189] Providers expressed a need for organizations to provide financial assistance in order to obtain adequate technologies necessary for successfully implementing telehealth services.[210, 216] They also expressed concerns about the costs associated with staff workload pressures and lack of human connection for patients.[217]

Six surveys identified cost as a barrier to telehealth,[245, 279-282] with healthcare providers concerned about reimbursement[245, 281, 282] and the general increase in the cost of business.[279, 280] Two surveys reported benefits of telehealth in relation to cost: reduced travel burden[283] and the ability to deliver care at the same cost via telehealth.[284] Qualitative data were collected more often in the United States than surveys and more frequently included video as a mode of delivery. There were no common findings across the two types of studies in reference to healthcare system, clinical specialty, or time period that the data were collected (Appendix C, Results C.5).

We have moderate confidence that the cost of telehealth can be a barrier to care owing to limits to insurance reimbursement. Our confidence was lowered owing to concerns about insufficient details about recruitment and data collection. Three studies included a moderately detailed discussion of costs as a barrier; most of the studies that discussed cost as a possible facilitator included moderately detailed discussions. Additionally, there was overall heterogeneity of the populations studied (Appendix C, Results Table C.6; Appendix D, Evidence Table D.22; Table 18). The surveys echoed the concern about reimbursement, but providers also noted in the surveys that telehealth could reduce costs by reducing their travel burden.

3.4.2.2.3. Privacy

Ten qualitative studies described providers' concerns about privacy in telehealth. Privacy concerns were related to maintaining confidentiality in the digital environment,[219] especially if patients accessed telehealth in public places.[218] Some providers noted that a benefit of telehealth was increased privacy, which supported greater comfort for patient disclosure and help-seeking,[171, 220] while others cited difficulties ensuring privacy and confidentiality.[221-224] Difficulties ensuring privacy stemmed from patients having children and/or other housemates that made it difficult for them to express themselves freely, as they did not want their conversation overheard or had to work around the schedules of other people in the household.[223, 224] In addition, inadequate privacy may limit the accessibility of remotely delivered services.[225, 226]

There were no surveys that collected data on privacy from a provider perspective.

We have moderate confidence that there are issues related to privacy in the context of confidentiality from a provider perspective. We had concerns related to transparency of data collection, recruitment, study design, and analysis in the two qualitative studies. We also have moderate confidence that privacy is a facilitator to telehealth. We had concerns about data collection, recruitment, and analysis, however, findings related to privacy were thoroughly described (Appendix C, Results C.6; Appendix D, Evidence Table D.22; Table 18).

3.4.2.2.4. Health Outcomes

Thirty-three qualitative studies discussed health outcomes associated with telehealth from the provider perspective. Providers in one study noted a preference for phone over video as lockdown eased, even though they were able to achieve physical assessments (e.g., gait and respiratory monitoring) via video.[243] Providers' most frequently cited limitation of telehealth was the lack of physical interaction/exam with patients.[143, 192, 231, 239, 240, 244] Providers also noted concerns with telehealth appointments: less information to inform clinical decision-making,[248] inadequate quality of care provided via the telehealth environment versus face-to-face,[241] potential risks to patients and providers from virtual interactions,[234] concerns about prescribing certain medications,[247] the continuity of the rehab process and developing rapport,[233, 240] and potential for patients to become distracted in the home environment.[244] Providers noted telehealth as resulting in a lack of physical contact,[143] being more exhausting than face-to-face therapy,[237] and resulting in feelings of loneliness, all affecting therapists' well-being at work.[237] In addition, providers noted difficulties in providing a standard level of patient care, resulting from poor quality of technology; however, they also felt that the technology facilitated unexpected positive outcomes, such as being able to meet families and providing innovations for group therapy.[229] Providers discussed a potential drop in their productivity.[198]

Improved outcomes associated with telehealth noted by providers were a more holistic view of the patient and their home environment,[250] more opportunity for families/caregivers to be involved in telehealth visits,[182, 231, 236] facilitated clinical assessment and treatment,[191] patients being able to set up a relaxing experience in their home,[182] improved client contact,[231] and maintained or improved quality of care.[218] In addition, video visits were described as advantageous, as they were convenient and saved patients time and money, particularly for older patients and those traveling long distances for in-person appointments.[182, 245]

Providing and facilitating access to video visits to all patients was reported as an important goal, which might be accomplished by engaging and empowering health system personnel to expand access.[195] This action would help to streamline scheduling processes and video visit workflows[196] and provide clinic staff support to prepare patients for visits.[196] To be sustainable, "Patients' suitability for video visits would need to be determined during scheduling based on several criteria (e.g., physical examination needs, patient's technological capacity and demographics, new versus return)."[245]

Providers noted that the use of telehealth reduced travel time,[240, 246] is more convenient,[246, 248] and allows for time flexibility.[182] Telehealth was noted as improving patient access to care[230, 236] and facilitating continuity of care.[245] Providers expressed that their experiences providing pain rehabilitation via telehealth were tightly linked to whether the methods could be used properly, related to technology, the environment, the patient, and the provider/care team.[227] Providers expressed appreciation of continued care, facilitated through equitable patient access to required technology and devices (e.g., smart phones, tablet, e-mail).[190, 228]

Providers felt that telehealth facilitated access to colleagues with prior telehealth experience, accessible electronic medical record (EMR) data to plan telehealth care visits in advance of visits, and assistance for office staff in telehealth scheduling and administration.[190] One group altered how they could use telehealth to triage or collect a medical history before an in-person visit, thereby minimizing exposure time.[235] Having good technology setup[279] and training were seen as necessary for successful implementation,[238, 249] as were having a technology advocate[242] and flexibility of telehealth platforms.[232] In addition, providers felt it was important to provide technological access and support.[196, 244]

Limited and conflicting information regarding outcomes from the provider perspective was available in the survey data. One survey of psychiatrists found that providers thought that their video sessions were equivalent to face-to-face sessions;[200] and, in another survey of neurosurgeons, providers felt that the quality of care via telehealth was inferior to face-to-face visits.[285] Owing to the heterogeneity of data in the qualitative studies, we cannot point to any similarities across the groups (Appendix C, Results Table C.5).

We have moderate confidence that telehealth can be a barrier to health outcomes owing to a lack of physical interaction with patients. However, providers noted that telehealth can also give a more holistic view of patients and their environment and, in that way, could improve quality of care. We have concerns about transparency and sufficiency of data collection as well as analytic procedures.

Further, telehealth access impacts provider ability to deliver care which impacts patient outcomes. There is overall heterogeneity of the populations studied (Appendix C, Results Table C.6; Appendix D, Evidence Table D.22; Table 18). Information on outcomes was only found in two surveys and is not comparable to the qualitative data; the surveys only recorded provider impressions of the equivalence of telehealth to face-to-face visits.

3.4.2.2.5. Communication

Sixteen qualitative studies detailed the provider perspective of communication in telehealth. Providers noted barriers in communication and developing rapport, which they felt was not as effective in telehealth compared with in-person visits owing to technical limitations that exacerbated the lack of visual cues, eye contact, and body language (i.e., nonverbal limitations).[191, 198, 215, 246, 248] In discussing technical limitations, providers noted Zoom fatigue[251] and managing group dynamics,[251] in addition to concerns about delays in examination, time to complete evaluation,[244] privacy,[214, 250] and lack of "water cooler" opportunities to collaborate with other therapists, caregivers, or patients.[233] Providers noted concerns about how patients regard telehealth appointments, such as the formality with which patients do/do not regard the virtual appointment (e.g., driving during the appointment).[252]

Provider-noted facilitators included having a centralized patient call center to facilitate patient technological troubleshooting and scheduling;[190] providing explicit orientation to etiquette expectations;[251] offering individual coaching, as needed, to facilitate social competency with telehealth;[251] and having good leadership and teamwork practices that support telehealth.[253] Other facilitators noted by providers were to use end-of-day clinical debriefs among the care team, check-in with clients after already scheduled visits, and/or use text and phone for outreach.[251]

Providers felt that telehealth resulted in increased comfort for patients in their own home[246] and described video visits as convenient and efficient[231] and as facilitating better emotional connections.[248] Of note, providers stated that telehealth resulted in their ability to use new strategies for connecting with patients,[246] such as being able to add visual cues to aid to their discussions (e.g., during dietary conversations, holding up the actual food item).[192] Findings of one study showed that telehealth services may not be appropriate for patients with complex diseases or situations that require a great variety of health services.[237] Providers felt that telehealth facilitated easier connectivity to patients,[250] in particular for teenage patients who tend to use telehealth visits more than in-person visits, offering increased insight into how patients/families manage their disorders at home.[192]

Six surveys collected information on telehealth and its impact on communication.[196, 200, 245, 250, 282, 286] In one survey, providers noted that they had good rapport and were able to connect well with their patients via telehealth.[200] The remainder of the surveys pointed to concerns about or barriers to communication between provider and patients: providers had concerns about sharing information with other healthcare teams and understanding patient preferences for care;[250] expressed a desire for training in reference to telehealth communication, communicating post-visit instructions, or using interpreters on calls;[196, 245, 282] had difficulty reaching patients and recognized patient preferences for face-to-face communication.[286] Both the qualitative studies and surveys took place primarily in the United States but are not comparable to one another across mode of delivery, healthcare system, or provider specialty (Appendix C, Results C.5).

We have moderate confidence that telehealth can both impede and facilitate communication between provider and patient: barriers include telehealth platform fatigue and provider concerns about patients' casual approach to telehealth care; facilitators include increased patient comfort and easier connectivity to patients. Concerns about this body of evidence include a lack of transparency in data collection and analysis and descriptions of communication issues that were not thorough in over one-third of included qualitative studies. Additionally, there is overall heterogeneity of the populations studied (Appendix C, Results C.6; Appendix D, Evidence Table D.22; Table 18). Survey data identified a different set of provider concerns about and benefits of telehealth for communication.

3.4.2.2.6. Inequity

Eighteen qualitative studies addressed inequity as a concern for providers. While providers felt that telehealth improved patient access to care,[218, 230] access was described as potentially different for some populations (e.g., rural, disabled, those without reliable internet service) raising the issue of equity in access to healthcare.[214, 231, 240, 248, 252, 255, 257] Providers highlighted issues with patients' ability to access the technology and/or equipment,[192, 228, 245, 250, 256] especially for remote/rural communities[189, 198, 241, 242, 254, 257] or for those who have limited resources, such as limited internet access or equipment.[228]

Eight surveys of providers collected information on telehealth inequity.[196, 199, 245, 253, 280, 282, 286, 287] Inequity was noted as connection (Wi-Fi or internet) access or issues[280, 287] and the potential that patients' limited financial resources could limit access.[196, 199, 253, 280, 282] These surveys are not comparable to the qualitative studies in terms of where studies were conducted, mode of telehealth, clinical specialty area, or timing of data collection (Appendix C, Results C.5).

We have high confidence that inequity, in the context of access to telehealth, is a concern for providers across specialty areas. We had only minor concerns regarding data collection, accuracy, transparency, and analysis (Appendix C, Results C.6; Appendix D, Evidence Table D.22; Table 18). The survey information collected aligned with the qualitative data.

3.4.2.2.7. Technical Issues

Twenty-seven qualitative studies identified technology challenges, including digital literacy, experienced by many providers and their staff. Providers noted that technical difficulties sometimes resulted in missed appointments[262] and that there were inadequate resources available to resolve these technical issues.[192, 206, 255, 262, 265] Providers noted logistical challenges in accessing the telehealth technology.[246] They also indicated that the swift transition to telehealth after March 2020, and the minimal use of it prior to that, greatly affected the ease of implementation.[190, 215, 248] There were concerns about patients' variable internet speeds, which could result in insufficient diagnostic ability.[247] Providers noted difficulties accessing telehealth services in hospice care.[260] The delivery of services through telehealth[264] may be limited by patient, provider, and technological factors;[230, 232, 244, 258, 259] the absence of desired functionalities, such as a virtual waiting room or a chat function, resulted in challenges in the workflow,[143] and some providers found telehealth to be time consuming.[192, 247] In addition, providers noted a potential loss of access to the electronic medical record when working remotely.[242] Some providers described challenges that their opioid treatment providers faced in implementing telehealth services, citing clinic capacity.[202] Likewise, some providers noted the time demands and costs associated with setup.[241] Recent transitions to the electronic medical record exacerbated unfamiliarity with telehealth administration and scheduling.[190]

Digital literacy of both patients and providers was raised as a concern by providers.[250] Providers described limited abilities to prevent technical difficulties as a barrier.[182] Such difficulties disproportionately affected older and economically disadvantaged patients who may struggle to use laptops and tablets[261, 263] and lack digital proficiency.[240] Technological limitations also included ease of use and the learning curve of therapists and patients;[233] while usability was considered high, usability/technical difficulties and lack of digital literacy affected implementation and ease of use, especially with logging on and maintaining continuous Wi-Fi or data connection throughout the visit.[143]

We identified 12 surveys of providers that addressed barriers to telehealth caused by technical issues.[179, 182, 193, 196, 245, 250, 255, 280, 288-291] There was a wide variety of concerns identified in the surveys: for example, connection issues encountered prior to consultation on both the provider and patient ends,[182, 250, 280] concerns about implementation[291] and provider training needs,[196] and the quality of audio/video.[250, 290] Most data in both qualitative studies and surveys were collected from a U.S. population, and about half of the included qualitative and survey studies evaluated video visits (Appendix C, Results C.5). There were no surveys that collected data on digital literacy from a provider perspective.

We have high confidence that providers feel that technical issues can negatively impact access to care across specialty areas. We had only minor concerns regarding data collection, accuracy, transparency, and analysis. Additionally, there is overall heterogeneity of the populations studied (Appendix C, Results C.6; Appendix D, Evidence Table D.22; Table 18). Information collected via surveys support this conclusion.

3.4.2.2.8. Appropriateness of Fit

We identified five qualitative studies that assessed appropriateness of fit (i.e., whether telehealth is a good fit for end users based on abilities and understanding) of telehealth from the provider perspective. Providers described the fit of telehealth modalities (i.e., phone and video) as variable, depending on the patient.[202] In all, providers noted that telehealth is appropriate for some patients but not all.[182, 196] Decisions for which patients should receive alternative consultations, telehealth versus face-to-face, were based on three main considerations: (1) minimization of risk, (2) adherence to guidelines, and (3) preference for face-to-face consultations.[191] Providers felt that some patient groups, such as Indigenous people, simply did not like the idea of video interactions.[264]

There were no surveys that collected data on appropriateness of fit from a provider perspective.

We have high confidence that telehealth can be used appropriately, as long as alternative delivery of care is considered. We had only minor concerns regarding data collection, accuracy, transparency, and analysis (Appendix C, Results C.6; Appendix D, Evidence Table D.22; Table 18).

3.4.2.2.9. Future Use

Sixteen studies addressed the future use of telehealth services. Some providers reported a strong desire to return to in-person models, which some felt reflected best practices and facilitated peer interaction and support.[272] Similarly, many providers stressed the need for flexible modes of delivery based on patient suitability and patient/provider preference, citing a blended/hybrid model as the best approach in the future of care delivery.[266, 267, 269, 271-274] Providers learned to be proactive and anticipate future challenges and difficulties and plan accordingly to reduce their negative impact.[270] Providers suggested the need for information on adapting practice models for assessing patients via telehealth,[223, 271] integrating EMRs,[216] and educating and better integrating patients and families/caregivers, which they felt improved over time/with exposure to telehealth.[216, 223, 267, 268] Increasing insurance coverage for telehealth was noted as a necessary component of successful future use.[267, 269, 274]

Some providers felt that telemedicine increased work/life balance because telemedicine allowed them greater ability to multi-task, take more breaks, and spend time with family while working from home.[225, 273] However, physicians also noted that working from home invited more interruptions and pressed the need for clinicians to focus on telehealth sessions and manage their time.[223, 225, 267] In addition, there were noted social concerns that included feelings of isolation and decreased informal communication with coworkers;[225] providers noted higher levels of exhaustion from telemedicine sessions[273] and stressed that future use is best suited in environments where there are adequate numbers of direct service providers to deliver quality telehealth.[210]

Successful future implementation relies on ensuring adequate staffing and time for virtual appointments.[272, 275] One study noted that a threat to long-term sustainability was that several new and expanded programs did not have long-term staffing plans.[249] Also, making sure that community interventions (such as Wi-Fi enhancers and universal broadband access) and education/training were implemented to ensure improved quality of and access to telehealth visits, especially for underserved populations.[216, 223, 267, 276] There were also concerns about the lack of legal protections for those conducting appointments via telehealth.[274] In addition, the cost of telehealth software was perceived as a barrier to future implementation of telehealth services.[210] This was a new theme identified during the update for our review; we did not include surveys for the update.

We have high confidence that telehealth can be used in the future, as long as hybrid models are available based on patient preference and appropriateness of telehealth for certain conditions. We had minor to very minor concerns regarding data collection, accuracy, transparency, and analysis (Appendix C, Results C.6; Appendix D, Evidence Table D.22; Table 18).

3.4.2.2.10. Preparedness for Future Implementation

Three studies described preparedness for future implementation. “Preparedness” was operationalized to include both available equipment and adequate staff capacity to provide telehealth services.[277] Clinics that already used telehealth in their practice, and had adequate resources (i.e., audio-visual technologies and instructional materials and procedures) and infrastructures to support its use, were better able to pivot to increasing telehealth use.[277, 278] Those who were less well prepared, however, had a more difficult time. One study described attempts to mirror face-to-face appointments from each clinic setting for telehealth services to ease the transition and to ensure successful implementation.[278] Institutional support was described as a key facilitator of telehealth implementation.[209] The availability of equipment and the capacity of health professionals and patients to use audio-visual technologies resulted in most participants providing consultations via telephone.[277] This was a new theme identified during the update for our review; we did not include surveys for the update.

We have moderate confidence that providers and their practices were prepared for telehealth and its future use. We had no to minor to very minor concerns related to the coherence and relevancy of our findings, and minor concerns regarding adequacy owing to the small sample size. We had moderate concerns about study methodology owing to insufficient information about data collection in all three studies, along with other minor issues (Appendix C, Results Table C.4; Appendix D, Evidence Table D.22; Table 18).

3.4.2.2.11. Changes in Practice

Seven studies described changes in practice necessary to implement telehealth in the future. Negative patient feedback prompted changes to practice models.[270] Some regarded telehealth as a positive change[172] but noted that it changed how they typically oriented patients and aligned expectations of therapy.[223] Another study noted the need to build capacity and repurpose work roles to better integrate telehealth with in-person programs.[217, 272, 275] To accommodate the changes and workload pressures necessitated by the virtual environment, practitioners described adaptations necessary to creating structure in their day to help mediate “Zoom fatigue” – these tactics included going for walks, taking lunch breaks, or even pretending to “go home” to help separate work from personal life.[217, 223] In addition, providers described the need to align patients’ expectations of the telehealth environment, noting that when they were not on time, some patients left the videoconference.[208] There were noted challenges with ensuring providers met appointment times.[208] This was a new theme identified during the update for our review; we did not include surveys for the update.

We have high confidence that providers and their practices regard telehealth positively and that it necessitated needed changes in workflow and patient care. We had no to very minor concerns related to the coherence and relevancy of our findings, and minor concerns regarding adequacy owing to inconsistent findings. We had minor concerns about study methodology owing to insufficient information about data collection in most studies, along with other minor issues (Appendix C, Results Table C.6; Appendix D, Evidence Table D.22; Table 18).

3.4.2.3. Other Populations’ Perspectives of Barriers and Facilitators to Telehealth

3.4.2.3.1. Telehealth Literacy

One qualitative study of providers, patients, and caregivers recommended making telehealth platforms more amenable to older populations and those with cognitive impairments.[292]

Two surveys of patient/caregiver groups reported that telehealth was acceptable, they felt comfortable with the technology,[293] and they experienced little to no difficulty with the telehealth platforms.[294]

3.4.2.3.2. Cost

No qualitative studies or surveys described cost from the perspective of other or mixed populations as a barrier or a facilitator to telehealth.

There were no surveys in other populations that addressed costs.

3.4.2.3.3. Privacy

No qualitative studies or surveys described privacy from the perspective of other or mixed groups as a barrier or a facilitator to telehealth.

There were no surveys in other populations that addressed privacy.

3.4.2.3.4. Health Outcomes

Five qualitative studies described health outcomes of telehealth from combined populations of patients, caregivers, and/or providers. For physical assessments via telehealth, groups reported issues with establishing continuity of care, the physical setting, focusing on available resources, the location of the care provider or child, and potential risks in the patient's physical environment.[233, 292] Concerns about the lack of physical exam/interaction were echoed by caregivers.[295] Other concerns that emerged in provider and patient interviews included the logistics of the appointment[296] and the need to confront new roles and workloads.[297] Suggested facilitators included using a piecemeal approach to virtual care, which allowed providers to act rapidly and provided the flexibility needed for providers to select technologies based on their needs when technical challenges occurred.[297] Another suggestion from patient/provider/caregiver perspectives was that tele-rehabilitation could be integrated as part of a hybrid delivery package, after initial visits are (ideally) home visits.[292]

There were no surveys in other populations that addressed health outcomes.

3.4.2.3.5. Communication

Six qualitative studies described communication from a combination of perspectives. Groups noted limitations of the virtual environment that prevent in-person evaluations, such as a physical exam or biological testing.[244, 292, 298] Other difficulties were described as hearing difficulties, language barriers, and technical issues.[296] Distractions in the home environment were also noted.[298] Some patients were not able to engage during telehealth visits owing to sleeping, personal issues, or not being physically and emotionally available.[299] Patients and caregivers expressed concerns about the maintenance of boundaries between patients and providers and between work/non-work hours.[233]

Two surveys of patient/caregiver groups reported that telehealth improved communication with their healthcare provider.[300, 301]

3.4.2.3.6. Access

Nine qualitative studies described perspectives related to access from mixed study populations. Telehealth may be a means to improve equity/expand access, but it comes with technical difficulties.[298, 302] One critical barrier was the "paradoxical impact" on inequities, whereby virtual technologies could improve the distribution of healthcare services for those who already have access to healthcare.[297] Patient/caregiver interviews noted technological difficulties,[233, 244, 303] specifically regarding ease of use and learning curves for both therapists and patients;[233] using tele-rehabilitation would depend on assessment of a person's physical, and digital, ability.[292] The telephone was seen as an effective method for obtaining a clinical history, but video appointments were necessary for examination of wounds; the overall preference was for an in-person evaluation.[304] Review of patient medical records also highlighted technical difficulties accessing services, including ''technicality,'' ''engagement,'' and ''scheduling,'' or not specified.[299] The barrier of scheduling issues was echoed in patient medical records, revealing that patient/caregivers who had other scheduled or unscheduled events, sometimes forgot the appointment or had conflicts.[299] One study from the patient/caregiver perspective highlighted challenges using the online system.[305] Telehealth worked better for some patients if a caregiver was present to facilitate/support video calling.[292] Staff and patients chose the telephone as an easy and accessible platform for communicating and did not consider that there was any added benefit from having a video function.[206]

Two surveys of patient/caregiver groups reported that they had no problems accessing telehealth and, further, described telehealth as easy to use.[301, 306]

3.4.3. Satisfaction and Dissatisfaction With Telehealth

3.4.3.1. Patient Perspective of Satisfaction and Dissatisfaction With Telehealth

3.4.3.1.1. Ease of Use

Five qualitative studies described satisfaction with ease of use of telehealth from the patient perspective. Patients noted the convenience of telehealth[159, 289, 307] and felt that telehealth appointments increased appointment flow[289] and provided better access.[307] "A further aspect to consider when evaluating the satisfaction with telehealth in this study is that many patients were grateful to receive care during the COVID-19 pandemic and considered telehealth to be the safest and only option."[142] In addition, a mixed-model clinic structure (i.e., telehealth and face-to-face clinic provided simultaneously) was reported as ideal, as long as patients were able to see a doctor if their condition deteriorated, as well as annually/biannually for examination and 'check[ing]-in.'[142] However, one group of patients expressed concerns about the necessity of having a quiet home environment, free of distractions, or any other factors preventing them from learning or performing the self-administered tasks/treatments.[156]

Ten surveys described satisfaction or dissatisfaction with ease of use of telehealth.[149, 181, 184, 279, 302, 308-312] A common theme across surveys was patients noting that telehealth was convenient.[184, 279, 308, 310] Another theme was ease of scheduling, set up, and use of the systems for healthcare.[149, 309, 311, 312] One study reported that patients found it very difficult to set up a telehealth appointment[181] and another cited distractions in the home environment as an impediment to use.[302] The survey and qualitative data were similar in that half of the included studies were U.S.-based, otherwise they were not similar in terms of mode of telehealth delivery, patient condition, or timing of the study (Appendix C, Results Table C.7).

We have moderate confidence that patients are satisfied with the ease of use of telehealth. Our confidence is limited owing to insufficient detail related to data collection and analysis and limited discussions of satisfaction in three of the five studies (Appendix C, Results Table C.8; Appendix D, Evidence Table D.22; Table 19). Information collected via surveys supports the findings that patients find telehealth easy to use.

Table 19. Summary of the evidence for patient satisfaction and dissatisfaction (N=30)

Summary of Review Findings	Studies, N	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment
Ease of use: Patients find telehealth easy to use.	5[142, 156, 159, 289, 307]	Minor (satisfaction) to moderate (dissatisfaction) concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Access: Telehealth facilitates access to care, but patients have some privacy concerns.	9[138, 140, 144, 155, 160, 175, 213, 313, 314]	Minor (satisfaction and dissatisfaction) concerns	No or very minor concerns	Minor concerns	No or very minor	Moderate confidence
Health Outcomes: Patients perceive telehealth as beneficial to their health outcomes.	11[138, 147, 156, 161, 163, 165, 173, 174, 315-317]	Minor concerns	No or very minor concerns	Minor concerns	No or very minor concerns	High confidence
Communication: Patients are satisfied with telehealth and its impacts on communication, but noted some concerns about it along with some suggestions for improvement.	12[140, 144, 152, 156, 159, 160, 315, 318-322]	Moderate (satisfaction) to minor (dissatisfaction) concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Privacy: Patients have concerns related to privacy issues and telehealth.	9[138, 163, 169, 174, 320, 323-325]	Minor concerns	No or very minor concerns	Minor concerns	No or very minor concerns	High confidence
Benefits: Patients report general satisfaction and benefits of telehealth.	13[144, 145, 150, 152, 154, 155, 159, 166, 307, 313, 315, 326, 327]	Minor concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Preferences: In general, patients prefer face-to-face visits with their healthcare provider, but noted that telehealth was more convenient and may be better suited for some forms of care.	10[143, 146, 152, 159, 166, 289, 307, 321, 328, 329]	Minor concerns	No or very minor concerns	Minor concerns	Minor concerns	High confidence

Summary of Review Findings	Studies, N	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment
Concerns: Patients have concerns about telehealth use for complex care. They also have concerns about setup, and the lack of personal care via telehealth.	5[137, 166, 307, 315, 327]	Minor concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Suggestions: Patients feel that trust and developing rapport with providers is beneficial to telehealth.	4[139, 156, 159, 174]	Minor concerns	No or very minor concerns	Serious concerns	No or very minor concerns	Low confidence

CASP = Critical Appraisal Skills Programme; CERQual = Confidence in the Evidence from Reviews of Qualitative Research.

3.4.3.1.2. Access

Five qualitative studies described satisfaction with access to telehealth from the patient perspective. Patients noted telehealth as a convenient method for accessing care.[144, 313, 330] Access to care (i.e., attendance and engagement), especially for those who might be unable to travel to appointments, was facilitated by telehealth.[330] When discussing access, patients also raised concerns about ethical issues, for which patient consent to use personal data and closed/password-protected online sessions were recommended to prevent uninvited interruptions.[160] Suggestions for what would be helpful included simplifying the process of connecting to the virtual platform and improving Wi-Fi connectivity issues.[140] Additional concerns regarding appointment scheduling were discovered in studies conducted later in the COVID-19 era. Patient portals for scheduling were cited as an issue,[213] as well as portals for access to the clinicians: for instance, difficulty with the portal and video conferencing;[138, 175] and administrative "gate-keeping," where clinical support staff prevented contact with the providers.[213, 314]

Five surveys described satisfaction with access to telehealth.[142, 176, 179, 239, 331] Satisfaction was rated for convenience and ease of access to care[179, 239, 331, 332] and a desire to continue to use telehealth for care.[142] Study populations in the qualitative studies and surveys were not comparable except for mode of telehealth delivery; both the qualitative studies and surveys collected information primarily from patients who received telehealth via video (Appendix C, Results Table C.7).

We have moderate confidence that patients express both satisfaction and dissatisfaction with access to telehealth care. There was a lack of detail about data collection and analyses in more than half of the studies, reducing our confidence in the findings (Appendix C, Results Table C.8; Appendix D, Evidence Table D.22; Table 19). The survey data support the finding that patients were satisfied with telehealth as a convenient way to access care; there were no survey data that recorded concerns about access.

3.4.3.1.3. Health Outcomes

Eleven qualitative studies described satisfaction with health outcomes associated with telehealth from the patient perspective. Patients generally described telehealth as positively impacting patient convenience and the overall experience.[147] In one study, attendance was high and all parents stated that overall satisfaction with care was high; more than 90 percent of respondents reported satisfaction with telehealth consults and 100 percent reported satisfaction with treatment procedures via telehealth.[315] Other studies cited satisfaction about the relaxed atmosphere of telehealth;[316] and, in a study on exercise, the participants believed telehealth to be instrumental in their continuation of physical activity during the COVID-19 era.[163] Online integrative oncology treatment was identified by patients to have beneficial effects that included increased feelings of caring, containment, support, calm, and empowerment.[156]

Challenges and dissatisfaction were noted in obstetrics and gynecology, specifically regarding pregnancy: patients felt that their health concerns were not adequately addressed during telehealth visits, and there was an overall sentiment that telehealth was inappropriate for this population.[165, 173]

Four surveys identified satisfaction or dissatisfaction with telehealth's impact on health outcomes.[179, 333-335] Patients felt safer seeing their providers remotely[333] and noted that they believed that the telehealth visit helped with their reported complaints. Patients also noted that they felt that a face-to-face exam would have been better, citing blood pressure cuffs and Doppler imaging as examples of things that would improve their care and outcomes.[179, 335] Qualitative data on oncology patients were collected in three studies taking place in three different countries; survey data were also collected in multiple countries, otherwise they were not similar in terms of mode of telehealth delivery, patient condition, or timing of the study (Appendix C, Results Table C.7).

We have high confidence that patients are satisfied with the health outcomes from telehealth and find that it is beneficial to their overall care and receipt of treatment procedures. Our limited concerns are owing to insufficient data provided about data collection and analysis; however, sufficient descriptions of outcomes had a strong impact on our confidence. (Appendix C, Results Table C.8; Appendix D, Evidence Table D.22; Table 19). In general, the survey data agreed with the qualitative data. However, two surveys noted that face-to-face interactions would have been better for recording blood pressure or Doppler readings and could have improved outcomes in ways telehealth could not.

3.4.3.1.4. Communication

Nine qualitative studies described satisfaction with communication associated with telehealth from the patient perspective. Patients noted being satisfied with having access to see and discuss their health concerns with a telehealth nurse, whom they appreciated being the same telehealth nurse for each visit.[140] This same group of patients perceived greater accessibility in scheduling visits.[140] Other patient groups responded that the telehealth platform facilitated building and maintaining relationships between family and healthcare providers,[318] resulting in retained independence and social connectedness throughout the COVID-19 pandemic,[319] as well as maintaining ongoing treatment discussions when patients were not able to go to the office in person.[156] Some patients felt that telehealth was comparable to in-patient visits and that appointments were less rushed.[144] In addition, being at home provided an added layer of comfort and safety,[144, 336] and the platform allowed them to ask more questions.[144] Patients with specific healthcare needs (e.g., prostate check, intrauterine device removal) required in-person examination and care, resulting in increased peace-of-mind and confidence.[159] Among a group of patients completing group teletherapy, participants preferred to have at least one in-person meeting to meet other patients and build relationships.[322] Patients were generally understanding of the limitations resulting from the COVID-19 pandemic and the necessity to transition to an online platform, which they felt facilitated building and maintaining relationships/rapport.[160]

Several challenges in communicating via telehealth platforms were noted in three studies. Patients noted difficulties with masks and telehealth,[315] difficulty hearing one another properly,[160] and challenges with scheduling followups and other future appointments.[315]

To support and enhance communication, patients suggested user-centered technical features that included interactivity, were visually instructive and informative, and allowed connectivity through messaging.[321] Other recommendations included using secure e-mail and video methods that facilitate remote connectivity and communication.[152]

More surveys than qualitative studies collected data on satisfaction and dissatisfaction with communication (N=19)[140, 142, 148, 149, 181, 184, 185, 239, 279, 304, 309, 312, 315, 329, 334, 337-340]. Overall, patients expressed satisfaction with provider/staff understanding of patient concerns,[148, 181, 184, 239, 337, 338, 340-342] and they also felt their needs were being met in the telehealth exams.[148, 181, 184, 343] Patients also noted that telehealth did not negatively impact their satisfaction with treatment explanation[149, 181, 312, 315, 334] or overall experience.[140, 185, 339] Although, in general, patients noted satisfaction with telehealth and did not note much difference between telehealth and in-person visits,[142, 304, 329] one study found the opposite position among surveyed patients.[142] Most of the surveys were conducted early in the era of COVID-19, whereas qualitative data were collected more commonly during the general period of COVID-19. Both qualitative studies and surveys were conducted in multiple countries, otherwise they were not similar in terms of mode of telehealth delivery, patient condition, or timing of the study (Appendix C, Results Table C.7).

We have moderate confidence that patients are satisfied with telehealth and its impacts on communication. Our concerns are owing to the lack of sufficiency of detail across studies regarding data collection and analyses. We are also concerned about the sufficiency of discussion about communication as it applies to telehealth (Appendix C, Results Table C.8; Appendix D, Evidence Table D.22; Table 19). The survey data support the findings of the qualitative studies in reference to satisfaction. While the qualitative studies found some dissatisfaction with communication via telehealth, a single survey noted that telehealth limited patient communication with their providers.

3.4.3.1.5. Privacy

Eight qualitative studies addressed patient satisfaction with privacy in telehealth. Two studies found that patients were satisfied with telehealth and privacy; one study of adolescents[344] demonstrated that patients 13 years and older liked the ability to access their patient portals, and another of adults[163] taking online exercise courses were less self-conscious in their groups. Two studies were neutral about any privacy issues that may exist during telehealth.[169, 325] Five studies noted general dissatisfaction with telehealth privacy: patients perceived telephone counseling as more impersonal compared with in-person evaluations and noted inadequate privacy in the home environment to receive counseling services.[336] Three studies gathered information pointing to lack of safety and privacy in the home environment.[138, 174, 323] Finally, one study noted concerns about telehealth and privacy of information about self-harm and suicide.[324]

Three surveys addressed privacy as a measure of satisfaction among patients.[142, 340, 345] Across these three surveys, patients noted that they felt that their privacy was protected during telehealth consultations. These surveys and qualitative studies are not comparable: the qualitative study took place in the United States via telephone-only administration of telehealth in an opioid treatment population later in the COVID-19 era, whereas the surveys were conducted in multiple countries with mixed modes of telehealth delivery (Appendix C, Results Table C.7).

We have high confidence that patients express both dissatisfaction and satisfaction related to privacy and telehealth. We had only minor concerns with the evidence owing to the lack of sufficiency of detail across studies regarding data collection and analyses (Appendix C, Results Table C.8; Appendix D, Evidence Table D.22; Table 19). The survey data do not support the finding that patients are dissatisfied or concerned about privacy issues with telehealth.

3.4.3.1.6. Benefits

Thirteen qualitative studies described patient-perceived benefits of telehealth. Telehealth was positively received by many patients,[155, 315] especially as it provided a safe and contact-free alternative throughout the COVID-19 pandemic,[307] which enabled continuity of care.[145, 152, 159, 326, 327] Although some patients were skeptical of the quality of telehealth visits, especially for evaluations requiring physical assessment (e.g., eye exams), others were very satisfied and felt that the telehealth appointment was just as good as in-person, with the added benefits of convenience and ease of use.[152, 166, 313] Telehealth was perceived to facilitate increased levels of communication, which translated into personalized care and positive health impacts.[145] Patients also reported benefits of telehealth that included reduced hassle, time, and costs associated with traveling to appointments.[326] Other patients described a positive experience associated with telehealth[154] and telephone consultations,[150] rating the experience as good as in-person care, especially in regards to communication, building rapport, and sharing information.[145, 150] Patients reported being satisfied and having their needs met, stating they would likely choose telehealth over an in-person visit.[144]

There were no surveys that collected data about telehealth in the context of patient satisfaction as a benefit.

We have moderate confidence that patients are satisfied with telehealth and express their satisfaction by describing benefits. Our concerns are owing to a lack of information related to data collection and analyses. Further, discussions about the benefits of telehealth were only moderately described (Appendix C, Results Table C.8; Appendix D, Evidence Table D.22; Table 19).

3.4.3.1.7. Preferences

Ten qualitative studies described patients' preferences regarding telehealth. Although patients described similarities between telehealth and in-person appointments,[289] the preference was for face-to-face, in-person appointments.[152, 166, 289] Patients felt that in-person evaluation facilitated easier conversations with providers, enhancing rapport.[152] In addition, preferences for telehealth versus in-person evaluations were typically based on the health issues patients were presenting with (including severity of symptoms, likelihood of needing a physical exam, and whether they felt that they could explain themselves more clearly in-person),[159, 307] in addition to the benefits provided by a virtual appointment (e.g., convenience and efficiency).[152] This was especially true for patients who thought telehealth appointments were the best environment for discussing personal health problems.[307] Video consultations were seen as more acceptable and were better received than telephone consultations;[289, 307] however, the latter were preferred over video appointments in the case of a short followup appointment.[143] Patients were apprehensive about the legitimacy of telehealth[328] but were grateful for the added safety in light of the COVID-19 pandemic.[146] In addition, patients expressed that telehealth was not well-suited for all groups, such as those who had recently undergone major surgery.[329] Some felt that telehealth was acceptable after an initial, in-person evaluation[307] and that an established relationship between patient and provider was critical.[166] Other patient groups felt that telehealth was especially useful for triaging patients to in-person evaluation.[143, 166] Patients preferred telehealth appointments that were less than one hour in length, to limit the tiring effect of looking at the computer screen.[146] In one study, patients expressed wanting some customizable functionalities that encourage greater engagement and accountability.[321]

There were no surveys that collected data about telehealth in the context of preferences impacting patient satisfaction.

We have high confidence that, in general, patients prefer face-to-face visits with their healthcare provider but noted that telehealth was more convenient and may be better suited for some forms of care. We had minor concerns about data collection and analyses, but descriptions of preferences were thorough across the included studies (Appendix C, Results Table C.8; Appendix D, Evidence Table D.22; Table 19).

3.4.3.1.8. Concerns

Five qualitative studies described patients' concerns about telehealth. Patients described the challenges in conducting a telehealth appointment in view of complex care needs;[137] some had anxiety and skepticism regarding telehealth and setup[166] and others stated a reduced confidence in providers.[137] There were some sentiments that telehealth appointments were less personal than in-person appointments with physical exams.[307] Patients sometimes found communication challenging, reporting difficulties hearing and challenges with followups and scheduling future appointments.[315] In addition, the use of telehealth was less common when obtaining specialist care, which often required in-person evaluation (e.g., dentistry).[327]

There were no surveys that collected data about telehealth in the context of concerns impacting patient satisfaction.

We have moderate confidence that patients have concerns about telehealth use for complex care, as well as concerns about setup and the lack of personal care via telehealth. Our concerns about methodology were primarily about limited findings applicable to satisfaction with telehealth (Appendix C, Results Table C.8; Appendix D, Evidence Table D.22; Table 19).

3.4.3.1.9. Suggestions

Four qualitative studies focused on patient suggestions or facilitators to improve telehealth. In these studies, patients suggested several facilitators for successful implementation. Patients felt that telehealth consultations required mutual trust between the patient and their provider; this was seen as easier to accomplish for preexisting relationships with the healthcare provider, suggesting that developing rapport/relationships with the care team might be challenging for new patients.[159] In one study, many patients reported a beneficial effect of telehealth, including a sense of caring and support, feeling empowered, and feeling that the appointment was calming. Telehealth facilitated patient self-efficacy and involvement in their own care.[156] One study suggested additional training and technical support be provided to patients to better facilitate their telehealth visit,[139] while another suggested that hybrid models of care be developed to better develop a therapeutic relationship and facilitate interpersonal connections.[139]

There were no surveys that collected data about telehealth in the context of suggestions or facilitators impacting patient satisfaction.

We have low confidence that patients' suggestions of trust development, developing rapport, additional technical support, and hybrid models of care are facilitators to telehealth. We have serious concerns about the detail surrounding data collection, data analysis, and presentation of findings (Appendix C, Results Table C.8; Appendix D, Evidence Table D.22; Table 19).

3.4.3.2. Provider Perspective of Satisfaction and Dissatisfaction With Telehealth

3.4.3.2.1. Ease of Use

Five qualitative studies described provider satisfaction regarding ease of use of telehealth. Providers indicated advantages to telehealth, including that it is more convenient,[194, 242] provides flexibility and greater access to patients,[242] is more efficient in terms of time and utilization of office space,[329] allows for remote work,[255] and supports greater inclusion of caregivers.[194] However, this same group of providers felt that, overall, while telehealth works well for their work schedule, there is a lack of internet access in rural settings, and it is a tedious system.[194] To deal with the emergent nature of telehealth, providers reported leveraging existing systems, especially triage systems, to do the following: assess patient needs, communicate and support care-related decisions, ensure seamless transitions of care, and provide specialized support (e.g., bereavement and grief support services).[241]

Eleven surveys described provider satisfaction or dissatisfaction with ease of use of telehealth. [143, 181, 190, 201, 242, 280, 286, 287, 337, 346, 347] Providers noted that telehealth was convenient and easy to use for both their practices and their patients.[143, 190, 201, 227, 242, 286, 337, 346] While ease of use was commonly noted, some providers noted that integrating telehealth into current practice was difficult,[286] citing difficulty in coordination and setup.[181, 280] Some providers also had difficulty in providing care and noted that consultations were uncomfortable.[181, 242, 287, 347] Populations across the qualitative data and survey data were not comparable (Appendix C, Results Table C.9).

We have low confidence that providers are satisfied with telehealth, find it easy to use, more convenient, efficient, and perceive that it provides better access to patients. Our confidence is limited owing to a lack of sufficient details about qualitative methodology, which resulted in an inability to assess rigor. Additionally, there was a lack of detail in descriptions regarding ease of use in three of the five studies (Appendix C, Results Table C.10; Appendix D, Evidence Table D.22; Table 20). The survey data support the qualitative data.

3.4.3.2.2. Access

Four qualitative studies described provider perspectives regarding access to telehealth. Providers noted being generally satisfied with the telehealth platform, stating that telehealth provides benefits to both staff and patients.[229] Perceived benefits to patients included patients not having to travel, find parking, or sit in waiting rooms, providing a level of convenience not comparable to in-person visits.[189, 286] Providers noted that some patients are not well served by telehealth, such as those who are more difficult to reach and engage via telehealth (e.g., patients with mental health conditions).[229] Some providers reported issues, for both themselves and their patients, with insufficient technological infrastructure (particularly related to internet connections), describing a lack of sufficient support from the organization to help with software or devices used to access the technology.[231] In addition, providers felt that they needed a very user-friendly video call tool to ensure privacy standards are met, in addition to wanting features such as a digital white board, the ability to transfer files securely, and capacity for support group sessions.[231]

Five surveys described provider satisfaction with access to care.[143, 179, 340, 348, 349] Surveys gathered information about providers' general satisfaction with access to care via telehealth,[143, 348, 350] as well as provider impressions that patients can access and use telehealth.[143, 179] Results from one survey identified dissatisfaction with access as it applies to cost of telehealth to providers.[349] Populations across the qualitative data and survey data were not comparable (Appendix C, Results Table C.9).

We have moderate confidence that providers are overall satisfied with telehealth and believe it can increase access to care for patients in terms of travel and time. However, we have the same level of confidence that providers were dissatisfied with telehealth owing to poor infrastructure and difficulty accessing technology for both providers and their patients, potentially limiting long-term implementation. While findings are well described, our confidence is limited owing to inadequate details about qualitative methodology, which limited our ability to address

Table 20. Summary of the evidence for provider satisfaction and dissatisfaction (N=54)

Summary of Review Findings	Number of Studies	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment
Ease of use: Many providers find telehealth easy to use: it is more convenient, efficient, and provides better access to patients. In some settings (e.g., rural communities that have inadequate connectivity), telehealth is not as easy to use.	5[194, 241, 242, 255, 329]	Minor concerns (satisfaction); no or very minor concerns (dissatisfaction)	No or very minor concerns	Moderate concerns (satisfaction); serious concerns (dissatisfaction)	No or very minor concerns	Low confidence
Access: Providers believe telehealth can increase access to care for patients in terms of travel and time. Difficulties were noted by providers, specifically poor infrastructure and difficulty accessing technology for both providers and their patients.	3[189, 229, 286]	Moderate concerns (satisfaction); minor concerns (dissatisfaction)	No or very minor concerns .	Moderate concerns	No or very minor concerns	Moderate confidence
Health Outcomes: Providers overall were satisfied with telehealth's impact on patient outcomes. They also provided conflicting views about telehealth's impact on patient outcomes (e.g., accountability).	15[189, 202, 214, 228, 236, 241, 242, 245, 254, 259, 265, 279, 287, 326, 351]	Minor concerns	No or very minor concerns	Moderate concerns (satisfaction); minor concerns (dissatisfaction)	No or very minor concerns	Moderate confidence
Communication: Telehealth can impede provider/patient communication owing to its impersonal nature.	20[202, 214, 219, 230, 231, 234, 236, 242, 245, 255, 257, 259, 262, 264, 265, 279, 286, 326, 352, 353]	Minor concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence
Benefits: Telehealth is seen as beneficial to patients from the provider perspective. Providers also found telehealth beneficial to their practices because it improved efficiency, capacity, and collaboration.	24[143, 189, 194, 203, 214, 215, 230, 232, 236, 238, 239, 243, 253, 255, 257-259, 263, 286, 287, 354-357]	Minor concerns	No or very minor concerns	Minor concerns	Minor concerns	Moderate confidence
Preferences: Providers are generally satisfied with telehealth, and believe it can replace many aspects of in	16[156, 191, 196, 202, 203, 206, 215, 218, 227, 230, 243, 255, 259, 354, 357, 358]	Minor concerns	No or very minor concerns	Moderate concerns	Minor concerns	Low confidence

Summary of Review Findings	Number of Studies	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment
person care, but overtime providers noted a need to catch up on care put on hold during the pandemic.						
Concerns: Providers feel that telehealth should not replace face-to-face visits; it prevents physical exam and telehealth is not suited for all types of care.	17[156, 214, 219, 227, 238, 241, 242, 245, 258, 259, 262, 279, 286, 356, 357, 359, 360]	Minor concerns	No or very minor concerns	Minor concerns	No or very minor concerns	High confidence
Provider Suggestions: Providers felt that telehealth in combination within person care should be considered for the future.	11[219, 236, 239, 245, 253, 257, 286, 351, 353, 357, 361]	Moderate concerns	No or very minor concerns	Moderate concerns	No or very minor concerns	Moderate confidence

CASP = Critical Appraisal Skills Programme; CERQual = Confidence in the Evidence from Reviews of Qualitative Research.

methodologic rigor (Appendix C, Results Table C.10; Appendix D, Evidence Table D.22; Table 20). The survey data support the qualitative data.

3.4.3.2.3. Health Outcomes

Fifteen qualitative studies described provider satisfaction or dissatisfaction with health outcomes of telehealth. Overall, providers described telehealth as increasing accountability,[242] improving treatment accuracy and effectiveness,[351] and increasing efficiency over face-to-face contact.[241] Providers felt that telehealth was especially useful in triaging patients.[259] The virtual environment meant that patients were more likely to keep appointments,[189, 326] which resulted in greater compliance,[242] increased patient comfort and safety,[242] improved therapeutic relationships,[242] and overall positive patient experiences.[259] Providers noted that using telehealth services negates infection risk in hospital settings[351] and minimizes the risk of COVID-19 transmission.[287] Others noted positive outcomes that included opportunities for patients to learn treatment skills for use in home settings[228] and opportunities for providers to gain additional information about the patient: for instance, a registered dietician may be able to "look into" a patient's refrigerator/pantry to understand home environment and diet.[189] One study reported that providers perceived that telehealth interactions resulted in increased focus on the topic, conciseness of the appointment, and an increased length of assessment; however, telehealth also resulted in less time or opportunity to manage all of the information.[265] Providers felt more control over their schedules and a slowed pace, resulting in more peaceful and relaxing interactions with patients.[214]

When discussing negative outcomes associated with telehealth, providers described challenges delivering treatment protocols via telehealth,[228] including a lack of physical exam,[236, 259] which complicated their ability to diagnose and treat certain conditions.[236] This negatively impacted both the quality[202, 254] and continuity of care[245] and represented reduced accountability.[242] One example of this was unsupervised exercise and incorrect technique.[279]

Twelve surveys identified satisfaction or dissatisfaction with telehealth's impact on health outcomes.[179, 181, 219, 230, 242, 283, 284, 286, 304, 348, 355, 358] Providers noted that telehealth added value to treatment, in general,[286, 304] and particularly during couple's therapy.[355] Further, providers expressed confidence that diagnoses were accurate, client concerns were addressed, and equality of telehealth were equivalent to in-person care.[181, 242, 358] Contrary to those perceptions, some providers noted that they felt examinations suffered from lack of physical contact and the possibility to miss signs/indications of illness.[179, 242, 284, 348] Providers did not notice a lower frequency of no-shows to therapy appointments,[230] and did not observe positive patient outcomes compared with face-to-face care.[219, 283] Populations across the qualitative studies and surveys were not comparable (Appendix C, Results Table C.9).

We have moderate confidence that providers were both satisfied and dissatisfied with telehealth's impact on patient outcomes. Providers provided conflicting thoughts about accountability and treatment accuracy. Our confidence is limited owing to a lack of details about qualitative methodology, along with inadequate detail about outcomes in four of the 15 included studies (Appendix C, Results Table C.10; Appendix D, Evidence Table D.22; Table 20). The survey data support the qualitative data.

3.4.3.2.4. Communication

Twenty qualitative studies described communication via telehealth from the provider perspective. Some providers felt that telehealth facilitated conversations with and increased engagement of patients.[214, 230, 242, 279] While providers agreed that clear, concise, and definitive communication was instrumental to efficient care and maintaining morale (of both staff and patients), the evolving nature of the COVID-19 pandemic made such definitive communication challenging.[257] Providers perceived telephone conversations as more "business like," enabling greater ability to run their clinic.[259] Providers also discussed feeling more comfortable refusing patient requests during telehealth visits[236] and sometimes used apps to draw attention to important aspects related to disease or treatment.[286]

Conducting services via telehealth, especially for those providing mental health services, made building rapport with patients more difficult,[214, 219, 231, 242, 255, 259] which reduced the patient experience and resulted in an impersonal experience.[242] Telehealth may be challenging for long, in-depth sessions[255] for new patients or those who require a more thorough exam.[202, 259] Providers noted the lack of personal connection and touch,[236] the inability to fully assess patient status[202] and provide a hands-on physical examination,[245] and communication difficulties owing to sensory impairment, inadequate equipment, and uneven connectivity (e.g., in rural communities).[262] Further, providers noted the inability of the virtual environment to fully support nonverbal communication[231, 259, 326] or to convey visual cues (especially when using the telephone);[264] providers also reported needing to use visual aids.[245] These factors were associated with difficulties in providing emotional support for sensitive topics[265] and sometimes resulted in providers having to reassure patients that the standard of care would be maintained.[352]

To facilitate outreach and assessment, providers described needing to proactively assess high-risk patients, screen for social determinants of health, keep up-to-date records, and consent patients to telehealth early or on admission.[352] Further, providers felt that linking primary and secondary care could ease transitions of care.[353] Providers suggested a timely in-person followup visit[245] and efforts to build connectedness to counter less frequent in-person connections.[352] Other issues noted by providers were poor availability of patients by telephone[286] and legal issues, such as the indemnification between the patient and provider, potentially resulting from their virtual interaction.[234] Despite these challenges, once adapted, some providers described being able to spend longer times with each patient and being able to connect well with them.[214]

Twelve surveys identified satisfaction or dissatisfaction with the effect of telehealth on communication.[181, 198, 201, 219, 242, 284, 288, 333, 362-365] Providers expressed general satisfaction with telehealth as it influences communication.[362-365] They noted that telehealth was equivalent to in-person care when establishing rapport and engagement with patients,[363, 365] and they noted that patients were able to express themselves and understand their conditions during telehealth.[201, 284, 363] They also noted that their communication was effective[181, 219] and that their relationship with patients improved.[242] Other groups of providers noted the opposite: video counseling was an impediment to communication and patient engagement.[198, 219, 288, 364] Populations across the qualitative data and survey data were not comparable (Appendix C, Results Table C.9).

We have moderate confidence that providers are dissatisfied with telehealth: it can impede provider/patient communication owing to the impersonal nature. Findings regarding communication are well described, however, our confidence is limited owing to poor reporting of methods, which limited our evaluation of rigor (Appendix C, Results Table C.10; Appendix D, Evidence Table D.22; Table 20). The survey data are partially in agreement with the qualitative studies. While the qualitative studies point to telehealth as an impediment to communication, providers responding to surveys indicated that patients expressed themselves more freely and that telehealth was equivalent to in-person care in establishing rapport. Some surveys agreed with the qualitative studies in that telehealth was noted as an impediment to communication.

3.4.3.2.5. Benefits

Twenty-four qualitative studies focused on the benefits of telehealth from the provider perspective. Although some providers viewed in-person assessment as superior, telehealth was found to be beneficial and to increase accessibility during the time of limited in-person engagement.[255, 258] Providers viewed telehealth as a sufficient alternative to in-person evaluation that resulted in risk reduction for patients and providers,[238, 243, 253, 255, 257] shorter consultation lengths, and narrower gaps between need and demand (although there were concerns about access to services).[287] Telehealth was seen as a tool to limit followup interruptions[259, 354] and to ensure continuity of care and limit COVID-19 exposure.[194, 203, 215, 354] Telehealth was viewed as inappropriate for new patients.[259] Providers in one study noted an increase in remote healthcare delivery and acceptance since the start of the COVID-19 pandemic that they thought was facilitated by the availability of payments, the restructuring of policies to allow telehealth services, and the inclusion of remote consultations in appointment systems.[253]

Providers noted numerous benefits associated with video visits, including improvements to efficiency, capacity, and collaboration.[232] With the added value of video to observe visual cues and assess physical status,[143, 238, 259] clinical staff members were able to continue to see a full caseload of outpatients during pandemic quarantine.[189] Telehealth appointments were particularly useful to see followup and post-operative patients and to more accurately triage and consult new referrals.[239] Telehealth resulted in improved efficiency,[232, 259] although not for all patient populations, such as patients requiring in-person assessment.[230, 354] Noted benefits included continuation of services, increased availability, increased caregiver involvement, comfort of being at home, safety from COVID-19 exposure, increased flexibility, decreased travel time, preferred modality for some patients, and the integration of technology.[258] Other noted benefits included more frequent use of telephone consultations,[286] increased ability to collaborate,[214] and convenience of and increased access to medical and counseling services.[263] Also noted were increased ability to schedule appointments, the ability of patients to do more at home, and reduced barriers to telehealth use and care.[357] Primary care visits conducted via telehealth visits tended to be shorter than in-person visits.[236] Providers felt telehealth provided comparable care while preventing unnecessary travel, in addition to providing increased flexibility and convenience and enhanced connection.[286] Providers in one study noted that the home environment promoted stronger therapeutic rapport and connections.[355] Providers reported feeling favorably about the ability to work from home, which saved commuting time, increased capacity to see patients more efficiently, and facilitated issues related to childcare.[356]

There were no surveys that collected data about the satisfaction with benefits of telehealth from the perspective of the provider.

We have moderate confidence that providers are satisfied with telehealth and find it beneficial to patients and providers because it improves efficiency, capacity, and collaboration. Findings regarding benefits are well described; however, our confidence is limited owing to poor reporting of methods, which limited our evaluation of rigor (Appendix C, Results Table C.10; Appendix D, Evidence Table D.22; Table 20).

3.4.3.2.6. Preferences

Sixteen qualitative studies described provider preferences regarding telehealth. There was some preference for in-person assessments;[255, 358] providers noted being generally satisfied with telehealth[196, 255, 259] and perceived that patients found telehealth acceptable,[202, 215] especially once they became familiar with the process.[156, 218, 357] Providers felt that many components of in-person visits could be accomplished successfully via telehealth, including pain rehabilitation,[227] and that telehealth was especially suitable for patients with less complex care needs.[255] Telephone consultations were perceived as suitable for most patients;[243] the telephone was seen as a primary alternative to video, either because it assuaged concerns about technical challenges with video consultations or because the general practitioner already saw most of their patients face-to-face.[191] Providers did not feel there was any added benefit from having a video function.[206] Other providers felt that telehealth should be a permanent option[230] that could be integrated as a possible complement to in-person visits, reducing patient burden (e.g., travel time).[354] As the pandemic waned, preferences for in-person visits replaced some of the initial appeal for telehealth appointments: "There was a strong feeling from respondents that they needed to catch up on concerns that patients had put on hold because they wanted to discuss them in person."[203]

There were no surveys that collected data about telehealth in the context of preferences impacting provider satisfaction.

We have low confidence that providers are generally satisfied with telehealth and believe it can replace many aspects of in-person care. Providers noted that, over time, they needed to catch up on care put on hold during the pandemic. Our confidence is limited owing to a lack of details about qualitative methodology, along with inadequate detail about outcomes in 10 of the 16 included studies (Appendix C, Results Table C.10; Appendix D, Evidence Table D.22; Table 20).

3.4.3.2.7. Concerns

Seventeen qualitative studies discussed concerns with telehealth from the provider perspective. Overall, providers noted that, while telehealth was a good alternative, it should not replace in-person, face-to-face visits;[219, 245, 258, 286, 357] they regarded telehealth as preventing a proper physical examination, necessary especially during initial medical evaluations and ongoing treatment phases.[227, 259] In addition, providers felt that telehealth appointments are not well suited for all types of care, noting difficulty moving in-person appointments to patients' homes.[156, 359] While providers were generally dissatisfied with limited face-to-face, in-person contact,[262, 279] video consultations were seen as "better than nothing."[360] Some providers felt that this choice depends on personal preference[357] and expressed concerns about working remotely from their personal space.[279, 357] Others felt that remotely-delivered care resulted in patients relying more heavily on them during off-hours.[356] While many issues negatively impacted sustainability of the telehealth model, two primary issues stood out: not being able to conduct a physical exam and technical difficulties.[238, 245, 258] Providers' acceptance of video visits was similarly challenged by the technology and impact to workflow efficiency and communication.[241, 245, 258] Providers were concerned about the sufficiency of telehealth in providing a long-term, successful outcome.[227] They worried that patients who are critically ill and need to be seen in-person might fall through the cracks or be scheduled inappropriately for telehealth appointments.[214] One way providers dealt with this was to request more investigations to clarify questions not answered in the virtual environment owing to the lack of physical examination.[259] Some providers felt that more attention needed to be paid to understand relational processes in effectively communicating with patients via telehealth modalities.[242] Many decision moments were present, however there was insufficient information available.[286]

There were no surveys that collected data about telehealth in the context of concerns impacting provider satisfaction.

We have high confidence that providers had some concerns leading to dissatisfaction of telehealth and felt that it should not replace face-to-face visits, as telehealth precludes physical exams and is not suited for all types of care. Findings regarding benefits are well described across all studies with a small percentage with poor reporting of methods, which limited our evaluation of rigor (Appendix C, Results Table C.10; Appendix D, Evidence Table D.22; Table 20).

3.4.3.2.8. Provider Suggestions

Eleven qualitative studies discussed provider suggestions for implementing telehealth services from the provider perspective. Providers felt that future use of telehealth should be considered in combination with traditional, in-person visits[286] to ensure regular and appropriate followup, especially for particular patient populations (e.g., those who live far away from in-person care).[351] Providers discussed the importance of stimulating the use of eHealth services to ensure successful and wide-spread implementation.[357] Providers suggested that organizational readiness, engagement, and leadership are critical for successful telehealth implementation.[361] Several factors to assess readiness to change and support the implementation of telehealth were suggested: (1) measuring awareness and acceptability among target groups; (2) providing safe, private, comfortable, and context-sensitive environments for patients; and (3) providing sufficient care across modalities.[357]

At the system level, facilitators to the implementation of telehealth included governmental or organizational supports, such as health reforms or strategies that facilitate the increased acceptance of telehealth services.[253] At the organizational level, providers felt their ability to provide remote services was further enhanced by training and continuing education to achieve acuity in providing services via telehealth.[219, 353] In addition, access to formal and informal inter-organizational networks and recognition of external policies and protocols were highlighted.[361] Further, providing clinic staff with access to knowledge and information were seen as critical components to promoting provider and staff self-efficacy,[361] and one study highlighted the need for careful consideration of providers' workflows to avoid work overload and burnout.[236] Regarding the latter, "It became easier when they found ways to introduce clients to the therapeutic frame, send intake forms via e-mail, and speak with their clients about the challenges that come with remote treatment."[219] Increased resolution of video images facilitated remote physical assessments.[239] To mediate some of these issues, providers suggested: "(1) screen sharing to facilitate patient education and explain imaging results, (2) a waiting room function to replicate "stepping out of the room" when engaging with trainees, (3) a chat box for troubleshooting, (4) file sharing capabilities, (5) screenshot capabilities to support efficient charting, and (6) multi-person teleconferencing to include other members of the multidisciplinary team, interpreters, trainees, and family members in different physical locations."[245] Some providers noted that telehealth is here to stay and can no longer be ignored.[257] To facilitate its sustainability, remote delivery of care was seen as needing equal payment structures and technological support.[286] Social workers in one group noted that access to technology and other necessary supports facilitated their ability to complete their work, whether remotely or on-site via telehealth.[257]

There were no surveys that collected data about telehealth in the context of suggestions or facilitators impacting provider satisfaction.

We have moderate confidence that providers are satisfied with telehealth but suggested that telehealth in combination with in-person care should be considered for the future. Our confidence is limited owing to a lack of details about qualitative methodology, along with inadequate detail about outcomes in four of the 11 included studies (Appendix C, Results Table C.10; Appendix D, Evidence Table D.22; Table 20)

3.4.3.3. Other Populations' Perspective of Satisfaction and Dissatisfaction With Telehealth

3.4.3.3.1. Ease of Use

One qualitative study of providers and hospital administrators noted that telehealth improved ease of completing visits.[302]

Two surveys of patients and their caregivers addressed ease of use. In one survey the respondents noted that the telehealth equipment worked well and it was easy to speak with the provider,[366] and another survey noted some dissatisfaction of the patients and caregivers regarding the instructions for using telehealth.[294]

3.4.3.3.2. Access

Four qualitative studies of combined populations discussed telehealth access. One caregiver group noted being satisfied with not having to travel to appointments,[295] and a group of patient and caregiver respondents noted the convenience of being able to complete testing at home.[244] Patients and providers described reduced patient travel time and increased access owing to the ease of scheduling and accessing appointments.[298] In another study, nurses and aides identified scenarios such as evaluating poor wound healing, signs and symptoms of infection, weight gain, and respiratory difficulties as issues for which telehealth (via video) would be especially useful.[367] In this same study, patients and caregivers cited rashes, incisions, wounds, bleeding, and sore throat as issues for which the platform would be especially useful.[367]

Two surveys of patients and their caregivers identified positive aspects of access: one study noted that the respondents liked that the challenges of getting to their appointments were eliminated;[295] another study noted the following benefits: no time away from work, no travel, and saved time.[306]

3.4.3.3.3. Health Outcomes

One study with both patients and hospital administrators concluded that telehealth improved patient comfort.[302]

There were no surveys that collected data about telehealth from other user groups in the context of impact on outcomes.

3.4.3.3.4. Communication

Four qualitative studies reported data regarding communication from combined populations. In a group of patient and hospital administrators, the majority of respondents felt that telehealth resulted in diminished human connection and rapport, resulting in part from an inability to read non-verbal communication.[302] Patients and caregivers in one study noted telehealth as being subpar compared with in-person services, so telehealth was, therefore, not seen as a long-term solution or substitute for pre-COVID-19 era levels of care.[368] One caregiver group described being able to receive a good level of care and compassion, even via telephone.[369] Another patient/caregiver group provided generally negative feedback, citing technical difficulties (e.g., issues getting connected to the platform, losing internet connectivity), as well as limitations of evaluation within the virtual appointment.[244] In most cases, staff and patients chose the telephone as an easy and accessible platform for communicating and did not consider that there was any added benefit from having a video function.[206]

Three surveys of patients and their caregivers addressed improved communication via telehealth. These groups noted that they were more comfortable about discussing their emotional health via telehealth,[370] and they had the impression that providers were caring during the telehealth visit.[371] Another survey identified overall satisfaction with/ease of communication via telehealth.[301]

3.4.3.3.5. Benefits

In general, users felt satisfied with their telehealth visit in terms of benefits.[244, 304] Both patient/hospital administration groups,[302] as well as patient/caregiver groups,[305] noted the overall acceptability of telehealth and felt that it was especially adaptable to the COVID-19 pandemic.[295] Joint provider/patient groups described telehealth as a “whole new way of working.”[372] Patient/caregiver respondent groups were appreciative of clinics providing proactive care immediately after the onset of COVID-19 restrictions,[303] noting that video calling was more valuable than receiving no support at all or only phone consultations.[292]

Telehealth was viewed as especially beneficial for certain types of patients, such as those with issues of mobility.[373] Nurses and patients in one study identified a variety of benefits of using telehealth including convenience, saving time and money, and reducing stress.[367] Caregivers/parents experienced good or improved communication with providers, highlighting enhanced feelings of connectedness, no waiting time or travel, not having to adjust work schedules/take time off, and not sitting in busy waiting rooms.[369] Parent caregivers noted satisfying benefits of gaining time and not having to worry about their child missing school or having behavioral challenges at the hospital, for instance.[295]

There were no surveys that collected data about general benefits of telehealth from other user groups’ perspectives.

3.5. Results for Key Question 4

Key Question 4. What strategies have been used to implement telehealth interventions during the COVID-19 era?

3.5.1. Key Points and Summary

- No study compared implementation strategies for telehealth or provided a detailed description of their own implementation strategy, and fewer than half of the studies used a formal framework to design or evaluate their strategies.
- Acceptability of telehealth services to patients varied considerably by the type of care and setting; for providers, acceptability was influenced by several factors, such as previous experience with telehealth and the type of care provided.
- Adoption of telehealth among patients was variable across clinical settings and patient populations; whereas, adoption was generally accomplished in short timeframes among providers, but this seemed to be significantly affected by prior training in telehealth.
- Feasibility of telehealth was sometimes limited by the availability of telehealth technologies for patients but was generally high among providers.
- Fidelity of telehealth implementation, when measured, was generally positive (i.e., completed rate of the telehealth visits as planned).
- We found insufficient evidence on implementation cost, penetration, and sustainability of telehealth services from the patient and provider perspectives.
- Evidence on a health-system level was lacking for various outcomes of telehealth implementation (e.g., acceptability, adoption, appropriateness, feasibility, sustainability).

We identified 51 studies that assessed implementation of telehealth during the COVID-19 era (Appendix D, Evidence Tables D.23 through D.31). These studies aimed to develop a generalizable methodology to improve telehealth interventions during the COVID-19 era. None of the studies provided detailed descriptions of implementation strategies and only two of them compared strategies and/or patient groups. Only 18 of the studies used a formal and/or validated implementation framework to design and evaluate their implementation strategies (Table 21).

Most studies (N=23; 45.1 percent) were executed during the early COVID-19 era and were conducted in North America (N=37; 72.5 percent), with U.S. studies compromising 29 of those studies. Of the 51 studies, 35 (69 percent) reported using a mix of telephone and video to conduct the telehealth sessions, while 14 (27 percent) did not report details of their approach thus limiting the interpretation of findings.

Table 21. Implementation strategies and assessments with formal assessment frameworks (N=18)

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework
Agarwal , 2021[374]	Patients	Leveraging telehealth to follow up with patients during the acute phase of COVID-19 (typically 14 days from symptom onset) or until they were discharged to community-based care from their primary care provider.	Assessing the adoption, feasibility, and safety of the telehealth services.	Adoption-Feasibility-Safety for early innovation (Proctor et al., 2010)[29]
Braune, 2021[375]	Patients	Remotely supporting children with type 1 diabetes and their caregivers during diabetes management.	Increasing the time that these children spend in the optimum glucose range and improving the children's quality of life.	Service Design Methodology[376]
Miller, 2021[377]	Patients	Offering telehealth physical therapy in response to COVID-19 within a large urban academic medical center.	Identifying implementation strategies to maintain and scale up long-term telehealth physical therapy.	Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM)[378]
Weems 2021[379]	Patients	Implement different virtual caregiver support platforms during the COVID-19 era.	Measure the pragmatic quality improvement project to enhance delivery of virtual support services for alzheimer's disease and related dementias caregivers.	Consolidated Framework for Implementation Research (CFIR)[380]
Williams 2022[381]	Patients	Rapidly developing and implementing a pain-management program (PMP) in a hospital setting.	Measure improvement qualitatively with frequent and repeated qualitative data collection and quantitatively by patient demographic comparisons.	Model for Improvement Framework (MIF)[382]
Budhwani 2021[383]	Providers	Implement virtual care for mental health care at an academic ambulatory hospital.	Understand consistent facilitators of and persistent challenges to the use of virtual care and perceived impact on quality of care.	Non-adoption, Abandonment, Scale-up, Spread, and Sustainability (NASSS)[384]
Cox, 2021[385]	Providers	Implementing telerehabilitation by community rehabilitation services during COVID-19 era.	Understanding barriers and enablers to the implementation of telerehabilitation with community outpatients during COVID-19 era.	Hybrid Implementation Design (Curran et al., 2012)[386]
Lopez , 2021[387]	Providers	Delivering virtual cancer rehabilitation during the first 90 days of the COVID-19 era.	Understand the experiences of patients and healthcare providers who receive and deliver, respectively, virtual care.	Framework for Reporting Adaptations & Modifications-Expanded (FRAME)[378]
Mishkind , 2021[388]	Providers	Virtualizing individual therapy and medication management visits for patients with mental health issues.	Assess the clinical outcomes of virtualizing mental health care.	Best practices in videoconferencing-based tele-mental health (Shore et al., 2018)[389]
Ouellette , 2021[390]	Providers	Offering virtual care nursing leadership training.	Adapt training goals and content to meet learner needs during training sessions.	Normalization Process Theory[391]
Reid 2022[392]	Providers	Rapid implementation of obstetric telemedicine during the COVID-19 era.	Assess the rapid implementation of obstetric telemedicine during the COVID-19 era.	Consolidated Framework for Implementation Research (CFIR)[380]

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework
Stewart 2022[393]	Providers	Implement remote asthma consulting in UK general practices.	Evaluate the rapid and reactive implementation of telehealth in general practice in response to the COVID-19 era.	Extended Normalization Process Theory (eNPT)[394]
Thomas 2022[395]	Providers	Implement telehealth services across 16 allied health departments over four health service facilities.	Determine the clinician, service, and system level factors that influence sustained use of telehealth.	Non-adoption, Abandonment, Scale-up, Spread, and Sustainability (NASSS)[384]
Van Citters 2021[207]	Providers	Implement high-quality telehealth services among cystic fibrosis patients.	Qualitative exploration of facilitators and barriers to telehealth services.	Consolidated Framework for Implementation Research (CFIR)[380]
Weiskittle 2022[396]	Providers	Address older adult's social isolation during the COVID-19 era using telehealth.	Survey of geriatric mental health clinicians who used telehealth to address the pandemic's mental health side effects.	Hybrid Type 1 design framework[386]
Gilbert 2022[397]	Patients & Providers	Implement virtual consultations in tertiary orthopedic rehabilitation settings.	Measure patient preferences for orthopedic virtual consultation during COVID-19 era.	Normalization Process Theory (NPT)[398]
Payan 2022[399]	Patients & Providers	Use telemedicine during the pandemic at federally qualified healthcare centers (FQHCs) with a focus on language service provision.	Examine the patient facilitators and barriers to telemedicine implementation and use in FQHCs with a focus on language barriers.	Consolidated Framework for Implementation Research (CFIR)[380]
Ward 2021[400]	Patients & Providers	Implementation of a provider-to-provider tele-mental health intervention in unscheduled settings within the Veterans Health Administration (VHA).	Mixed-methods evaluation of an emergency telehealth intervention in unscheduled settings of the VHA.	Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM)[378]

RE-AIM: Reach Effectiveness Adoption Implementation Maintenance/sustainment

3.5.2. Patient-Focused Studies

Twenty-five studies enrolled patients as participants to assess implementation strategies of telehealth in the COVID-19 era, with thirteen of these also including healthcare providers (Appendix D, Evidence Table D.24). Seventeen studies included adult patients, only; three studies focused on pediatric patients, only; four studies focused on a mix of adult and pediatric patients; and one study did not report the age group of the patients. Only half of the patient-focused studies (N=12) reported on the race/ethnicity of the patients and reported that 0 percent to 94 percent were White, and 0 percent to 67 percent were Black. Seven of these studies focused on mental health conditions, six studies concentrated on rehabilitation issues, and twelve studies targeted other medical conditions (e.g., obstetrics and gynecology, type 1 diabetes, cancer, orthopedics, Alzheimer's and Parkinson's diseases, and chronic pain). All of the studies, except one, implemented their telehealth intervention as planned. The planned implementation strategies varied from more traditional centralized telehealth services to mobile units offering telehealth services to patients living in rural areas.

3.5.3. Provider-Focused Studies

Thirty-nine studies targeted healthcare providers and health systems to evaluate the effectiveness of implementation strategies for rolling out telehealth services during the COVID-19 era (Appendix D, Evidence Table D.25). Nine studies assessed the feedback on the implementation strategies that were provided by mental health experts, six studies focused on rehabilitation experts, six studies enrolled primary care physicians, 17 studies included other types of specialties (e.g., neurology, obstetrics and gynecology, hepatology, ophthalmology, pediatrics), and one study did not specify the specialty of the providers. Twelve studies were conducted in large regional health systems, 18 studies were performed in single health systems, two studies were limited to specific clinics or centers, and seven studies either missed information on the type of the underlying health systems or included other types of health systems.

3.5.4. Implementation Strategies and Outcomes

Both patient-focused and provider-focused studies adopted a variety of strategies and different approaches/frameworks to assess the outcomes of telehealth implementation. All studies strategized to integrate and/or boost existing telehealth services into their routine clinical practices to minimize the negative effect of the COVID-19 pandemic. However, studies conducted different assessments to measure the effect of the telehealth implementation. The assessments ranged from descriptive statistics, surveys, interviews, to mixed-methods approaches. Only 18 of the studies (Table 22) used a validated assessment framework to measure the success of the implementation outcomes (e.g., Normalized Process Theory; Reach Effectiveness Adoption Implementation Maintenance/sustainment (RE-AIM); Normalization Process Theory). Studies with qualitative components extracted common themes from the patient and/or provider feedback. Overall, the qualitative themes suggested interest by patients in using telehealth services but also revealed potential barriers to the achievement of optimal outcomes of telehealth implementation (Appendix D, Evidence Table D.29).

Table 22. Implementation outcome categories covered by Key Question 4 studies (N=51)

Implementation Outcome Category	Patient Studies, N (Percent)	Patients, N	Provider or Health System Studies, N (Percent)	Providers, N
Acceptability	20 (80)	10,140	26 (66.7)	1,505
Adoption	17 (68)	371,974	26 (66.7)	965
Appropriateness	18 (72)	2,533	28 (71.8)	1,633
Feasibility	13 (52)	1,290	22 (56.4)	827
Fidelity	3 (12)	245	8 (20.5)	548
Implementation Cost	2 (8)	355	4 (10.3)	216
Penetration	0 (0)	0	3 (7.7)	22
Sustainability	3 (12)	804	9 (23.1)	439

3.5.4.1. Types of Implementation Outcomes

In most studies, healthcare systems did not have the time and resources to assess different approaches to telehealth implementation during the COVID-19 era. Indeed, no study evaluated implementation strategies directly, such as through comparison of implementation methods in a controlled study. We have thus described the measures commonly used to assess implementation outcomes and those results. We adopted the categories defined by Proctor et al. (2011) to summarize the implementation outcomes of the studies.[29] Implementation outcomes were categorized and then summarized as acceptability, adoption, appropriateness, feasibility, fidelity, implementation cost, penetration, and sustainability (Appendix D, Evidence Tables D.30 and D.31). *Acceptability* describes the satisfaction among implementation stakeholders (e.g., patients, providers, healthcare organizations) with different aspects of the intervention (e.g., content, delivery). *Adoption* describes the rates of uptake or use of the intervention by the provider or healthcare organization. *Appropriateness* refers to the program suitability or compatibility at various levels of stakeholders (e.g., patient, provider, healthcare organization). *Feasibility* is the practicability of the intervention for everyday use by the providers or healthcare organization. *Fidelity* refers to the delivery of the intervention as designed. *Implementation cost* describes the assessment of marginal cost, cost-effectiveness, or cost benefit. *Penetration* is the degree to which the intervention was institutionalized. *Sustainability* is the continued delivery of the intervention beyond the study period.[401]

As Table 22 demonstrates, most studies focused on the acceptability, adoption, appropriateness, and feasibility outcomes of the implementation strategies. Fewer studies focused on fidelity, implementation cost, penetration, or sustainability of the telehealth implementation.

To assess the coverage of different types of implementation outcomes across studies, evidence was grouped using the implementation outcomes defined by Proctor et al. (2011)[29] (Table 22, and Appendix D, Results Tables D.30 and D.31).

3.5.4.2. Acceptability

3.5.4.2.1. Patients

Patient satisfaction and confidence with telehealth services varied widely by the type of care and setting in which it was delivered. For example, telehealth for services that required physical manipulation were more burdensome on patients and caregivers than telehealth services that did not require physical manipulation (e.g., telerehabilitation versus teleconsultation). However, patients were satisfied if those healthcare interventions were meant to reduce isolation and improve interpersonal connection[179, 251, 375, 377, 400, 402-408] (Appendix D Table D.30).

3.5.4.2.2. Providers

Several factors appeared to influence provider satisfaction with telehealth services, such as the type of healthcare provided, availability of home health devices, previous experience with telehealth technology, and established workflows[179, 245, 251, 324, 383, 392, 395, 403, 405, 406, 409-416] (Appendix D Table D.31).

3.5.4.2.3. Patients and Providers

Telehealth interventions that increased access in target patient populations were acceptable to both patients and providers; however, patients and/or providers agreed that healthcare services requiring a physical exam, manipulation of the patient, or equipment for patient assessment were best supplemented with in-person visits[245, 375, 379, 396, 404, 406, 409, 411, 412, 414, 416-418] (Appendix D Tables D.30 and D.31).

3.5.4.2.4. Health System

No evidence.

3.5.4.3. Adoption

3.5.4.3.1. Patients

Adoption of telehealth services was variable across clinical setting, digital literacy of the patient population, and the urgency with which patients required healthcare services[251, 374, 375, 377, 379, 397, 399, 402, 406, 419, 420] (Appendix D Table D.30).

3.5.4.3.2. Providers

Adoption of telehealth services was relatively quick among providers; however, the efficiency of adoption depended on prior training of the providers using telehealth services[245, 251, 278, 290, 324, 383, 385, 387, 388, 392, 395, 400, 406, 414, 421] (Appendix D Table D.31).

3.5.4.3.3. Health System

No evidence.

3.5.4.4. Appropriateness

3.5.4.4.1. Patients

Telehealth showed varying levels of appropriateness across patients. For example, telehealth visits were found to be appropriate for patients requiring timely followups and continuity of care but not suitable for patient populations requiring physical examination, having acute illnesses, or requiring the collection of data from young children[99, 251, 374, 375, 400, 402, 407, 414, 416, 417, 419] (Appendix D Table D.30).

3.5.4.4.2. Providers

Telehealth was assumed to be mostly appropriate for outpatient visits (e.g., prenatal care, COVID-19 visits); however, those services were found to be not appropriate for specific services (e.g., group therapy, physical examination, or services requiring assistance from a caregiver or participation of young children)[179, 245, 251, 290, 385, 392, 393, 395, 396, 400, 403, 406, 408, 410, 411, 415, 416, 422, 423] (Appendix D Table D.31).

3.5.4.4.3. Health System

No evidence.

3.5.4.5. Feasibility

3.5.4.5.1. Patients

Feasibility of telehealth services was sometimes limited by technological challenges, lack of privacy, and missing medical equipment (e.g., thermometers, oximeters) at the patient's residence[99, 374, 381, 397, 400, 402, 414, 415] (Appendix D Table D.30).

3.5.4.5.2. Providers

Telehealth reduced the wait times (backlogs), as well as no-shows, hence increasing workplace flexibility; however, certain visit types took longer than planned (e.g., visits that required moving the camera for physical examination)[278, 383, 392, 397, 399, 411, 413] (Appendix D Table D.31).

3.5.4.5.3. Health System

No evidence.

3.5.4.6. Fidelity

3.5.4.6.1. Patients

We identified three studies reporting completion of visits by patients[375, 404, 414] (insufficient evidence).

3.5.4.6.2. Providers

One study discussed the fidelity of visits by providers[416] (insufficient evidence).

3.5.4.6.3. Health System

Various health systems demonstrated the achievement of an acceptable rate of the planned telehealth visits as originally designed, with modest modifications[179, 245, 387, 388, 397, 423, 424] (Appendix D Table D.31).

3.5.4.7. Implementation Cost and Penetration

3.5.4.7.1. Patients

Two studies calculated the saved costs associated with the receipt of telehealth by patients[179, 414] (insufficient evidence). None of the studies assessed the penetration of the implementation strategy across other patient populations.

3.5.4.7.2. Providers

None of the studies focusing on providers calculated the incurred or saved costs associated with telehealth implementation. None of the studies assessed the penetration of the implementation strategy across other providers and/or health systems.

3.5.4.7.3. Health System

No evidence.

3.5.4.8. Sustainability

3.5.4.8.1. Patients and Providers

Sustainability of telehealth services was mostly assessed qualitatively (e.g., intention of patients or providers to use telehealth after the COVID-19 pandemic)[179, 245, 392, 408, 414] (Appendix D Tables D.30 and D.31).

3.5.4.8.2. Health System

No evidence.

3.5.5. Summary of Findings

As shown in Table 23, we generally have low confidence in our conclusions about the outcomes from telehealth implementation (i.e., low strength of evidence). This was mainly because there were no trials and most studies did not have a comparison or control group, did not apply protection against bias, often did not compare telehealth with routine care, and were frequently single site studies.

Table 23. Summary of findings for implementation outcomes

Finding	Outcome Category	Level	Number of Studies	Strength of Evidence
Satisfaction with telehealth services varied by the type of care and setting.	Acceptability	Patient	12 studies [179, 251, 375, 377, 400, 402-408]	Moderate
Several driving factors appeared to influence provider satisfaction with telehealth services.	Acceptability	Provider	18 studies [179, 245, 251, 324, 383, 392, 395, 403, 405, 406, 409-416]	Low
Telehealth interventions increased access in target patient populations, but some were best supplemented with in-person visits.	Acceptability	Patient & Provider	17 studies [245, 375, 379, 396, 404, 406, 409, 411, 412, 414, 416-418]	Low
Adoption of telehealth services was variable across different patient populations.	Adoption	Patient	11 studies [251, 374, 375, 377, 379, 397, 399, 402, 406, 419, 420]	Low
Adoption of telehealth services was relatively quick among providers; however, some providers face more challenges than others.	Adoption	Provider	15 studies [245, 251, 278, 290, 324, 383, 385, 387, 388, 392, 395, 400, 406, 414, 421]	Moderate
Telehealth showed varying levels of appropriateness across patients.	Appropriate	Patient	11 studies [99, 251, 374, 375, 400, 402, 407, 414, 416, 417, 419]	Low
Telehealth was found to be appropriate by providers for some medical services but not all.	Appropriate	Provider	19 studies [179, 245, 251, 290, 385, 392, 393, 395, 396, 400, 403, 406, 408, 410, 411, 415, 416, 422, 423]	Low
Feasibility of telehealth was sometimes affected by technical challenges and lack of privacy at home.	Feasibility	Patient	8 studies [99, 374, 381, 397, 400, 402, 414, 415]	Low
Telehealth reduced backlogs and no-shows; however, it lengthened some types of visits.	Feasibility	Provider	7 studies [278, 383, 392, 397, 399, 411, 413]	Low
Telehealth services were deployed and completed as originally designed/planned.	Fidelity	Health System	7 studies [179, 245, 387, 388, 397, 423, 424]	Low
Patients and providers intend to continue telehealth visits in the future.	Sustainability	Patient & Provider	5 studies [179, 245, 392, 408, 414]	Low

4. Discussion

4.1. Findings in Relation to the Decisional Dilemma

We used a mixed-methods review of qualitative and quantitative studies to address the key decisional dilemma for patients, providers, and health systems of *how* to provide telehealth services. To address this question, we sought to identify which telehealth intervention worked for which patient population, in which setting, and through which implementation strategy.

We selected studies that analyzed national databases, with characteristics from millions of telehealth visits, to summarize characteristics of patients, providers, and health systems using telehealth during the COVID-19 era. We found that patients who used telehealth were more likely to be people who are young to middle-aged, female, White, with higher socioeconomic status, and living in urban settings. These are the same user characteristics as those that used healthcare and digital healthcare pre-COVID-19. This finding, along with those from our qualitative synthesis, suggests that, while telehealth may improve access to care, it may be doing so for those who already have access.

We found that telehealth visits for mental and behavioral health conditions were more frequent than for other conditions and were also more likely than other types of care to be delivered via telehealth. Conversely, one of the challenges highlighted in our qualitative synthesis was the dissatisfaction with telehealth in developing rapport, especially for mental health care.

The studies that compared telehealth with in-person care reported a wide range of outcomes, measured in a variety of ways, in patients with a variety of clinical conditions. This limited our ability to draw conclusions and prevented us from making any general statements about the benefits and harms of telehealth. Despite this limitation, we identified several key findings. Patients who receive an initial telehealth visit have lower hospitalization rates compared with those who receive in-person care for general medical conditions. However, among patients who receive COVID-19 care and pregnancy/prenatal/gynecological care, those who receive an initial telehealth visit may have higher hospitalization rates compared with those who receive in-person care. Telehealth may be an inadequate mode of care delivery for patients requiring specialized care for complex clinical conditions.

Hospitalization rates for patients who had an initial telehealth visit varied across different clinical conditions; however, in studies that assessed readmission rates, among patients who receive specialized care for COVID-19, pregnancy/prenatal/gynecological, and surgical conditions, those who receive an initial telehealth visit may have similar or lower readmission rates compared with those who receive in-person care. Still, we cannot distinguish the reason for healthcare utilization; patients in the telehealth group may have been less likely to have severe conditions that led to necessary utilization or may have been less likely to seek unnecessary care.

Clinical outcomes were generally similar between telehealth and in-person care; any differences in outcomes between telehealth and in-person care varied by the type of outcome measured. For instance, differences in mortality rates and reported adverse events between telehealth and in-person care were small and/or not clinically meaningful. The small sample sizes and short study followup periods may have resulted in detecting small differences among patients who received an initial telehealth visit compared with those who received in-person visits. Telehealth may be a convenient mode of care delivery for specific clinical conditions, such as weight management, which require fewer interventions by the provider. However, it may be less suitable and less desirable for therapies requiring the development of rapport between patients and providers and communications between the patient and care team. This finding is consistent with the findings of our qualitative synthesis.

For process outcomes, the difference in missed visits rates between telehealth and in-person care was large and meaningful: patients who received care for specific conditions, acute clinical conditions in particular, in an initial telehealth visit had lower missed visits rates but, conversely, had lower rates of case resolution and a higher rate of duplicated services compared with those who received in-person care. The exception was for patients receiving care for general behavioral and mental health conditions, where those who receive an initial telehealth visit have higher missed visit rates compared with those who receive in-person care. Moreover, for patients who receive care for specific conditions (excluding COVID-19 and pregnancy/prenatal/gynecological care), those who receive an initial telehealth visit may have higher rates of case resolution and a lower rate of duplicated services compared with those who receive in-person care. Lower rates of up-to-date labs and paraclinical assessment, as well as any change in treatment plan or medications, for patients who receive care for specific conditions in an initial telehealth visit suggest that telehealth care may not be an adequate mode of care delivery when care beyond initial assessment of clinical condition is required or when the provider needs to make a decision about the treatment plan or medications. This finding was also seen in our qualitative synthesis and the synthesis of implementation studies; telehealth may not be appropriate for new patients; patients with complex conditions; or those requiring a greater variety of health services, including physical exams.

Our findings regarding outcomes of telehealth differ somewhat from prior research. In a review before the COVID-19 era, the evidence supported the use of telehealth as a way to reduce acute care utilization (e.g., readmissions, length of stay, emergency department (ED) visits).[26] In late 2020, the National Committee for Quality Assurance (NCQA) Taskforce on Telehealth Policy analyzed evidence from several large health systems and payors and found that the use of telehealth, both before and during the COVID-19 pandemic, reduced urgent and ED care, as well as the use of expensive or often overused services, such as imaging.[425] We found mixed results on healthcare utilization outcomes, which varied by the clinical condition of the patient.

Similar to the results of systematic reviews of telehealth before the COVID-19 era,[14] we identified general satisfaction, among patients, with telehealth as it addresses barriers to care such as limited mobility, lack of transportation, and living in a rural area. There is a mixed body of evidence on the risk of using telehealth as a substitute for in-person care. A review in the early months of the pandemic identified that telehealth care, when provided in a clinically appropriate manner, did not impact the ability of the provider or care team to obtain clinical information, make an accurate diagnosis, and develop a treatment plan, and that telehealth care produced the same desired clinical outcomes as compared with in-person care.[426] In contrast, in our review, we identified many concerns from patients and providers regarding the potential impact of telehealth on increased missed or delayed diagnoses owing to the lack of a physical exam, procedures, labs, and imaging, or the limitations of telehealth communication (owing to technical limitations exacerbated by the lack of visual cues, eye contact, and body language, i.e., nonverbal limitations or language barriers and preferences). Using telehealth in combination with traditional, in-person visits could help to ensure regular and appropriate followups, especially for specific patient populations (e.g., those who live far away from in-person care).

We identified no studies that compared implementation strategies for telehealth or provided a detailed description of their own implementation strategy. Similar to other reviews,[427] evidence was lacking on implementation cost, penetration, and sustainability of services and on the telehealth implementation challenges at the health-system level. On the provider side, telehealth adoption was achieved in a short timeframe but was significantly affected by prior training in telehealth, and acceptability of telehealth care was affected by several factors ranging from previous experience with telehealth technology to the type of care provided. The appropriateness of telehealth care in achieving planned administrative and clinical outcomes was mixed on both patient and provider levels. Feasibility of telehealth care was generally high among providers but was sometimes limited for patients by the availability of telehealth technologies.

4.2. Strengths and Limitations

We performed a comprehensive assessment of the ways to provide telehealth services in relation to patient, provider, and health system characteristics. The assessment included in-depth evaluation of outcomes of care for telehealth in comparison to in-person care. Moreover, our review included a detailed evaluation of benefits and harms, satisfaction and barriers, and facilitators of telehealth from patient and provider perspectives using both quantitative and qualitative evidence.

Studies included in our review had a variety of limitations, including a lack of standard information about details of the telehealth and how it was implemented, which made comparisons across studies challenging. Outcomes of telehealth care were defined widely across different studies and were measured using a variety of assessment approaches. Owing to missing information and variation in outcomes measured, we were unable to conduct any meta-analyses. Few studies specified the telehealth modality (audio or video). One of the major limitations of the evidence base was the lack of a unified approach to assessing the outcomes of telehealth. The heterogeneity of the outcomes reported across different studies and the variety of clinical conditions and patient/provider characteristics limited our ability to synthesize the evidence. The assessment of telehealth effectiveness is multidimensional; therefore, measurement of outcomes of telehealth requires multidimensional approaches.

The standard telehealth quality measures, such as found in reports sponsored by the Agency for Healthcare Research and Quality (AHRQ) and the National Quality Forum, were developed for the pre-COVID-19 era.[428, 429] Considerations in the development of such measures may not fully apply to the current environment, where telehealth is now one of the dominant care modalities. We are not aware of any validated evaluation frameworks for telehealth, and certainly not for telehealth during the COVID-19 era. Reviewing the pre-COVID-19 era telehealth performance measures and selecting an initial set of process and outcome measures that are appropriate for the circumstances of the COVID-19 era may help to perform assessment studies with generalizable results across different populations.

Furthermore, most of the quantitative studies in this review were at high risk of bias and qualitative studies often lacked rigorous reporting or methods. In addition, a larger portion of the qualitative data was from providers versus patients; very few studies provided the caregiver perspective. Evidence was lacking regarding burden and costs of telehealth care to patients, providers, and health systems, including barriers previously identified, such as limited insurance coverage and regulations regarding jurisdiction of licensure. It was unclear in many studies if potential confounders had been adequately considered. For instance, those accessing telehealth may have different characteristics from those receiving in-person care that influence process outcomes such as adherence (i.e., more likely to be living in urban settings, higher education, etc.). Outcomes of telehealth were often short-term. Long-term sustainability and implementation issues were not evaluated, which is particularly important as telehealth becomes one of the dominant modes of care delivery.

Our review also had several limitations. Our search was limited to the COVID-19 era, with some limited comparison to pre-COVID-19 era when the comparison was performed as a part of the study design. Despite this limit, our updated search identified more than 200 additional eligible studies, of which 124 were added to the synthesis. Owing to the wide range of available virtual care modalities and settings, we limited our review to telehealth that was provided in a synchronous manner in the outpatient/ambulatory or ED setting, which supported communications between a patient and a provider. Telehealth has been used in other settings, such as for in-patient care and for provider-provider communications. There is also a growing body of evidence on the use of virtual care in asynchronous settings, such as through wearable devices, which was beyond the scope of this review.

To ensure findings were most likely to apply to populations served by the AHRQ Learning Health Systems panel, we limited our review to studies conducted in settings or populations similar to the United States. Nevertheless, the available evidence provides the key insight that the value of telehealth care may take different forms for different users and may not be generalizable for different settings or for different patient and provider populations.

4.3. Implications

In terms of clinical practice and health policy, telehealth has been implemented in a variety of ambulatory care settings, and there is some evidence for effectiveness in a variety of settings and populations. Our review provides some evidence for effectiveness of telehealth as an adequate mode of care delivery when focused care is offered for special clinical conditions among patients who do not have complex clinical conditions or require fewer interventions by the provider (e.g., weight management). Telehealth may be inadequate when care beyond initial assessment of clinical condition is required; among new patients; patients with complex conditions; or those requiring a greater variety of health services, including physical exams.

Telehealth implementation, to some extent, has addressed both patient and provider needs and has provided an alternative mode of care delivery during the COVID-19 era that will continue beyond the pandemic. In order to use telehealth as a stand-alone substitute or in combination with in-person care, it is necessary to develop best practices, including recommendations for different clinical settings and health systems and considerations for clinical conditions and patient populations that would benefit the most. Because telehealth will likely become one of the main modes of care delivery, even after the COVID-19 era, models that integrate telehealth in the traditional care process will be critical. In general, though, the successful integration of telehealth care will have implications for provision of care for patients with different acute and chronic conditions, in ambulatory care and in-patient settings.

In terms of future research, evidence about telehealth would be more useful for practice and policy decisions if the quality of data and studies were better. More specifically, there is a need for a clear definition of telehealth and other modes of virtual care delivery, the context in which the services are implemented, and the usual or alternative models of care used for comparison. Such a unified approach would make comparisons across different studies possible. Furthermore, research needs to be conducted as multisite studies and in different private and public health systems, rather than relying on pre-post data from a single site. With the rapid innovations in the telehealth domain and the expansion of telehealth in clinical practice, it is critical for the research community to focus on identifying the full range of clinical use cases for telehealth, including types of visits and conditions that are not appropriate for telehealth. Future research is needed on the effectiveness of telehealth for clinical applications with limited prior evidence but rapid expansion during a pandemic (e.g., primary care and pre- and post-surgical visits). Also, the identification of appropriate and clinically important outcomes is critical and needs to replace, or at least augment, the current reliance on easily measured outcomes. More research is needed to perform an economic assessment of telehealth and the impact of telehealth care within alternative payment arrangements (e.g., risk-based arrangements), including rigorous methods to measure and analyze costs. Future research needs to address the evidence gaps on the implementation challenges of telehealth at the health-system level (e.g., technical assistance needs, staffing models), ideally using implementation frameworks, and generate evidence from organizations with varied experiences adopting or expanding telehealth for a range of uses (e.g., from primary to critical care, and post-acute and long-term care) in response to COVID-19.[14, 427]

4.4. Conclusions

Whereas telehealth use spiked after the beginning of the COVID-19 pandemic, the characteristics of patients using telehealth services follow a similar pattern as the use of other healthcare and digital health services, with people who are young to middle-aged, female, White, with higher socioeconomic status, and living in urban settings comprising a higher proportion of telehealth users. We found that the use of telehealth may be comparable to in-person care when followup visits and clinical and process outcomes were assessed. As we transition through the COVID-19 era, telehealth will likely continue to be one of the main modes of care delivery. Thus, models for integrating telehealth with traditional care process become increasingly important and ongoing evaluations of telehealth will be particularly valuable. Our findings suggest a direction for future work and are relevant to policymakers, payors, and practitioners as they manage the use of telehealth during the pandemic and beyond.

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421. Childs AW, Unger A, Li L. Rapid design and deployment of intensive outpatient, group-based psychiatric care using telehealth during coronavirus disease 2019 (COVID-19). J Am Med Inform Assoc. 2020 Jul 1;27(9):1420-4. doi: 10.1093/jamia/ocaa138. PMID: 32687151.

422. Guarino M, Cossiga V, Fiorentino A, et al. Use of Telemedicine for Chronic Liver Disease at a Single Care Center During the COVID-19 Pandemic: Prospective Observational Study. J Med Internet Res. 2020 Sep 21;22(9):e20874. doi: 10.2196/20874. PMID: 32896833.

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424. Kapoor S, Eldib A, Hiasat J, et al. Developing a pediatric ophthalmology telemedicine program in the COVID-19 crisis. J aapos. 2020 Aug;24(4):204-8.e2. doi: 10.1016/j.jaapos.2020.05.008. PMID: 32890736.

425. National Association of Quality Assurance. Taskforce on Telehealth Policy (TTP) Findings and Recommendation. 2020. https://www.ncqa.org/programs/data-and-information-technology/telehealth/. Accessed on April 1 2022.

426. Ml G, He H, Km S. Telediagnosis for Acute Care: Implications for the Quality and Safety of Diagnosis. Agency for Healthcare Research and Quality; 2020. https://www.ahrq.gov/patient-safety/reports/issue-briefs/teledx.html. Accessed on April 1 2022.

427. Return on Health: Moving Beyond Dollars and Cents in Realizing the Value of Virtual Care. 2021. https://www.ama-assn.org/system/files/2021-05/ama-return-on-health-report-may-2021.pdf. Accessed on April 2022.

428. Totten AM, Hansen RN, Wagner J, et al. AHRQ Comparative Effectiveness Reviews. Telehealth for Acute and Chronic Care Consultations. Rockville (MD): Agency for Healthcare Research and Quality (US); 2019.

429. Creating a Framework to Support Measure Development for Telehealth National Quality Forum. Washington D.C.: 2017. https://www.qualityforum.org/Publications/2017/08/Creating_a_Framework_to_Support_Measure_Development_for_Telehealth.aspx

6. List of Acronyms

AHRQ	Agency for Healthcare Research and Quality
CASP	Critical Appraisals Skills Programme
CDC	Centers for Disease Control and Prevention
CI	Confidence interval
CPAP	Continuous positive airway pressure
ED	Emergency Department
IDS	Integrated delivery system
IP	Inpatient
IQVIA	IQVIA National Disease and Therapeutic Index
KQ	Key Question
LHS	Learning Health System
NICU	neonatal intensive care unit
OECD	Organisation for Economic Cooperation and Development
OP	Outpatien
OR	Odd ration
PICOTS	population, intervention, comparators, outcomes, timing, setting
PRESS	Peer Review of Electronic Search Strategies
RCT	Randomized controlled trial
ROBINS-I	Cochrane Risk of Bias Assessment Tool for Non-Randomized Studies of Interventions
SEADS	Supplemental Evidence and Data for Systematic review
SES	Socioeconomic status
SOE	Strength of evidence
US	United States
VA	Veterans Affairs

Appendix A. Methods

Table A.1.1. PubMed search strategy

#	String
1	“Virtual health”[tiab]
2	Telehealth[tiab]
3	Telemedicine[mh]
4	telemedicine[tiab]
5	“mobile health”[tiab]
6	mHealth[tiab]
7	“m-health”[tiab]
8	eHealth[tiab]
9	“e-health”[tiab]
9	“virtual care”[tiab]
10	1 OR 2OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 9
11	“clinical study”[pt]
12	“clinical studies as topic”[mh]
13	“clinical study”[tiab]
14	“observational study”[pt]
15	“observational studies as topic”[mh]
16	“observational study”[tiab]
17	“clinical trial”[pt]
18	“clinical trials as topic”[mh]
19	“clinical trial”[tiab]
20	“comparative study”[pt]
21	“comparative study”[tiab]
22	“controlled clinical trial”[pt]
23	“controlled clinical trials as topic”[mh]
24	“controlled clinical trial”[tiab]
25	“randomized controlled trial”[pt]
26	“randomized controlled trials as topic”[mh]
27	“randomized controlled trial”[tiab] OR RCT[tiab] OR “randomised controlled trial”[tiab]
28	“cohort studies”[mh]
29	“cohort study”[tiab]
30	“retrospective studies”[mh]
31	“retrospective study”[tiab]
32	“cross-sectional studies”[mh]
33	“cross-sectional study”[tiab]
34	“qualitative research”[mh]
35	“evaluation study”[pt]
36	“evaluation studies as topic”[mh]
37	“focus groups”[mh]
38	interview[pt]
39	“interviews as topic”[mh]
40	“qualitative”[tiab]
41	“evaluation study”[tiab]
42	“focus group”[tiab]
43	Interview[tiab]
44	Interviews[tiab]
45	11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 OR 42 OR 43 OR 44
46	Review[pt]
47	“systematic review”[pt]
48	"Meta-Analysis as Topic"[Mesh]
49	46 OR 47 OR 48
50	(10 AND 45) NOT 49

Table A.1.2. CINAHL and PsycINFO

Number	Search string	Limiters
S15	(S11 AND S12) NOT S13	Limiters - Published Date: 20200301-20210731
S14	S11 AND S12	
S13	reviews OR "systematic review" OR metaanalysis" OR "meta analysis" OR "meta-analysis"	
S12	"clinical study" OR "observational study" OR "clinical trial" OR "comparative study" OR "controlled clinical Trial" OR "randomized controlled trial" OR "cohort study" OR "retrospective study" OR "cross-sectional study" OR "cross sectional study" OR "qualitative research" OR "evaluation study" OR "focus group" OR "focus groups" OR interview OR “randomised controlled trial”	
S11	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10	
S10	(MM "Telehealth+")	
S9	MM "Telemedicine" OR MM "Online Therapy" OR MM "Teleconferencing" OR MM "Teleconsultation" OR MM "Telepsychiatry" OR MM "Telepsychology" OR MM "Telerehabilitation"	
S8	TI "e-Health" OR AB "e-Health"	
S7	TI eHealth OR AB eHealth	
S6	TI "m-Health" OR AB "m-Health"	
S5	TI mHealth OR AB mHealth	
S4	TI "mobile health" OR AB "mobile health"	
S3	TI telemedicine OR AB telemedicine	
S2	TI telehealth OR AB telehealth	
S1	TI "Virtual health" OR AB "Virtual health"	

Table A.1.3. Cochrane Database search

ID	Search
#1	("virtual health"):ti,ab,kw (Word variations have been searched)
#2	(telehealth):ti,ab,kw (Word variations have been searched)
#3	MeSH descriptor: [Telemedicine] explode all trees
#4	(telemedicine):ti,ab,kw (Word variations have been searched)
#5	("mobile health"):ti,ab,kw
#6	("m-health"):ti,ab,kw
#7	(mhealth):ti,ab,kw
#8	(ehealth):ti,ab,kw
#9	("e-health"):ti,ab,kw
#10	#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9

*Date limited, no review

Table A.2. PICOTS and study design: Inclusion and exclusion criteria

PICOT	Inclusion	Exclusion
P: Population	KQs 1 and 2: • Patients of any age • Health systems • Hospitals • Providers KQ 3: • Patients or their caregivers • Providers KQ 4: • Hospitals • Community-based clinics • Private practices • Mental health services • Federally Qualified Health Centers • Rural clinics • Healthcare systems	All KQs: Patients receiving inpatient care Providers providing inpatient care
I: Interventions	KQs 1-3: • Remotely delivered synchronous medical services (e.g., telephone, video visits) between a patient and a healthcare provider in an ambulatory setting (e.g., outpatient and community-based clinics) or ED providing acute/urgent care (e.g., symptom management); routine/chronic care (e.g., preventive services, chronic disease management); mental health services; wellness visits; post-hospital discharge care (e.g., routine followup and care for nonacute issues) • Patient and specialist communications facilitated by an ED physician in an ED (particularly important in rural care settings) KQ 4: Implementation strategies for telehealth	All KQs: Remotely delivered, nonsynchronous medical services (e.g., remote monitoring devices, health apps, wearable devices, patient portals)
C: Comparators	KQs 1-3: In-person care, no care, no comparison KQ 4: Implementation strategies for telehealth	N/A

PICOT	Inclusion	Exclusion

O: Outcomes	KQ 1: N/A
	KQ 2:
	• System outcomes
	• Healthcare access (e.g., insurance coverage, WIFI, and smartphone access)
	• Healthcare utilization (e.g., hospitalization, readmission, ED visit)
	• Healthcare performance and quality measures (e.g., adhering or meeting Healthcare Effectiveness Data and Information Set (HEDIS) standards or other validated quality measures), e.g.,
	  o Practice efficiency
	  o No-show rates
	  o Staffing hours
	  o Cycle times
	  o Communication
	  o Clinical outcomes (any)
	  o Medication adherence
	  o Up-to-date lab values
	  o Adverse effects/patient safety issues
	  o Inappropriate treatment
	• Misdiagnosis/delayed diagnosis/care
	• Case resolution/Duplication of services (telehealth followed immediately by in-person visit)
	• Privacy/confidentiality breaches
	• Cost (see Appendix A for detailed cost outcomes)
	KQ3:
	• Patient/provider-level outcomes
	• Patient satisfaction/perceptions
	• Physician /provider satisfaction/engagement/burnout
	• Barriers and enablers
	KQ4:
	• Implementation strategies
		N/A

T: Timing	All KQs: The era of COVID-19 (March 2020-present) KQ 1d: During the first 4 months or beyond the initial phase*	Studies completed prior to the era of COVID-19
S: Setting	ALL KQs: • Healthcare provided outside of a medical office via phone or video • Healthcare provided in an ED by a specialist via phone or video • Outpatient population or health system characteristics similar to US population and health system characteristics (including ED) (see Table A.3 for a list of included countries)	Inpatient setting Non-US-based studies with different patient population or health system characteristics
Study Design[†]	KQ 1: Large scale, US-based studies based on claims or EHR data[†] KQ 2: Quantitative studies (e.g., RCT, CT, cohort studies.) KQ 3: Qualitative studies[‡] (e.g., focus groups, interviews, surveys) KQ 4: Mixed methods (qualitative and quantitative studies)	

CT = controlled trial; ED = emergency department; EHR = electronic health record; HEDIS = Healthcare Effectiveness Data and Information Set; KQ = Key Question(s); N/A = not applicable; RCT = randomized controlled trial

* Studies that began before the era of COVID-19 (11 March 2020) and extend into the era of COVID-19 were excluded unless they met the following criteria: data from the pre- and post-COVID-19 era were stratified—the stratified data were extracted; studies initiated as early as 1 January 2020 were considered applicable if studies of telehealth in response to COVID-19.
† We listed studies of other types, and from other countries.
‡ To be eligible for inclusion as a qualitative study, the sampling, data collection, and data analyses must have been systematically conducted; data must have been analyzed using methods of qualitative data analysis (such as thematic analysis).

Table A.3. Included countries*

Country	Country
Australia	Italy
Austria	Japan
Belgium	Korea (South)
Canada	Latvia
Chile	Lithuania
Czech Republic	Luxembourg
Denmark	New Zealand
Estonia	Norway
Finland	Poland
France	Portugal
Germany	Slovak Republic
Greece	Slovenia
Hungary	Spain
Ireland	Sweden
Israel	Switzerland
	The Netherlands
	UK
	USA

*List of Organisation for Economic Cooperation and Development (OECD) nations excluding those with a World Bank classification below "upper-income."(Organisation for Economic Co-operation and Development. 2022. https://www.oecd.org/index.htm.)

Table A.4. Methods by Key Question

Key Question	Proposed Methods	Included Studies Designs	Synthesis or Analysis
1. What are the characteristics of patient, provider, and health systems using telehealth during the COVID-19 era, specifically?	Narrative Review	Large-scale, US-based studies based on claims or EHR data*	Descriptive statistics
2. What are the benefits and harms of telehealth during the COVID-19 era?	Systematic Review	Study designs: RCT, CT, observational studies	Systematic Review
3. What is considered a successful telehealth intervention during the COVID-19 era?	Qualitative evidence synthesis	Qualitative research, and surveys	Matrix of perspectives and outcomes Convergent segregated approach
4. What strategies have been used to implement telehealth interventions during the COVID-19 era?	Systematic Review Qualitative evidence synthesis	Study designs: Systematic Review: RCT, CT, observational studies, process evaluation studies (i.e., identifying/addressing barriers/facilitators; populations to target; mechanisms for success/failure)	Systematic review results

CT = controlled trial; EHR = electronic health record; RCT = randomized controlled trial

*We listed studies of other types, and from other countries.

Appendix B. List of Excluded Studies

A Comparison of Exercise Intensity in Hybrid Versus Standard Phase Two Cardiac Rehabilitation. Journal of cardiopulmonary rehabilitation and prevention. 2021;41(1):19-22. doi: 10.1097/HCR.0000000000000569. PMID: CN-02254194. **- Data not abstractable (e.g., dates overlap COVID-19 era but are not stratified; or includes non-US comparable countries, and data are not stratified)**

A OP, Grimison P, Boyer M, et al. Patient satisfaction with telehealth consultations in medical oncology clinics: A cross-sectional study at a metropolitan centre during the COVID-19 pandemic. J Telemed Telecare. 2021 Oct 16:1357633x211045586. doi: 10.1177/1357633x211045586. PMID: 34657513**. - Addresses KQ3 only: Survey with no open-ended question(s)**

Abokalawa F, Ahmad SF, Al-Hashel J, et al. The effects of coronavirus disease 2019 (COVID-19) pandemic on people with epilepsy (PwE): an online survey-based study. Acta Neurol Belg. 2022 Feb;122(1):59-66. doi: 10.1007/s13760-021-01609-1. PMID: 33555559. **- Population is not comparable to a US population**

Accorsi TAD, Amicis K, Brígido ARD, et al. Assessment of patients with acute respiratory symptoms during the COVID-19 pandemic by Telemedicine: clinical features and impact on referral. Einstein (Sao Paulo). 2020;18:eAO6106. doi: 10.31744/einstein_journal/2020AO6106. PMID: 33295428. **- Population is not comparable to a US population**

Achieving optimal adherence to medical therapy by telehealth: findings from the ORBITA medication adherence sub-study. Pharmacology research and perspectives. 2021;9(1)doi: 10.1002/prp2.710. PMID: CN-02271618. **- Study dates not available AND no terms suggesting conducted during COVID-19**

Adepoju OE, Chae M, Ojinnaka CO, et al. Utilization Gaps During the COVID-19 Pandemic: Racial and Ethnic Disparities in Telemedicine Uptake in Federally Qualified Health Center Clinics. J Gen Intern Med. 2022 Apr;37(5):1191-7. doi: 10.1007/s11606-021-07304-4. PMID: 35112280. **- Addresses KQ1 only: Not a US-based studyNot nationally representative data (large data set collected at the national level)**

Adly AS, Adly MS, Adly AS. Telemanagement of Home-Isolated COVID-19 Patients Using Oxygen Therapy With Noninvasive Positive Pressure Ventilation and Physical Therapy Techniques: Randomized Clinical Trial. J Med Internet Res. 2021 Apr 28;23(4):e23446. doi: 10.2196/23446. PMID: 33819166. **- Population is not comparable to a US population**

Agazzi H, Hayford H, Thomas N, et al. A nonrandomized trial of a behavioral parent training intervention for parents with children with challenging behaviors: In-person versus internet-HOT DOCS. Clin Child Psychol Psychiatry. 2021 Oct;26(4):1076-88. doi: 10.1177/13591045211027559. PMID: 34156883. **- Addresses KQ1 only: Only includes changes in number (frequency) of telehealth visits due to COVID-19**

Agrawal S, Strzelec B, Poręba R, et al. Clinical Characteristics, Preventive Care and Attitude to Telemedicine among Patients with Diabetic Retinopathy: A Cross-Sectional Study. J Clin Med. 2021 Jan 12;10(2)doi: 10.3390/jcm10020249. PMID: 33445546. **- Not applicable to any of the key questions**

Ahonle ZJ, Kreider CM, Hale-Gallardo J, et al. Implementation and use of video tele-technologies in delivery of individualized community-based vocational rehabilitation services to rural veterans. Journal of Vocational Rehabilitation. 2021;55(2):227-33. doi: 10.3233/JVR-211159. PMID: 152820783. Language: English. Entry Date: 20211019. Revision Date: 20211019. Publication Type: Article. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Aiken ARA, Starling JE, Gomperts R. Factors Associated With Use of an Online Telemedicine Service to Access Self-managed Medical Abortion in the US. JAMA Netw Open. 2021 May 3;4(5):e2111852. doi: 10.1001/jamanetworkopen.2021.11852. PMID: 34019085. **- Data not abstractable (e.g., dates overlap COVID-19 era but are not stratified; or includes non-US comparable countries, and data are not stratified)**

Ainslie M, Brunette MF, Capozzoli M. Treatment Interruptions and Telemedicine Utilization in Serious Mental Illness: Retrospective Longitudinal Claims Analysis. JMIR Ment Health. 2022 Mar 21;9(3):e33092. doi: 10.2196/33092. PMID: 35311673. **- Addresses KQ1 only: Not a US-based studyNot nationally representative data (large data set collected at the national level)**

Airola E, Rasi P, Outila M. Older people as users and non-users of a video conferencing service for promoting social connectedness and well-being – a case study from Finnish Lapland. Educational Gerontology. 2020;46(5):258-69. doi: 10.1080/03601277.2020.1743008. PMID: 142799718. Language: English. Entry Date: 20200422. Revision Date: 20200430. Publication Type: Article. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Ajinkya S, Almallouhi E, Turner N, et al. The Relationship Between Admission Systolic Blood Pressure and Mortality in Telestroke Patients. Telemed J E Health. 2020 Jul;26(7):941-4. doi: 10.1089/tmj.2019.0151. PMID: 31600113. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Akenine U, Barbera M, Beishuizen CR, et al. Attitudes of at-risk older adults about prevention of cardiovascular disease and dementia using eHealth: a qualitative study in a European context. BMJ Open. 2020 Aug 6;10(8):e037050. doi: 10.1136/bmjopen-2020-037050. PMID: 32764085. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Al-Alawi M, McCall RK, Sultan A, et al. Efficacy of a six-week-long therapist-guided online therapy versus self-help internet-based therapy for COVID-19–induced anxiety and depression: open-label, pragmatic, randomized controlled trial. JMIR mental health. 2021;8(2)doi: 10.2196/26683. PMID: CN-02266411. **- Population is not comparable to a US population**

Alencar M, Johnson K, Gray V, et al. Telehealth-Based Health Coaching Increases m-Health Device Adherence and Rate of Weight Loss in Obese Participants. Telemed J E Health. 2020 Mar;26(3):365-8. doi: 10.1089/tmj.2019.0017. PMID: 30994410. **- Study of remotely delivered, non-synchronous medical services (e.g., wearable devices, apps, text messaging, etc.)**

Al-Hassani F, Nikkhah D, Pickford MA. The management of ulnar polydactyly with a telemedicine-based referral system and a one-stop clinic. J Plast Reconstr Aesthet Surg. 2020 Apr;73(4):783-808. doi: 10.1016/j.bjps.2019.11.024. PMID: 31836262. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Ali SH, Mohaimin S, Islam T, et al. Implementation evaluation and fidelity assessment of a diabetes management intervention during the COVID-19 pandemic: findings from the diabetes research, education, and action for minorities (DREAM) initiative. Journal of general internal medicine. 2021;36(SUPPL 1):S66-S7. doi: 10.1007/s11606-021-06830-5. PMID: CN-02305965. **- Meeting abstract only**

Aliaga-Castillo V, Horment-Lara G, Contreras-Sepúlveda F, et al. Safety and effectiveness of telerehabilitation program in people with severe haemophilia in Chile. A qualitative study. Musculoskelet Sci Pract. 2022 Apr 14;60:102565. doi: 10.1016/j.msksp.2022.102565. PMID: 35462316. **- Population is not comparable to a US population**

Allen AZ, Zhu D, Shin C, et al. Patient Satisfaction with Telephone Versus Video-Televisits: A Cross-Sectional Survey of an Urban, Multiethnic Population. Urology. 2021 Oct;156:110-6. doi: 10.1016/j.urology.2021.05.096. PMID: 34333039. **. - Addresses KQ3 only: Survey with no open-ended question(s)**

Allison KM, Levac DE. Impact of the COVID-19 pandemic on therapy service delivery and functioning for school-aged children with disabilities in the United States. Disabil Health J. 2022 Apr;15(2):101266. doi: 10.1016/j.dhjo.2021.101266. PMID: 35115260. **. - Addresses KQ3 only: Survey with no open-ended question(s)**

Al-Mahrouqi T, Al-Alawi K, Al-Alawi M, et al. A promising future for tele-mental health in Oman: A qualitative exploration of clients and therapists' experiences. SAGE Open Med. 2022;10:20503121221086372. doi: 10.1177/20503121221086372. PMID: 35371483. **- Population is not comparable to a US population**

Almouaalamy NA, Jafari AA, Althubaiti AM. Tele-clinics in palliative care during the COVID-19 outbreak: Tertiary care cancer center experience. Saudi Med J. 2022 Apr;43(4):394-400. doi: 10.15537/smj.2022.43.4.20210808. PMID: 35414618. **- Population is not comparable to a US population**

Alpuim Costa D, Nobre JGG, Fernandes JP, et al. Impact of the COVID-19 Pandemic on Breast Cancer Management in Portugal: A Cross-Sectional Survey-Based Study of Medical Oncologists. Oncol Ther. 2022 Mar 21:1-16. doi: 10.1007/s40487-022-00191-7. PMID: 35312952. **. - Addresses KQ3 only: Survey with no open-ended question(s)**

Alshaali A, Abd ElAziz S, Aljaziri A, et al. Preventive steps implemented on geriatric services in the primary health care centers during COVID-19 pandemic. J Public Health Res. 2021 Nov 22;11(2)doi: 10.4081/jphr.2021.2593. PMID: 34814652. **- Population is not comparable to a US population**

Al-Thani H, Mekkodathil A, Hussain A, et al. Implementation of vascular surgery teleconsultation during the COVID-19 pandemic: Insights from the outpatient vascular clinics in a tertiary care hospital in Qatar. PLoS One. 2021;16(9):e0257458. doi: 10.1371/journal.pone.0257458. PMID: 34591886. **- Addresses KQ1 only: Only includes changes in number (frequency) of telehealth visits due to COVID-19**

Althobiani M, Alqahtani JS, Hurst JR, et al. Telehealth for patients with interstitial lung diseases (ILD): results of an international survey of clinicians. BMJ Open Respir Res. 2021 Dec;8(1)doi: 10.1136/bmjresp-2021-001088. PMID: 34969772. **- Data not abstractable (e.g., dates overlap COVID-19 era but are not stratified; or includes non-US comparable countries, and data are not stratified)**

Alvarez-Jimenez M, Rice S, D'Alfonso S, et al. A Novel Multimodal Digital Service (Moderated Online Social Therapy+) for Help-Seeking Young People Experiencing Mental Ill-Health: Pilot Evaluation Within a National Youth E-Mental Health Service. J Med Internet Res. 2020 Aug 13;22(8):e17155. doi: 10.2196/17155. PMID: 32788151. **- Study dates not available AND no terms suggesting conducted during COVID-19**

Alwakeel AJ, Sicondolfo A, Robitaille C, et al. The Accessibility, Feasibility, and Safety of a Standardized Community-based Tele-Pulmonary Rehab Program for Chronic Obstructive Pulmonary Disease: A 3-Year Real-World Prospective Study. Ann Am Thorac Soc. 2022 Jan;19(1):39-47. doi: 10.1513/AnnalsATS.202006-638OC. PMID: 34170802. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Amici G, Lo Cicero A, Presello F, et al. [The advantages of remote patient monitoring in automated peritoneal dialysis]. G Ital Nefrol. 2020 Jun 10;37(3) PMID: 32530154. **- Non-English language article**

Aminoff H, Meijer S, Arnelo U, et al. Modeling the Implementation Context of a Telemedicine Service: Work Domain Analysis in a Surgical Setting. JMIR Form Res. 2021 Jun 21;5(6):e26505. doi: 10.2196/26505. PMID: 34152278. **- Study dates not available AND no terms suggesting conducted during COVID-19**

An J, Ryu HK, Lyu SJ, et al. Effects of Preoperative Telerehabilitation on Muscle Strength, Range of Motion, and Functional Outcomes in Candidates for Total Knee Arthroplasty: A Single-Blind Randomized Controlled Trial. Int J Environ Res Public Health. 2021 Jun 4;18(11)doi: 10.3390/ijerph18116071. PMID: 34199913. **- Study dates not available AND no terms suggesting conducted during COVID-19**

Anderson D, Porto A, Koppel J, et al. Impact of Endocrinology eConsults on Access to Endocrinology Care for Medicaid Patients. Telemed J E Health. 2020 Nov;26(11):1383-90. doi: 10.1089/tmj.2019.0238. PMID: 32023182. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Anderson D, Sturt J, McDonald N, et al. International feasibility study for the Women's Wellness with Type 2 Diabetes Programme (WWDP): An eHealth enabled 12-week intervention programme for midlife women with type 2 diabetes. Diabetes Res Clin Pract. 2021 Jan;171:108541. doi: 10.1016/j.diabres.2020.108541. PMID: 33227358. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Anderson HL, Kurtz J, West DC, et al. Replace, amplify, transform: a qualitative study of how postgraduate trainees and supervisors experience and use telehealth for instruction in ambulatory patient care. BMC Med Educ. 2022 Feb 22;22(1):118. doi: 10.1186/s12909-022-03175-3. PMID: 35193579. **- Not applicable to any of the key questions**

Anderson KG, Bompadre V, Parker C, et al. Abbreviated Outpatient Upper Extremity Fracture Care to Avoid Clinic and Hospital Environmental Encounters During the COVID-19 Pandemic: A New Approach to Fracture Care? J Pediatr Orthop. 2022 Apr 1;42(4):e367-e72. doi: 10.1097/bpo.0000000000002073. PMID: 35125413. **- Not applicable to any of the key questions**

Andino J, Zhu A, Chopra Z, et al. Video Visits are Practical for the Follow-up and Management of Established Male Infertility Patients. Urology. 2021 Aug;154:158-63. doi: 10.1016/j.urology.2021.03.050. PMID: 34022261. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Andrew N, Barraclough KA, Long K, et al. Telehealth model of care for routine follow up of renal transplant recipients in a tertiary centre: A case study. J Telemed Telecare. 2020 May;26(4):232-8. doi: 10.1177/1357633x18807834. PMID: 30449243. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Androga LA, Amundson RH, Hickson LJ, et al. Telehealth versus face-to-face visits: A comprehensive outpatient perspective-based cohort study of patients with kidney disease. PLoS One. 2022;17(3):e0265073. doi: 10.1371/journal.pone.0265073. PMID: 35275958. **. - Addresses KQ3 only: Survey with no open-ended question(s)**

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Bleyel C, Hoffmann M, Wensing M, et al. Patients' Perspective on Mental Health Specialist Video Consultations in Primary Care: Qualitative Preimplementation Study of Anticipated Benefits and Barriers. J Med Internet Res. 2020 Apr 20;22(4):e17330. doi: 10.2196/17330. PMID: 32310139. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Cheung KL, Tamura MK, Stapleton RD, et al. Feasibility and Acceptability of Telemedicine-Facilitated Palliative Care Consultations in Rural Dialysis Units. J Palliat Med. 2021 Jan 19doi: 10.1089/jpm.2020.0647. PMID: 33470899. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Radtke SJ, Umeh R, Chavez M, et al. Telemedicine for Delivery of Postoperative Care Following Minimally-Invasive Gynecologic Surgery: A Randomized Controlled Trial. Journal of Minimally Invasive Gynecology. 2020;27(7):S113-S. doi: 10.1016/j.jmig.2020.08.179. PMID: 146558104. Language: English. Entry Date: In Process. Revision Date: 20201023. Publication Type: Article. Supplement Title: 2020 Supplement. Journal Subset: Biomedical. **- Meeting abstract only**

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Rand ML. Nursing Interventions Increase Influenza Vaccination Quality Measures for Home Telehealth Patients. J Nurs Care Qual. 2021 Jun 30doi: 10.1097/ncq.0000000000000577. PMID: 34224534. **- Study of remotely delivered, non-synchronous medical services (e.g., wearable devices, apps, text messaging, etc.)**

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Ruiz-Romero V, Martínez-Pillado M, Torres-Domínguez Y, et al. [User satisfaction with telephonic consultations carried out during the COVID-19 pandemic.]. Rev Esp Salud Publica. 2021 Apr 16;95 PMID: 33859157. **- Non-English language article**

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Saberi P, McCuistian C, Agnew E, et al. Video-Counseling Intervention to Address HIV Care Engagement, Mental Health, and Substance Use Challenges: A Pilot Randomized Clinical Trial for Youth and Young Adults Living with HIV. Telemed Rep. 2021;2(1):14-25. doi: 10.1089/tmr.2020.0014. PMID: 33575683. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Sabırlı R, Karsli E, Canacik O, et al. Use of WhatsApp for Polyclinic Consultation of Suspected Patients With COVID-19: Retrospective Case Control Study. JMIR Mhealth Uhealth. 2020 Dec 11;8(12):e22874. doi: 10.2196/22874. PMID: 33276318. **- Population is not comparable to a US population**

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Saini L, Madaan P, Bhagwat C, et al. Home-Videos for Neurodevelopmental Follow-Up of High-Risk Infants during COVID-19 Pandemic: A Simple and Inexpensive Tool. J Trop Pediatr. 2021 Jan 29;67(1)doi: 10.1093/tropej/fmaa088. PMID: 33324988. **- Population is not comparable to a US population**

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Sammour Y, Spertus JA, Shatla I, et al. Comparison of Video and Telephone Visits in Outpatients With Heart Failure. Am J Cardiol. 2021 Nov 1;158:153-6. doi: 10.1016/j.amjcard.2021.08.008. PMID: 34470705. **- Meeting abstract only**

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Samuels EA, Khatri UG, Snyder H, et al. Buprenorphine Telehealth Treatment Initiation and Follow-Up During COVID-19. J Gen Intern Med. 2022 Apr;37(5):1331-3. doi: 10.1007/s11606-021-07249-8. PMID: 34981357. **- Addresses KQ1 only: Not a US-based studyNot nationally representative data (large data set collected at the national level)**

Samushiya MA, Kryzhanovsky SM, Ragimova AA, et al. [COVID-19 effect on mental health and sleep disorders]. Zh Nevrol Psikhiatr Im S S Korsakova. 2021;121(4. Vyp. 2):49-54. doi: 10.17116/jnevro202112104249. PMID: 34078860. **- Non-English language article**

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Sangalli L, Fernandez-Vial D, Moreno-Hay I, et al. Telehealth Increases Access to Brief Behavioral Interventions in an Orofacial Pain Clinic During the COVID-19 Pandemic: A Retrospective Study. Pain Med. 2022 Apr 8;23(4):799-806. doi: 10.1093/pm/pnab295. PMID: 34623433. **- Addresses KQ2 ONLY and is a non-comparative study**

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Santos-Moreno P, Rodríguez-Vargas GS, Casanova R, et al. Evaluation of a Non-Face-to-Face Multidisciplinary Health Care Model in a Population with Rheumatoid Arthritis Vulnerable to COVID-19 in a Health Emergency Situation. Healthcare (Basel). 2021 Dec 17;9(12)doi: 10.3390/healthcare9121744. PMID: 34946471. **- Population is not comparable to a US population**

Sarmah PB, Broadley GA, Khwaja S, et al. Clinical Safety and Cost-Effectiveness of Follow-up Virtual Clinic for Bladder Outflow Obstruction Surgery. J Endourol. 2020 Nov;34(11):1161-6. doi: 10.1089/end.2020.0319. PMID: 32668986. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Sarteau AC, Souris KJ, Wang J, et al. Changes to care delivery at nine international pediatric diabetes clinics in response to the COVID-19 global pandemic. Pediatr Diabetes. 2021 May;22(3):463-8. doi: 10.1111/pedi.13180. PMID: 33470020. **- Data not abstractable (e.g., dates overlap COVID-19 era but are not stratified; or includes non-US comparable countries, and data are not stratified)**

Sassani JC, Artsen AM, Baranski L, et al. Preoperative counseling method and postoperative opioid usage: a secondary analysis of the patient preparedness randomized controlled trial. Female pelvic medicine & reconstructive surgery. 2020;26(10 SUPPL 1):S66-. doi: 10.1097/SPV.0000000000000934. PMID: CN-02244545. **- Data not abstractable (e.g., dates overlap COVID-19 era but are not stratified; or includes non-US comparable countries, and data are not stratified)**

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Touson Jonathan C, Namita A, Corinne D, et al. An Application of Harrison's System Theory Model to Spark a Rapid Telehealth Expansion in the time of COVID-19. Learn Health Syst. 2020 Jun 30;5(1)doi: 10.1002/lrh2.10239. PMID: 32838036. **- Not applicable to any of the key questions**

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Trabjerg TB, Jensen LH, Søndergaard J, et al. Cross-sectoral video consultations in cancer care: perspectives of cancer patients, oncologists and general practitioners. Support Care Cancer. 2021 Jan;29(1):107-16. doi: 10.1007/s00520-020-05467-0. PMID: 32318872. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Traube DE, Taylor A, Cederbaum JA, et al. Strategies for implementation of virtual home visitation in the United States. Health Soc Care Community. 2021 Nov 18doi: 10.1111/hsc.13650. PMID: 34791751. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Upadhyay UD, Koenig LR, Meckstroth KR. Safety and Efficacy of Telehealth Medication Abortions in the US During the COVID-19 Pandemic. JAMA Netw Open. 2021 Aug 2;4(8):e2122320. doi: 10.1001/jamanetworkopen.2021.22320. PMID: 34427682. **- Addresses KQ2 ONLY and is a non-comparative study**

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Uscher-Pines L, McCullough C, Dworsky MS, et al. Use of Telehealth Across Pediatric Subspecialties Before and During the COVID-19 Pandemic. JAMA Netw Open. 2022 Mar 1;5(3):e224759. doi: 10.1001/jamanetworkopen.2022.4759. PMID: 35357455. **- Addresses KQ1 only: Not a US-based studyNot nationally representative data (large data set collected at the national level)**

Uscher-Pines L, Raja P, Mehrotra A, et al. Health center implementation of telemedicine for opioid use disorders: A qualitative assessment of adopters and nonadopters. J Subst Abuse Treat. 2020 Aug;115:108037. doi: 10.1016/j.jsat.2020.108037. PMID: 32600625. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Uscher-Pines L, Raja P, Qureshi N, et al. Use of Tele-Mental Health in Conjunction With In-Person Care: A Qualitative Exploration of Implementation Models. Psychiatr Serv. 2020 May 1;71(5):419-26. doi: 10.1176/appi.ps.201900386. PMID: 31996115. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Uscher-Pines L, Sousa J, Zachrison K, et al. What Drives Greater Assimilation of Telestroke in Emergency Departments? J Stroke Cerebrovasc Dis. 2020 Dec;29(12):105310. doi: 10.1016/j.jstrokecerebrovasdis.2020.105310. PMID: 32992169. **- Data not abstractable (e.g., dates overlap COVID-19 era but are not stratified; or includes non-US comparable countries, and data are not stratified)**

Usman M, Tarar MY, Toe KKZ, et al. Evolving Practice in Management of Pelvic-Acetabular Trauma: COVID-19 Experience From a Tertiary Referral Centre in the UK. Cureus. 2021 Oct;13(10):e18778. doi: 10.7759/cureus.18778. PMID: 34796067. **- Addresses KQ2 ONLY and is a non-comparative study**

Valentine L, McEnery C, Bell I, et al. Blended Digital and Face-to-Face Care for First-Episode Psychosis Treatment in Young People: Qualitative Study. JMIR Ment Health. 2020 Jul 28;7(7):e18990. doi: 10.2196/18990. PMID: 32720904. **- Study dates not available AND no terms suggesting conducted during COVID-19**

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Valevicius A, Ferguson-Pell M, Kershaw C, et al. Lessons Learned from Transitioning to Telerehabilitation During COVID-19 in Alberta, Canada...American Congress of Rehabilitation Medicine (ACRM) Annual Conference (Virtual), September 24−29, 2021. Archives of Physical Medicine & Rehabilitation. 2021;102(10):e68-e. doi: 10.1016/j.apmr.2021.07.673. PMID: 152647314. Language: English. Entry Date: 20211004. Revision Date: 20211004. Publication Type: Article. **- Meeting abstract only**

van den Biggelaar RJM, Hazenberg A, Cobben NAM, et al. A Randomized Trial of Initiation of Chronic Noninvasive Mechanical Ventilation at Home vs In-Hospital in Patients With Neuromuscular Disease and Thoracic Cage Disorder: The Dutch Homerun Trial. Chest. 2020 Dec;158(6):2493-501. doi: 10.1016/j.chest.2020.07.007. PMID: 32682770. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Van Den Broek SR, Bagot KL, Arthurson L, et al. Investigating Clinician Experiences of Teleneuropsychology Service Implementation within Rural Inpatient Rehabilitation Settings: A Mixed Method Approach. Arch Clin Neuropsychol. 2021 Nov 4doi: 10.1093/arclin/acab086. PMID: 34747438. **- Includes only patients receiving inpatient care**

van den Helder J, Mehra S, van Dronkelaar C, et al. Blended home-based exercise and dietary protein in community-dwelling older adults: a cluster randomized controlled trial. J Cachexia Sarcopenia Muscle. 2020 Dec;11(6):1590-602. doi: 10.1002/jcsm.12634. PMID: 33103379. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Walle T, Erdal E, Mühlsteffen L, et al. Completion rate and impact on physician-patient relationship of video consultations in medical oncology: a randomised controlled open-label trial. ESMO Open. 2020 Nov;5(6):e000912. doi: 10.1136/esmoopen-2020-000912. PMID: 33203685. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Weißenfeld MM, Goetz K, Steinhäuser J. Facilitators and barriers for the implementation of telemedicine from a local government point of view - a cross-sectional survey in Germany. BMC Health Serv Res. 2021 Sep 6;21(1):919. doi: 10.1186/s12913-021-06929-9. PMID: 34488753. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Wintrich J, Pavlicek V, Brachmann J, et al. Remote Monitoring With Appropriate Reaction to Alerts Was Associated With Improved Outcomes in Chronic Heart Failure: Results From the OptiLink HF Study. Circ Arrhythm Electrophysiol. 2021 Jan;14(1):e008693. doi: 10.1161/circep.120.008693. PMID: 33301362. **- Study of remotely delivered, non-synchronous medical services (e.g., wearable devices, apps, text messaging, etc.)**

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Wong CJ, Nath JB, Pincavage AT, et al. Telehealth Attitudes, Training, and Preparedness Among First-Year Internal Medicine Residents in the COVID-19 Era. Telemed J E Health. 2022 Feb;28(2):240-7. doi: 10.1089/tmj.2021.0005. PMID: 34085854. **- Not applicable to any of the key questions**

Wong CY, Colven RM, Gibran NS, et al. Accuracy and Cost-effectiveness of a Telemedicine Triage Initiative for Patients With Suspected Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis. JAMA Dermatol. 2021 Jan 1;157(1):114-5. doi: 10.1001/jamadermatol.2020.4490. PMID: 33237271. **- Meeting abstract only**

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Wood T, Freeman S, Banner D, et al. Exploring user perspectives of factors associated with use of teletrauma in rural areas. Australas Emerg Care. 2021 May 7doi: 10.1016/j.auec.2021.04.001. PMID: 33972192. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Woodward EN, Drummond KL, Oliver KA, et al. Lagniappes: "A Little Something Extra" or Unintended Positive Consequences of Implementation Facilitation. Psychiatr Serv. 2021 Jan 1;72(1):31-6. doi: 10.1176/appi.ps.202000151. PMID: 33138706. **- Data not abstractable (e.g., dates overlap COVID-19 era but are not stratified; or includes non-US comparable countries, and data are not stratified)**

Wright AJ. Equivalence of remote, digital administration and traditional, in-person administration of the Wechsler Intelligence Scale for Children, Fifth Edition (WISC-V). Psychol Assess. 2020 Sep;32(9):809-17. doi: 10.1037/pas0000939. PMID: 32718161. **- Study of remotely delivered, non-synchronous medical services (e.g., wearable devices, apps, text messaging, etc.)**

Wright E, Shaltout O, Zokvic MA, et al. Delivery of menopause care during a pandemic: an evaluation of patient satisfaction with telephone visits. Menopause. 2021 Dec 6;29(2):184-8. doi: 10.1097/gme.0000000000001906. PMID: 34873109. **. - Addresses KQ3 only: Survey with no open-ended question(s)**

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Wu YR, Chou TJ, Wang YJ, et al. Smartphone-Enabled, Telehealth-Based Family Conferences in Palliative Care During the COVID-19 Pandemic: Pilot Observational Study. JMIR Mhealth Uhealth. 2020 Oct 28;8(10):e22069. doi: 10.2196/22069. PMID: 33021483. **- Study of remotely delivered, non-synchronous medical services (e.g., wearable devices, apps, text messaging, etc.)**

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Yadav RS, Singh P, Askari M, et al. Impact of Covid Pandemic and Working Strategies on Private Practitioners. J Pharm Bioallied Sci. 2021 Nov;13(Suppl 2):S1414-s7. doi: 10.4103/jpbs.jpbs_231_21. PMID: 35018001. **- Population is not comparable to a US population**

Yadaw AS, Li YC, Bose S, et al. Clinical features of COVID-19 mortality: development and validation of a clinical prediction model. Lancet Digit Health. 2020 Oct;2(10):e516-e25. doi: 10.1016/s2589-7500(20)30217-x. PMID: 32984797. **- Not applicable to any of the key questions**

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Ymer L, McKay A, Wong D, et al. Cognitive Behavioral Therapy for Sleep Disturbance and Fatigue Following Acquired Brain Injury: Predictors of Treatment Response. J Head Trauma Rehabil. 2021 Jul 26doi: 10.1097/htr.0000000000000705. PMID: 34320552. **- Study dates not available AND no terms suggesting conducted during COVID-19**

Yoshida K, Yamaoka Y, Eguchi Y, et al. Remote neuropsychological assessment of elderly Japanese population using the Alzheimer's Disease Assessment Scale: A validation study. J Telemed Telecare. 2020 Aug-Sep;26(7-8):482-7. doi: 10.1177/1357633x19845278. PMID: 31068063. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Young HM, Miyamoto S, Dharmar M, et al. Nurse Coaching and Mobile Health Compared With Usual Care to Improve Diabetes Self-Efficacy for Persons With Type 2 Diabetes: Randomized Controlled Trial. JMIR Mhealth Uhealth. 2020 Mar 2;8(3):e16665. doi: 10.2196/16665. PMID: 32130184. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Youssef A, Cassin SE, Wnuk S, et al. The impact of COVID-19 pandemic on bariatric patients' self-management post-surgery. Appetite. 2021 Jul 1;162:105166. doi: 10.1016/j.appet.2021.105166. PMID: 33610640. **- Not applicable to any of the key questions**

Yu E, Hagens S. Socioeconomic Disparities in the Demand for and Use of Virtual Visits Among Senior Adults During the COVID-19 Pandemic: Cross-sectional Study. JMIR Aging. 2022 Mar 22;5(1):e35221. doi: 10.2196/35221. PMID: 35134746. **- Addresses KQ1 only: Not a US-based study**

Yu Z, Roberts B, Snyder J, et al. A Pilot Study of a Videoconferencing-Based Binge Eating Disorder Program in Overweight or Obese Females. Telemed J E Health. 2021 Mar;27(3):330-40. doi: 10.1089/tmj.2020.0070. PMID: 32503392. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Yuan N, Botting PG, Elad Y, et al. Practice Patterns and Patient Outcomes After Widespread Adoption of Remote Heart Failure Care. Circ Heart Fail. 2021 Oct;14(10):e008573. doi: 10.1161/circheartfailure.121.008573. PMID: 34587763. **- Addresses KQ2 ONLY and is a non-comparative study**

Yue H, Mail V, DiSalvo M, et al. Patient Preferences for Patient Portal-Based Telepsychiatry in a Safety Net Hospital Setting During COVID-19: Cross-sectional Study. JMIR Form Res. 2022 Jan 26;6(1):e33697. doi: 10.2196/33697. PMID: 34932497. **- Addresses KQ1 only: Not a US-based studyNot nationally representative data (large data set collected at the national level)**

Yun S, Enjuanes C, Calero E, et al. Study design of Heart failure Events reduction with Remote Monitoring and eHealth Support (HERMeS). ESC heart failure. 2020doi: 10.1002/ehf2.12962. PMID: CN-02178453. **- No original data (review, editorials, letters, protocols, etc.)**

Zaagsma M, Koning MHM, Volkers KM, et al. 'It really is quite a different ballgame'. A qualitative study into the work experiences of remote support professionals. J Appl Res Intellect Disabil. 2022 Apr 26doi: 10.1111/jar.13001. PMID: 35474394. **- Not applicable to any of the key questions**

Zaccari B, Loftis JM, Haywood T, et al. Synchronous Telehealth Yoga and Cognitive Processing Group Therapies for Women Veterans with Posttraumatic Stress Disorder: A Multisite Randomized Controlled Trial Adapted for COVID-19. Telemed J E Health. 2022 Mar 29doi: 10.1089/tmj.2021.0612. PMID: 35357957. **- Not applicable to any of the key questions**

Zachrison KS, Samuels-Kalow ME, Boggs KM, et al. Association of Emergency Department Payer Mix with ED Receipt of Telehealth Services: An Observational Analysis. West J Emerg Med. 2022 Jan 31;23(2):141-4. doi: 10.5811/westjem.2021.9.53014. PMID: 35302445. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Zalewski M, Walton CJ, Rizvi SL, et al. Lessons Learned Conducting Dialectical Behavior Therapy via Telehealth in the Age of COVID-19. Cogn Behav Pract. 2021 Nov;28(4):573-87. doi: 10.1016/j.cbpra.2021.02.005. PMID: 34629837. **- Addresses KQ2 ONLY and is a non-comparative study**

Zetterqvist V, Gentili C, Rickardsson J, et al. Internet-Delivered Acceptance and Commitment Therapy for Adolescents with Chronic Pain and Their Parents: A Nonrandomized Pilot Trial. J Pediatr Psychol. 2020 Oct 1;45(9):990-1004. doi: 10.1093/jpepsy/jsaa060. PMID: 32974656. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Zhang AAY, Chew NWS, Ng CH, et al. Post-ST-Segment Elevation Myocardial Infarction Follow-Up Care During the COVID-19 Pandemic and the Possible Benefit of Telemedicine: An Observational Study. Front Cardiovasc Med. 2021;8:755822. doi: 10.3389/fcvm.2021.755822. PMID: 34746268. **- Population is not comparable to a US population**

Zhang J, Boden M, Trafton J. Mental health treatment and the role of tele-mental health at the veterans health administration during the COVID-19 pandemic. Psychological Services. 2021doi: 10.1037/ser000053010.1037/ser0000530.supp (Supplemental). PMID: 2021-34458-001. **- Not applicable to any of the key questions**

Zhang Z, Henley T, Schiaffino M, et al. Older adults' perceptions of community-based telehealth wellness programs: a qualitative study. Inform Health Soc Care. 2021 Nov 25:1-12. doi: 10.1080/17538157.2021.2006198. PMID: 34822311. **- Study dates not available AND no terms suggesting conducted during COVID-19**

Zhao Y, Ren M, Wang X, et al. Telephone-Based Reeducation of Drug Administration for Helicobacter p ylori Eradication: a Multicenter Randomized Controlled Study. Gastroenterology research and practice. 2020;2020doi: 10.1155/2020/8972473. PMID: CN-02161857. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

Zhen-Duan J, Gade N, Falgas-Bagué I, et al. Using a structural vulnerability framework to understand the impact of COVID-19 on the lives of Medicaid beneficiaries receiving substance use treatment in New York City. Health Serv Res. 2022 Mar 27doi: 10.1111/1475-6773.13975. PMID: 35340033. **- Addresses KQ3 only: Conducted during the early COVID era only (March 2020 to June 2020)**

Zhu Y, Chen Z, Ding A, et al. Patient Satisfaction With the Head and Neck Cancer Telephone Triage Service During the COVID-19 Pandemic. Cureus. 2021 Sep;13(9):e18375. doi: 10.7759/cureus.18375. PMID: 34729263. **- Addresses KQ3 only: Conducted during the early COVID era only (March 2020 to June 2020)**

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Zomerdijk N, Jongenelis M, Yuen E, et al. Experiences and needs of people with haematological cancers during the COVID-19 pandemic: A qualitative study. Psychooncology. 2022 Mar;31(3):416-24. doi: 10.1002/pon.5819. PMID: 34500498. **- Addresses KQ2 ONLY and is a non-comparative study**

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Zupan M, Zaletel M, Žvan B. Enhancement of Intravenous Thrombolysis by Nationwide Telestroke Care in Slovenia: A Model of Care for Middle-Income Countries. Telemed J E Health. 2020 Apr;26(4):462-7. doi: 10.1089/tmj.2019.0046. PMID: 31140945. **- Study completed prior to the era of COVID-19 (Prior to March 2020)**

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Appendix C. Results

Key Question 1 Studies

Abdullah H, Lynch S, Aftab S, et al. Characteristics of Calls to a COVID-19 Mental Health Hotline in the First Wave of the Pandemic in New York. Community Ment Health J. 2021 Jul 10:1-3. doi: 10.1007/s10597-021-00868-9. PMID: 34245443.

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Aguwa UT, Aguwa CJ, Repka M, et al. Teleophthalmology in the Era of COVID-19: Characteristics of Early Adopters at a Large Academic Institution. Telemed J E Health. 2021 Jul;27(7):739-46. doi: 10.1089/tmj.2020.0372. PMID: 33074795.

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Akama-Garren EH, Shah SA, Zinzuwadia AN, et al. Outcomes of a Student-Led Telemedicine Clinic in Response to COVID-19. J Ambul Care Manage. 2021 Jul-Sep 01;44(3):197-206. doi: 10.1097/jac.0000000000000380. PMID: 34016847.

Alexander GC, Tajanlangit M, Heyward J, et al. Use and Content of Primary Care Office-Based vs Telemedicine Care Visits During the COVID-19 Pandemic in the US. JAMA Netw Open. 2020 Oct 1;3(10):e2021476. doi: 10.1001/jamanetworkopen.2020.21476. PMID: 33006622.

Alkureishi MA, Choo ZY, Lenti G, et al. Clinician Perspectives on Telemedicine: Observational Cross-sectional Study. JMIR Hum Factors. 2021 Jul 9;8(3):e29690. doi: 10.2196/29690. PMID: 34184994.

Anderson TS, O'Donoghue AL, Dechen T, et al. Trends in telehealth and in-person transitional care management visits during the COVID-19 pandemic. J Am Geriatr Soc. 2021 Jun 14doi: 10.1111/jgs.17329. PMID: 34124776.

Atherly A, Van Den Broek-Altenburg E, Hart V, et al. Consumer Reported Care Deferrals Due to the COVID-19 Pandemic, and the Role and Potential of Telemedicine: Cross-Sectional Analysis. JMIR Public Health Surveill. 2020 Sep 14;6(3):e21607. doi: 10.2196/21607. PMID: 32833661.

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Table C.1. Summary matrix of the number of included studies with relevant outcomes by outcome category and clinical condition

Outcomes	General Medical Care - Adults	General Medical Care - Child	General Medical Care - All Ages	Specialized – COVID-19	Specialized - Pregnancy/ Prenatal/ Gynecological	Specialized – Other Conditions	Surgical Care	General Behavioral/Mental Health	Physical Rehabilitation/ Functional Impairment
Healthcare utilization-emergency department visits	Comparative: 0 studies Non-comparative: 1 study	Comparative: 0 studies Non-comparative: 1 study	Comparative: 2 studies Non-comparative: 0 studies	Comparative: 3 studies Non-comparative: 2 studies	Comparative: 1 study Non-comparative: 0 studies	Comparative: 5 studies Non-comparative: 3 studies	Comparative: 1 study Non-comparative: 1 study	0 studies	0 studies
Healthcare utilization-hospitalization	Comparative: 2 studies Non-comparative: 1 study	Comparative: 0 studies Non-comparative: 1 study	Comparative: 2 studies Non-comparative: 1 study	Comparative: 2 studies Non-comparative: 8 studies	Comparative: 2 studies Non-comparative: 1 study	Comparative: 9 studies Non-comparative: 3 studies	Comparative: 1 study Non-comparative: 0 studies	0 studies	0 studies
Healthcare utilization-readmission	0 studies	0 studies	0 studies	Comparative: 2 studies Non-comparative: 1 study	Comparative: 1 study Non-comparative: 0 studies	0 studies	Comparative: 3 studies Non-comparative: 0 studies	0 studies	0 studies
Clinical outcomes-mortality	0 studies	0 studies	0 studies	Comparative: 0 studies Non-comparative: 5 studies	Comparative: 2 studies Non-comparative: 0 studies	Comparative: 3 studies Non-comparative: 4 studies	Comparative: 2 studies Non-comparative: 0 studies	0 studies	0 studies
Clinical outcomes-patient reported outcomes	Comparative: 0 studies Non-comparative: 2 studies	0 studies	0 studies	0 studies	Comparative: 1 study Non-comparative: 0 studies	Comparative: 1 study Non-comparative: 1 study	0 studies	Comparative: 3 studies Non-comparative: 0 studies	Comparative: 0 studies Non-comparative: 1 study
Clinical outcomes-condition specific clinical outcomes	Comparative: 0 studies Non-comparative: 1 study	0 studies	0 studies	0 studies	Comparative: 2 studies Non-comparative: 1 study	Comparative: 7 studies Non-comparative: 1 study	Comparative: 1 study Non-comparative: 0 studies	Comparative: 1 study Non-comparative: 0 studies	0 studies

Outcomes	General Medical Care - Adults	General Medical Care - Child	General Medical Care - All Ages	Specialized – COVID-19	Specialized - Pregnancy/ Prenatal/ Gynecological	Specialized – Other Conditions	Surgical Care	General Behavioral/Mental Health	Physical Rehabilitation/ Functional Impairment
Clinical outcomes- adverse events	Comparative: 1 study Non-comparative: 1 study	0 studies	0 studies	0 studies	Comparative: 3 studies Non-comparative: 0 studies	Comparative: 1 study Non-comparative: 3 studies	Comparative: 4 studies Non-comparative: 0 studies	Comparative: 1 study Non-comparative: 0 studies	0 studies
Process outcomes- missed visits	0 studies	0 studies	0 studies	0 studies	Comparative: 1 study Non-comparative: 0 studies	Comparative: 4 studies Non-comparative: 1 study	Comparative: 1 study Non-comparative: 0 studies	Comparative: 1 study Non-comparative: 0 studies	0 studies
Process outcomes- case resolution/duplication of services	Comparative: 0 studies Non-comparative: 2 studies	Comparative: 0 studies Non-comparative: 1 study	Comparative: 2 studies Non-comparative: 0 studies	Comparative: 1 study Non-comparative: 1 study	Comparative: 1 study Non-comparative: 0 studies	Comparative: 7 studies Non-comparative: 7 studies	Comparative: 1 study Non-comparative: 1 study	0 studies	0 studies
Process outcomes- change in therapy/ Medication	Comparative: 2 studies Non-comparative: 0 studies	0 studies	0 studies	0 studies	0 studies	Comparative: 6 studies Non-comparative: 3 studies	0 studies	0 studies	0 studies
Process outcomes- Therapy/ Medication adherence	Comparative: 2 studies Non-comparative: 1 study	0 studies	0 studies	0 studies	0 studies	Comparative: 4 studies Non-comparative: 0 studies	0 studies	Comparative: 3 studies Non-comparative: 0 studies	0 studies
Process outcomes- up-to-date labs and paraclinical assessment	0 studies	0 studies	0 studies	Comparative: 0 studies Non-comparative: 1 study	Comparative: 1 study Non-comparative: 0 studies	Comparative: 6 studies Non-comparative: 0 studies	0 studies	0 studies	0 studies

Table C.2. Provider and healthcare systems of included studies with telehealth versus in-person comparisons in Key Question 2

Author, Year	N Providers	Healthcare System	Specialty/Clinical Focus
Afonso Noguueria, 2021[1]	1	Representative of a single large facility or organization	Heart failure clinic in hospital
Aiken, 2021[2]	3	Not reported	Abortion providers
Arias, 2022[3]	1	Representative of a single large facility or organization	Postpartum care
Barequet, 2021[4]	1	Limited study of less than above	Primary care (wide, full-range care)
Baughman, 2021[5]	1	Large/Regionally representative	Primary care (wide, full-range care)
Boles, 2022[6]	1	Representative of a single large facility or organization	Surgical
Borgen, 2021[7]	Not reported	Not reported	Home-care services
Boshara, 2022[8]	1	Large/Regionally representative	HIV
Cancer, 2021[9]	3	Representative of a single large facility or organization	Rehab/PT/OT/etc.
Carlberg, 2020[10]	1	Limited study of less than above	Tertiary care, Level I trauma center
Casariego-Vales, 2021[11]	Not reported	Not reported	At home monitoring
Cobo-Calbo, 2022[12]	1	Limited study of less than above	MS/Autoimmune disorder center
Cunningham, 2022[13]	6	Representative of a single large facility or organization	Rehab/PT/OT/etc.
Cvietusa, 2022[14]	1	Large/Regionally representative	Primary care (wide, full-range care)
D'Anna, 2021[15]	1	Representative of a single large facility or organization	Primary care (wide, full-range care)
Duryea, 2021[16]	1	Not reported	Antenatal and postpartum care clinic
Fortier, 2022[17]	1	Large/Regionally representative	Mental health
Fredwall, 2021[18]	1	Not reported	Epilepsy clinic
Gaetani, 2021[19]	Not reported	Not reported	Hereditary hemorrhagic telangiectasia center
Garmendia, 2021[20]	1	Not reported	Sleep unit
Grandizio, 2022[21]	1	Limited study of less than above	Surgical
Hamner, 2021[22]	1	Representative of a single large facility or organization	Mental health
Hatef, 2022[23]	1	Nationally representative	Not reported
Helmes, 2022[24]	1	Limited study of less than above	Dental surgery
Irarrazaval, 2021[25]	1	Representative of a single large facility or organization	Surgical
Kablinger, 2022[26]	1	Limited study of less than above	Mental health
Kerestes, 2021[27]	1	Not reported	Family planning clinic

Author, Year	N Providers	Healthcare System	Specialty/Clinical Focus
Khosla, 2022[28]	1	Limited study of less than above	Primary care (wide, full-range care)
Klain, 2021[29]	Not reported	Not reported	Radiometabolic Therapy Unit
Kolb, 2021[30]	1	Not reported	tertiary-care pediatric referral center
Korycinski, 2022[31]	1	Limited study of less than above	Primary care (wide, full-range care)
Levinson, 2021[32]	1	Limited study of less than above	Behavioral health: eating disorder
Li, 2021[33]	Not reported	Not reported	Eye hospital
Lindhagen, 2022[34]	1	Representative of a single large facility or organization	Gastroenterology department
Liu, 2021[35]	Not reported	Not reported	Gastroenterology/Rheumatology clinic
Mair, 2021[36]	1	Not reported	Rheumatology clinic
McCoy, 2022[37]	1	Representative of a single large facility or organization	Otolaryngology
McNamara, 2021[38]	9	Representative of a single large facility or organization	Pharmacy visit
Minsky, 2021[39]	1	Not reported	Weight management clinic
Offiah, 2022[40]	41	Large/Regionally representative	General cardiology clinics in hospital
Ostberg, 2022[41]	2	Not reported	Primary care (wide, full-range care)
Parise, 2021[42]	3	Representative of a single large facility or organization	Diabetes care center
Phillips, 2021[43]	1	Not reported	Primary care run respiratory assessment center
Pinsker, 2021[44]	1	Not reported	Diabetic center
Ragheb, 2021[45]	1	Representative of a single large facility or organization	Obstetric anesthesia
Reddy, 2021[46]	1	Limited study of less than above	Cancer care
Ripp, 2022[47]	1	Representative of a single large facility or organization	Mental health
Rowe, 2021[48]	1	Not reported	Tertiary hospital cardiology center
Rysinka, 2021[49]	32	Regional healthcare network	Primary care clinic
Schafer, 2022[50]	1	Representative of a single large facility or organization	Surgical
Sevilis, 2022[51]	171	Nationally representative	Stroke care
Sharma, 2020[52]	1	Not reported	Irritable Bowel Disease unit
Tarn, 2021[53]	Not reported	Not reported	Not reported
Tchang, 2022[54]	1	Limited study of less than above	Wellness/Health education
Uppal, 2022[55]	1	Representative of a single large facility or organization	Surgical
Wabe, 2022[56]	5	Large/Regionally representative	Primary care (wide, full-range care)

Author, Year	N Providers	Healthcare System	Specialty/Clinical Focus
Watson, 2021[57]	1	Representative of a single large facility or organization	Cancer care
Ye, 2022[58]	1	Representative of a single large facility or organization	Primary care (wide, full-range care)
Ye, 2022[59]	1	Representative of a single large facility or organization	Surgical
Zayde, 2021[60]	1	Limited study of less than above	Mental health
Zhao, 2021[61]	1	Not reported	Hospital clinic
Zhu, 2021[62]	1	Regional healthcare network	Rheumatology clinics
Zimmerman, 2021[63]	1	Representative of a single large facility or organization	Hospital

HIV=human immunodeficiency virus; MS=multiple sclerosis; N=sample size; OT=occupational therapy; PT=physical therapy

Table C.3. Matrix comparing qualitative and quantitative studies addressing patient barriers and facilitators

Barrier or Facilitator Category	Population	Qualitative Studies	Surveys
Telehealth literacy (barrier)	Studies, participants: N (n)	3 (1415)	1 (34)
	Telehealth Mode	Video (3),*	Video
	Country (ies)	Australia, Canada, US	US
	Health concern	General care (3)	Cardiac patients
	Demographics	Adults(3)	Over 75 years old
	Study period	Later COVID (3)	General COVID
Telehealth Literacy (facilitator)	NR	NR	NR
Cost (barrier)	NR	NR	NR
Cost (facilitator)	NR	NR	NR
Privacy (barrier)	Studies, participants: N (n)	7 (1236)	NR
	Telehealth Mode	Video (5); telephone only (1); NR (1)	NR
	Country (ies)	US (4); UK (1); Australia (1); Canada (1)	NR
	Health concern	Rheumatology (1); palliative care (1); neurology (1); sleep (1); oncology (1); contraception (1); NR (1)	NR
	Demographics	Age: Adult (5), NR (2); Sex: Female (1); NR (6); race, mixed (7)	NR
	Study period	Early COVID (4); general COVID (2); compares pre COVID to COVID era (1)	NR
Privacy (facilitator	Studies, participants: N (n)	NR	2 (356)
	Telehealth Mode	NR	NR (2)
	Country (ies)	NR	US (1); Israel (1)
	Health concern	NR	Oncology (1); dermatology (1)
	Demographics	NR	Adult (2); sex (mixed); race (mixed)
	Study period	NR	Early COVID (2)
Outcomes (barrier)	Studies, participants: N (n)	5 (1351)	NR
	Telehealth Mode	Video (1); telephone only (3); NR (1)	NR
	Country (ies)	Australia (2); Canada (1); The Netherlands (1); Multi (1)	NR
	Health concern	Rhematic disease (1); endometriosis (1); parkinson's (1); eating disorder (1); NR (1)	NR
	Demographics	Age: Adults (4), NR (1); sex: female (1); mixed (3), NR (1); race: NR	NR
	Study period	Early COVID (4); later COVID (1)	NR
Outcomes (facilitator)	NR	NR	NR
Communication (barrier)	Studies, participants: N (n)	5 (1537)	NR
	Telehealth Mode	Video (3); telephone only (2)	NR
	Country (ies)	US (2); UK (1); Australia (2)	NR

Barrier or Facilitator Category	Population	Qualitative Studies	Surveys
	Health concern	General care (1); rheumatology (1); ESRD (1); eating disorder (1); oncology (1)	NR
	Demographics	Age: adult; sex: mixed (5); race: mixed (2); NR (3)	NR
	Study period	Early COVID (3); later COVID (2)	NR
Communication (facilitator)	Studies, participants: N (n)	2 (30)	1 (53)
	Telehealth Mode	Telephone only (2)	Video
	Country (ies)	UK (2)	UK
	Health concern	ESRD (1); abortion (1)	Surgical patients
	Demographics	Age: adult; sex: female (1), mixed (1); race: white (2)	Over 65 years old
	Study period	General COVID (1); later COVID (1)	General COVID
Technical Issues (barrier)	Studies, participants: N (n)	9 (1605)	14 (1833)
	Telehealth Mode	Video (6); telephone only (1); NR (2)	Video (9); NR (6)
	Country (ies)	United States (5); Australia (2); Israel (1); New Zealand (1); UK (1)	Germany (1); Switzerland (1); UK (1): US (11)
	Health concern	General health (2); oncology (2); rheumatic disease (1); mental health (1); heart failure (1); eating disorder (1); substance abuse (1); respiratory (1)	Surgical (2), Oncology (1); dermatology (1); orthopaedics (3), general medicine (1), physical rehab (1), allergy (1), cystic fibrosis (1), mental health (1), womens' health (1), heart failure (1)
	Demographics	Age: adult (8), NR (2); race: mixed (8), NR (2); mixed (4), NR (6)	Age: adult (13); NR (1); sex: female (1); mixed (13); race: mixed (5), NR (8)
	Study period	Early COVID (3); general COVID (4); later COVID (2); compares pre COVID to COVID era (1)	Early COVID (9); General COVID (4); Later COVID (1)
Technical issues (facilitator)	NR	NR	NR
Inequity (barrier)	Studies, participants: N (n)	6 (1480)	2 (213)
	Telehealth Mode	Video (5); telephone only (1)	Video (1), NR (1)
	Country (ies)	United States (2); Canada (1); The Netherlands (1); Australia (1) UK (1), Israel (1)	US (2)
	Health concern	Substance abuse (1); rheumatic disease (1); neurology (1); mental health (1); general medicine (1) not reported (1)	Orthopedic (1); mental health (1)
	Demographics	Age: adult (4), NR (2); sex: mixed (6); Race: mixed (4), NR (2)	Age: adult (2); sex: mixed (2); race: mixed (2)
	Study period	Early COVID (4)	Early COVID (9); General COVID (4); Later COVID (1); compares pre to post COVID (1)
Inequity (facilitator)	NR	NR	NR

Barrier or Facilitator Category	Population	Qualitative Studies	Surveys
Suggestions (barrier)	NR	NR	NR
Suggestions (facilitator)	Studies, participants: N (n)	5 (500)	NR
	Telehealth Mode	Video (2); not reported (1)	NR
	Country (ies)	United States (2); Canada (1)	NR
	Health concern	Substance abuse (1); mental health (1); cancer (1)	NR
	Demographics	Age: elderly (<65) (1); NR (2); sex: mixed (1), NR (2); race: mixed (1), NR (2)	NR
	Study period	Early COVID (1); General COVID (1); Later COVID (3)	NR
Advantages (barrier)	NR	NR	NR
Advantages (facilitator)	Studies, participants: N (n)	4 (244)	NR
	Telehealth Mode	Video* (2); telephone only (1) not reported (1)	NR
	Country (ies)	United States (2); Australia (2)	NR
	Health concern	General concerns (1), otolaryngology (1), rheumatic disease (1), sleep (1)	NR
	Demographics	Age: adults (4); sex: mixed (4); race: mixed (1), NR (3)	NR
	Study period	Early COVID (3); compares (1)	NR
Appropriateness of Fit (barrier)	NR	NR	NR
Appropriateness of Fit (facilitator)	Studies, participants: N (n)	7 (1445)	NR
	Telehealth Mode	Video* (3), Video or telephone only (2), not reported (2)	NR
	Country (ies)	United States (3); Canada (2), Australia (2)	NR
	Health concern	Neurology (1), mental health (1), obstetrics, (1), genetic counseling (1), oncology (1), general (1), NR (1)	NR
	Demographics	Age: adult (5); chils and adult (1) NR (1); sex: mixed (5); female (1),NR (1); race: Mixed (3)NR (4)	NR
	Study period	Early COVID (1); General COVID (1)	NR
Changes to practice	Studies, participants: N (n)	1 (37)	NR
	Telehealth Mode	NR	NR
	Country (ies)	US	NR
	Health concern	Opioid use	NR
	Demographics	Adults	NR
	Study period	General COVID	NR
Future of telehealth	Studies, participants: N (n)	3 (439)	NA
	Telehealth Mode	Telephone only (1), telephone only or video* (2)	NA

Barrier or Facilitator Category	Population	Qualitative Studies	Surveys
	Country (ies)	US (1), UK (1), Australia (1)	NA
	Health concern	Obstetrics (1), mental health (2)	NA
	Demographics	Adults (3); Female (1), mixed sex (2)	NA
	Study period	General COVID (1), later COVID (2)	NA

* video=a combination of audio and video, either via telephone plus video feed, or video conference where the two are combined.

NR=not reported
US=United States
UK=United Kingdom
ESRD=end-stage renal disease

Table C.4. CERQual of studies addressing patient barriers and facilitators

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Telehealth literacy (3) Telehealth literacy amongst patients is a barrier to care.	Barrier (3): Isautier, 2020[64] Dainty, 2022[65] Sharma, 2022[66] Facilitators: NA	No or very minor concerns about studies addressing barriers: Three study of patients addressed barriers to care, and there were no concerns in any domains	No or very minor concerns about studies addressing barriers.	Barriers: 3 studies including 1415 participants No or very minor concerns: Three studies contributed to this finding. Sufficient detail was provided regarding methods of data collection and analysis.	No or very minor concerns about studies addressing barriers. In all three studies the population mean age was over 60.	High confidence.	Minor concerns due to a single study contributing to this domain.
Cost	NA	NA	NA	NA	NA	NA	NA
Privacy Issues surrounding privacy are a patient perceived barrier to care via telehealth	Barrier (7): Adams, 2021[67] Bethel, 2021[68] Boydell, 2021[69] Donovan, 2021[70] Granberg, 2021[71] Stifani, 2021[72] Subotic, 2020[73] Facilitators: NA	Minor concerns about studies addressing barriers: Two studies did not sufficiently describe the recruitment strategy; three studies did not provide interview guides, and one study did not sufficiently describe their analyses.	No or very minor concerns about studies addressing barriers.	Barriers: 7 studies including 1236 participants Moderate concerns. Four of the seven studies provide at least a moderate (to very thorough) description of their data collection and analysis processes and of the findings related to privacy. The remaining studies present limited findings related to privacy. One study was further limited by a lack of detail regarding the analytic process.	No or very minor concerns about studies addressing barriers.	Moderate confidence.	Concerns due to limited information available to privacy concerns in telehealth.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Outcomes Patients believe telehealth may be a barrier to improved health	Barriers (5): Adams, 2021[67] Barsom, 2021[74] Evans, 2021[75] Anghelescu, 2021[76] Hunter, 2021[77]	Minor concerns about studies addressing barriers: there was some concern regarding the research design, in one study; recruitment strategy was not well described in four studies; data collection was not completely described in one study (survey instrument not provided); and data analysis was not sufficiently described in two studies.	No or very minor concerns about studies addressing facilitators.	Barriers: 5 studies including 1351 participants Moderate concerns: Three of the five studies provided very rich descriptions of data collection and analysis, leading to confidence in the findings regarding outcomes. In one study, very little attention was given to free-text responses and findings here are not well described. In the final study, while the findings are adequately presented, it is not clear that “data saturation” was operationalized and, instead, was used as a general guideline to pick an arbitrary end-point for recruitment. Taking all five studies into account, we concluded that there are moderate concerns about data adequacy.	No or very minor concerns about studies addressing facilitators.	Moderate confidence.	Concerns due to lack of confidence regarding findings from 40% of the studies.

Communication Telehealth can act as both a barrier to care and a facilitator to care from a patients perspective.	Barriers (5): Adams, 2021[67] Antoun, 2021[78] Frayn, 2021[79] Granberg, 2021[71] Isautier, 2020[64] Facilitators (2): Antoun, 2021[78] Boydell, 2021[69]	Minor concerns about studies addressing barriers: An interview guide was not provided for one of the studies and data analysis was not sufficiently described in another study. Minor concerns about studies addressing facilitators: Data analysis was not sufficiently described in one of the two studies	No or very minor concerns about studies addressing barriers. No or very minor concerns about studies addressing facilitators.	Barriers: 5 studies including 1537 participants Minor concerns. Of these five studies, four reported very rich detail of data collection and analyses, leading to our confidence in the findings regarding communication, One study [71] is skewed by "who accepted and participated in a video visit and does not reflect the perceptions of those who did not agree to participate in a video visit." We do not feel that this sufficiently biases the findings regarding communication, however, because this finding is centered on challenges using telemedicine it thus would be best described from a user's perspective (versus a non-user). Facilitators: 2 studies including 30 participants No or very minor concerns. The data regarding communication is adequately described in both studies, including data collection and analyses. Taking both into account, we have no or very minor concerns about the adequacy of this data.	No or very minor concerns about studies addressing barriers. No or very minor concerns about studies addressing facilitators.	High confidence.	Only minor concerns related to the adequacy of findings.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Technical issues Technical issues: From the perspective of patients, technical issues present a barrier to care	Technical issues (9) Adams, 2021[67] Barsom, 2021[74] Ben-Ayre, 2021[80] Birkhoff, 2021[81] Clair, 2021[82] Costa, 2021[83] Frayn, 2021[79] Granberg, 2021[71] Imlach, 2020[84]	Minor concerns about studies addressing barriers: Main areas of concern were incomplete reporting of recruitment strategy (3); concerns about data collection including not providing survey instruments, or interview guides (5)	No or very minor concerns about studies addressing barriers.	Barriers: 9 studies including 1605 participants Moderate concerns. Five of the nine studies presented adequate data supporting the finding of technological issues related to telehealth utilization. Four studies provided insufficient detail about data collection and analysis, resulting in a lack of clarify about and confidence in the findings related to technological issues.	No or very minor concerns about studies addressing barriers.	Moderate confidence.	Concerns due to the lack of methodological rigor and description of findings related to technical issues.
Inequity Access to telehealth care is problematic for patients with low socioeconomic status including vulnerable populations, older adults, and non-native speakers.	Barriers (4) Isautier, 2020[64] Philip, 2020[85] Subotic, 2020[73] Mozes, 2022[86] Nguyen, 2022[87] San Juan, 2022[88]	Minor concerns about studies addressing barriers: Main areas of concern were incomplete reporting of recruitment strategy, and data collection (4 each); and inssuficient reporting of study purpose (3)	No or very minor concerns about studies addressing barriers.	Barriers: 6 studies including 1480 participants Moderate concerns. Four of the six studies in this area do not adequately describe qualitative data collection and analyses..	No or very minor concerns about studies addressing barriers.	Moderate confidence.	Concerns due to the lack of methodological rigor and description of findings related inequity

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Suggestions: Patients can provide suggestions for better telehealth implementation, and implementation	Facilitators (5) Haase, 2021[89] Clair, 2021[82] Costa, 2021[83] Silviero, 2021[90] Jassil, 2022[88]	Minor concerns about studies addressing facilitators:Recruitment strategy, and description of data collection were poorly reported in two studies each. . Aims were not stated, and ethical issues were not addressed in one study each. Details on the research design and statements of findings were poorly reported in one study each.	No or very minor concerns about studies addressing facilitators.	Facilitators: 5 studies including 500 participants Suggestions. Moderate concerns. Two of the five studies in this area provide insufficient detail recruitment strategy and data collection. About data collection and data analyses, leading to lowered confidence in the well-detailed findings related to suggestions that facilitate the implementation of telehealth services.	No or very minor concerns about studies addressing facilitators.	Moderate confidence.	Concerns due to the lack of methodological rigor and description of findings related to patient suggestions to improve telehealth

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Advantages Advantages: Patients feel that telehealth improves access to care, services, and convenience.	Facilitators (4) Triantafillou, 2021[91] Donovan, 2021[70] Javanparast, 2021[92] Adams, 2021[67]	Minor to moderate concerns about studies addressing facilitators	No or very minor concerns about studies addressing facilitators	Facilitators: 4 studies including 244 participants Advantages. Moderate concerns. Two of the four studies presented limited detail about the qualitative methodology and data findings.[67, 91] In one of these,[91] the authors did not audio-record the interviews and they were "transcribed in real time, with occasional use of paraphrase." This leads to a lack of confidence in the accurate recording, and analysis, of narratives. The other two studies included in this section provided sufficient detail about data collection and analyses.	No or very minor concerns about studies addressing facilitators.	Moderate confidence.	Concerns due to the lack of methodological rigor and description of findings related advantages of telehealth
Appropriateness of fit Some patients believe that telehealth is appropriate for their care, and others feel that telehealth is not appropriate for care provision in certain situatiosn	Facilitators (7) Subotic, 2020[73] Costa, 2021[83] Saad, 2021[93] Van Dam, 2021[94] Nguyen, 2022[87] Rezich, 2021[95] Edge, 2021[96]	Minor concerns about studies addressing facilitators:Six studies did not adequately address data collection, three did not adequately describe data analysis, two did not describe recruitment, and one study did not express a clear statement of purpose.		Facilitators: 7 studies including 1445 participants Appropriateness of Fit. Moderate concerns. Most of the studies provided inadequate detail of the data collection (no description of the tool used), and three inadequately described the data analysis.	No or very minor concerns about studies addressing facilitators.	Moderate confidence.	Concerns poorly detailed description of findings related to appropriateness of fit

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Changes to Practice Telehealth can lead to changes in the way medical/substance abuse practice is conducted.	Facilitator (1) Walters, 2022[97]	Minor concerns about studies addressing facilitators. The one study addressing this theme did not provide sufficient information about study aims, recruitment, or data analysis	No or very minor concerns about studies addressing facilitators	Facilitators: 1 study including 37 participants Changes to practice: Serious concerns. One small study addressed this topic	No or very minor concerns about studies addressing changes to pravtice	Low confidence	A single, small study with multiple minor methodologic flaws addressed this theme.
Future of telehealth Patient receiving obstetric care or mental health services are not positive about using telehealth as a regular care provision in the future	Facilitator (3) Stanhope, 2022[98] San Juan, 2021[99] Dennett, 2021[100]	Minor concerns about studies addressing facilitators. One study each did not adequately describe aims, data collection, and data analysis. One study did not include information on ethical issues. Two studies did not sufficiently address recruitment strategy.	No or very minor concerns about studies addressing facilitators	Facilitators: 3 studies including 439 participants Future of telehealth Minor concerns Three studies with minor methodologic issues across all.	Minor concerns about studies addressing the future of telehealth due to limited types of patient populations	Moderate confidence	All studies had minor methodologic concerns, and the study populations were limited to those receiving obstetric care or mental health care.

CASP= Critical Appraisal Skills Programme ; CERQual = Confidence in the Evidence from Reviews of Qualitative Research; NA=not available

Table C.5. Matrix comparing qualitative and quantitative studies addressing provider barriers and facilitators

Barrier or Facilitator Category	Population	Qualitative Studies	Surveys
Telehealth literacy (barrier)	Studies, participants: N (n)	7 (229)	6 (1179)
	Telehealth Mode	Video (5); not reported (2)	Video (5) NR (1)
	Country (ies)	US (6); Denmark (1)	US (5); Germany 1
	Healthcare System	Includes representatives from single large facilities or organizations (1); large regionally representative (1); not reported (5)	single large facilities or organizations (1); large regionally representative (1); not reported (4)
	Clinical/specialty Area	Primary/general care (3); dietician (2); prenatal care (1); oncology (1)	General care (2), mental health (1), transplant (1), prenatal care (1), sports medicine (1)
	Study period	Early COVID (3); General COVID (2) Later COVID (2)	Early COVID (4); General COVID (1)Later COVID (1)
Telehealth Literacy (facilitator)	Studies, participants: N (n)	3 (233)	3 (946)
	Telehealth Mode	Video (1); NR (1)	Video (2), telephone only (1)
	Country (ies)	US (3)	US (1), Germany (1), South Korea (1)
	Healthcare System	Includes representatives from single large facilities or organizations (1); NR (2)	Limited study of a small healthcare system (1), NR (2)
	Clinical/specialty Area	Primary care (1); prenatal care (1); dietician (1)	Sports medicine (1), psychology (1), mixed medical/surgical (2)
	Study period	Early COVID (1); Later COVID (2)	Early COVID (1); General COVID (1), Later COVID (1)
Cost (barrier)	Studies, participants: N (n)	19 (1,173)	5 (1034)
	Telehealth Mode	Video (12); telephone only (1), not stated (6)	Video (2), NR (3)
	Country (ies)	US (12), Australia (2), New Zealand (1), UK (1), Multi (4)	US (1), Australia (2), Canada (1), multiple (1)
	Healthcare System	Nationally representative (1), Includes representatives from single large facilities or organizations (3); limited population (1), not reported (14)	Representative of a single large facility (1), NR (4)
	Clinical/specialty Area	Primary care (4); mental/behavioral health (3); dietician (2), prenatal care (1), chronic disease (1), oncology (2), opioid treatment (1), mixed (1), rheumatology (1), hospice/palliative care (1), nephrology (1), social services (1)	Primary/general care (2), physiotherapy (1), neurology (1), NR (1)
	Study period	Early COVID (7); General COVID (5); Later COVID (7)	Early COVID (3); General COVID (1), Later COVID (1)
Cost (facilitator)	Studies, participants: N (n)	1 (22)	2 (686)
	Telehealth Mode	US (1)	NR (2)

Barrier or Facilitator Category	Population	Qualitative Studies	Surveys
	Country (ies)	NR (1)	Lithuania (1), multi (1)
	Healthcare System	NR (1)	NR (2)
	Clinical/specialty Area	Mental health (1)	Neurology (2)
	Study period	Early COVID (1)	Early COVID (1) Later COVID (1)
Privacy (barrier)	Studies, participants: N (n)	8 (495)	NR
	Telehealth Mode	US (2), Ireland (1), UK (1), Latvia (1), Australia (1), New Zealand (1), Mixed (1)	NR
	Country (ies)	Video (1), Telephone only or video (1)NR (6)	NR
	Healthcare System	Nationally representative (2), NR (5), Other (2)	NR
	Clinical/specialty Area	Mental/behavioral health (4), physical aor rehab therapy (1), primary care (1), oncology (1), Other (2)	NR
	Study period	General COVID (5), Later COVID (4)	NR
Privacy (facilitator)	Studies, participants: N (n)	2 (885)	NR
	Telehealth Mode	Telephone or video (1), not reported (1)	NR
	Country (ies)	US (1), Australia (1)	NR
	Healthcare System	Nationally representative (1), not reported (1)	NR
	Clinical/specialty Area	Mental health (1), oncology (1)	NR
	Study period	Later COVID (2)	NR
Outcomes (barrier)	Studies, participants: N (n)	14 (2768)	1 (14)
	Telehealth Mode	Video (9); NR (6)	NR
	Country (ies)	US (6), UK (2), The Netherlands (2), Switzerland (1), Israel (1), Finland (1), Australia (1)	US
	Healthcare System	Includes representatives from single large facilities or organizations (2); nationally representative (1); not reported (11)	NR
	Clinical/specialty Area	Mental/behavioral health (3); physical rehab or occupational therapy (3); opioid treatment (1), neuropsychology (1), dermatology (1), dietician (1), orhtopedics (1), occuloplastics (1), other medical specialists (1), palliative care (1)	Neurosurgery
	Study period	Early COVID (10); General COVID (2); Later COVID (2)	General COVID
Outcomes (facilitator)	Studies, participants: N (n)	23 (2611)	1 (89)
	Telehealth Mode	Video (14), telephone only (1), NR (8)	Video

Barrier or Facilitator Category	Population	Qualitative Studies	Surveys
	Country (ies)	US (16), Switzerland (2), The Netherlands (2), UK (1), Denmark, (1), Spain (1)	US
	Healthcare System	Large regionally representative (1), representative of a single large facility (4), nationally representative (1), NR (17)	Limited size healthcare system
	Clinical/specialty Area	Mental/behavioral health (3), opioid treatment (2), other mixed groups of providers (11), primary care (3), physical rehab (2)	Psychology
	Study period	Easry COVID (1), General COVID (8), Later COVIDE (5)	Later COVID
Communication (barrier)	Studies, participants: N (n)	11 (476) numbers not reported in one focus group	5 (445)
	Telehealth Mode	Video (8); NR (3)	Video (3), telephone only (1), NR (1)
	Country (ies)	US (9); Denmark (1), Israel (1)	US (3), The Netherlands (1), multi (1)
	Healthcare System	Includes representatives from single large facilities or organizations (3); nationally representative organization (1); limited study (1) and not reported (6)	Representative of a single large facility (1), NR (4)
	Clinical/specialty Area	Mental/behavioral health (4), primary care (2), opioid treatment (1), lactation professionals (1), NR (1)	Rheumatology (1), neurology (1), advanced practice (1), NR (2)
	Study period	Early COVID (7); General COVID (4)	Early COVID (4), Later COVID (1)
Communication (facilitator)	Studies, participants: N (n)	9 (1334)	1 (89)
	Telehealth Mode	Video (4); NR (5)	Video
	Country (ies)	US (6); Australia (1), Finland (1), The Netherlands (1)	US
	Healthcare System	Includes representatives from single large facilities or organizations (1); limited study (2); nationally representative (1) NR (5)	Limited size healthcare system
	Clinical/specialty Area	Mental/behavioral health (2), opioid treatment (1), physical rehab (1), prenatal care (1), dietician (1), lactation professionals (1), healthcare workers, unspecified (1), NR (1)	Psychology
	Study period	Early COVID (6); General COVID (2); Later COVID (1)	Later COVID
Inequity (barrier)	Studies, participants: N (n)	19 (4200)	8 (750)
	Telehealth Mode	Video (13), telephone only (1), NR (5)	Videao (2), Telephone only (1), NR (5)
	Country (ies)	US (14), UK (1), The Netherlands (1), Switzerland (1), Canada (1), Australia (1)	US (3), Australia (1), Canada (1). UK (1), The Netherlands (1), Multi (1)

Barrier or Facilitator Category	Population	Qualitative Studies	Surveys
	Healthcare System	Nationally representative (1), Representative od a single large facility (4), NR (14)	Representative of a single large facility (1), Limited size healthcare system (1), NR (6)
	Clinical/specialty Area	Mental/behavioral health (6), Primary care (2), opioid treatment (2), Physical rehab/occupational therapy (2), palliative care (1), dietician (2), substance abuse (1), social work (1), neurology (1), NR (1)	Rheumetology (1), neurology (1), transplant (1), primary care (1), advance practice (1), endocrine (1), NR (2)
	Study period	Early COVID (11), general COVID (5), later COVID (3)	Early COVID (4), Later COVID (4)
Inequity (facilitator)	NR	NR	NR
Technical Issues and digital literacy (barrier)	Studies, participants: N (n)	27 (4500)	12 (3426)
	Telehealth Mode	Video (12), telephone only (1), NR (14)	Video (6), NR (6)
	Country (ies)	US (15), UK (2), Switzerland (2), Australia (2), The Netherlands (1), Italy (1), Israel (1), multiple countries (3)	US (6), Canada (1), Germany (1), Ireland (1), Israel (1), Switzerland (1), UK (1)
	Healthcare System	Nationally representative (1), representative of a single large facility (5), NR (21)	Representative of a single large facility (2, Large reagionally representative system (2), NR (8),
	Clinical/specialty Area	Mental health (2), physical rehab/occupational therapy (2), Opioid/drug treatment (5), neurology (2), oncology (1), palliative care (1), treatment providers (1), medical specialists (1), dietician (1), neuropsychologist (1), geriatrics (1), hospice (1), lactation professionals (1), dermatology (1), chronic disease (1), prenatal care (1), genetic counselling (1), primary care (1), neurology (1), NR (1)	Mental health (1), primary care (4), nutrition (1), neurology (2), advanced practice (1), allergy (1), ob.gyn (1), NR (1)
	Study period	Early COVID (16), general COVID (7), later COVID (4)	Early COVID (6), general COVID (2), later COVID (3), comparative (1)
Technical issues (facilitator)	NR	NR	NR
Appropriateness of Fit (barrier)	NR	NR	NR
Appropriateness of Fit (facilitator)	Studies, participants: N (n)	5 (261)	NR
	Telehealth Mode	Video (3), NR (2)	NR
	Country (ies)	US (2), Switzerland (1), Denmark (1), NR (1)	NR
	Healthcare System	NR (5)	NR
	Clinical/specialty Area	General practice (3), opioid and alcohol/drug treatment (2)	NR

Barrier or Facilitator Category	Population	Qualitative Studies	Surveys
	Study period	Early COVID (2), general COVID (1), later COVID (2)	NR
Future use	Studies, participants: N (n)	15 (594)	NR
	Telehealth Mode	Video (5), telephone only (1), not reported (9)	NR
	Country (ies)	US (9), UK (1), Canada (2), Australia (2), mixed (1)	NR
	Healthcare System	Nationally representative (3), Mixed (4), small population (1), not reported (7)	NR
	Clinical/specialty Area	Primary care (5), speech/language (2), oncology (2), emergency medicine (1), social services (1), cardiology (1), mixed (1), mental health (1), opioid use (1)	NR
	Study period	General COVID (5), Later COVID (8), Compares early vs later (1)	NR
Preparation for future use	Studies, participants: N (n)	3 (94)	NR
	Telehealth Mode	Telephone only or video (3)	NR
	Country (ies)	US (1), Australia (1), mixed (1)	NR
	Healthcare System	Nationally representative (1), not reported (2)	NR
	Clinical/specialty Area	Mixed (3)	NR
	Study period	Later COVID (3)	NR
Change in practice	Studies, participants: N (n)	7 (293)	NR
	Telehealth Mode	Video (1), Telephone only or video (2), not stated (4)	NR
	Country (ies)	US (3), Canada (1), Australia (1), Mixed (2)	NR
	Healthcare System	Nationally representative (1), not reported (6)	NR
	Clinical/specialty Area	Primary care (2), oncology (1), therapy (1), hospice/palliative care (1), Cardiology (1), opioid use disorder (1)	NR
	Study period	General COVID (3), Later COVID (3), compares early to later (1)	NR

NR=not reported
US=United States
UK=United Kingdom
ESRD=end-stage renal disease

Table C.6. CERQual of studies addressing provider barriers and facilitators

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Telehealth literacy Telehealth literacy of patients is considered a barrier to care by providers. Providers noted that their own telehealth literacy can be reduced through training.	Barriers (6): Brunton, 2021[101] Due, 2021[102] Madden, 2020[103] Marshall, 2021[104] Ritchie, 2021[105] Singh, 2021[106] Rosenthal-2021[107] Facilitators (3): Alkureeishi, 2021[108] Brunton, 2021[101] Madden, 2020[103]	Minor concerns about studies addressing barriers: Concerns about recruitment strategy were noted in four of the six studies; information on data collection was either missing, or the survey guide was not provided in two studies; and information on data analysis was lacking or missing in two studies. Moderate concerns about studies addressing facilitators: Concerns about recruitment strategy were noted in two studies; survey instrument was not provided for one study; ethical issues were not sufficiently addressed in one study, and data analysis was insufficient or poorly described in two studies.	No or very minor concerns about studies addressing barriers: No or very minor concerns about studies addressing facilitators:	Barriers: 7 studies including 229 participants Moderate concerns. Six studies contributed to this finding. Four of six studies did not adequately describe the recruitment strategy; information on data analysis was lacking or missing in two studies. Only one study provided a rich presentation of data related to telehealth literacy. Facilitators: 3 studies including 233 participants Moderate concerns. Three studies contributed to this finding. Sufficiency of detail regarding methods of data analyses. None of the three studies adequately described the qualitative strategy; data analysis was insufficient or poorly described in two studies. TL was not adequately described in findings.	Minor concerns about studies addressing barriers: one study included clinicians and staff No to very minor concerns about studies addressing facilitators	Moderate confidence.	Concerns related to the transparency of data collection and analytic procedures; only one study adequately discussed findings related to telehealth literacy.

Cost The cost of telehealth can be a barrier to care due to limitations of reimburseme nt.	Barriers (19): Brunton, 2021[101] Filippi, 2021[109] Hlubocky, 2021[110] Hunter, 2021[111] Madden, 2020[103] Singh, 2021[106] Smithson, 2021[112] Srinivasan, 2020[113] Wilson, 2021[114] Uscher-Pines[115] Chang, 2021[116] Sloan, 2021[117] Van Citters, 2021[118] Guzman, 2022[119] Alpert, 2022[120] Kryszak, 2022[121] Negi, 2022[122] Frey, 2021[123] Lee, 2022[124] Facilitators (1): Brunton, 2021[101]	Minor concerns about studies addressing barriers: Eight studies did not completely describe their recruitment strategies; three studies did not provide survey instruments or interview guides; ethical issues were not addressed in one study; and data analysis was missing or poorly described in two studies Serious concerns about studies addressing facilitators: The one included study did not completely describe recruitment strategy or the survey instrument; the study did not include information on ethical issues, and did not provide sufficient information on data analysis.	No or very minor concerns about studies addressing barriers: No or very minor concerns about studies addressing facilitators:	Barriers: 10 studies including 982 participants Moderate concerns regarding sufficiency of detail regarding data collection and methods of data analyses. Eight studies did not adequately describe their recruitment strategies; data analysis was missing or poorly described in two studies. Only three studies presented at least a moderate discussion of findings related to cost. Facilitators: 1 study including 22 participants Moderate concerns. One study contributed to this finding. We had concerns regarding data accuracy and transparency, including sufficiency of details related to data collection and data analyses. The one included study did not completely describe recruitment strategy or provide sufficient detail about processes of data analysis. This study presented a moderate discussion related to costs.	No to very minor concerns about studies addressing barriers No to very minor concerns about studies addressing facilitators	Moderate confidence.	Concerns related to insufficient details regarding qualitative data collection and analyses; only three of the 10 included studies presented at least a moderate discussion related to cost as a barrier or facilitator to telehealth.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Privacy Privacy, in the context of maintaining confidentiality is a concern for providers.	Barriers (8): Schoebel, 2021[125] Shklarski, 2021[126] Reynolds, 2021[127] Kursite, 2022[128] Orlowski, 2022[129] Hersch, 2022[130] Rodda, 2022[131] Webb, 2022[132] Facilitators (2) Edge, 2021[96] Schrag, 2022[133]	Moderate concerns about studies addressing barriers: Details about research design was inadequate in three studies. Recruitment was not described in three studies, and poorly described in one. Data collection was not defined in two studies, and poorly described in three. Data analysis was poorly described in three studies	No or very minor concerns about studies addressing barriers No or very minor concerns about studies addressing facilitators	Barriers: 8 studies including 445 participants No to very minor concerns. Eight studies contributed to this finding. These studies inadequately described processes of data collection and analyses, however findings related to privacy are well-described in the studies. Facilitators: 2 studies including 885 participants Minor concerns. Studies were generally well described and provided sufficient detail in their description of privacy as a facilitator to telehealth.	No to very minor concerns about studies addressing barriers No to very minor concerns about studies addressing Facilitators	Moderate confidence.	Concerns related to the transparency of data collection and analytic procedures, however findings related to privacy are thoroughly described.

Outcomes Telehealth can be a barrier to health outcomes due to lack of physical interaction with patients. However, providers noted that telehealth can also give a more holistic view of patients and their environment and could improve quality of care. Further, telehealth access impacts provider ability to deliver care impacting patient outcomes	Barriers (14): Barsom, 2021[74] Bommersbach, 2021[134] Feijt, 2020[135] Gefen 2021[136] Gilbert, 2021[137] Heiskanen, 2021[138] Kang, 2020[139] Klamroth-Marganska, 2021[140] Luckett, 2021[141] Parsons, 2021[142] Singh, 2021[106] Sklar, 2021[143] Stewart, 2020[144] Uscher-Pines, 2020[145] Facilitators (23): Alkureeishi, 2021[108] Baadjou, 2020[146] Barnett, 2021[147] Barth, 2021[148] Dahl-Popolizio, 2020[149] Due, 2021[102] Feijt, 2020[135] Franzosa, 2021[150] Goddard, 2021[151] Gomez, 2021[152] Jimenez-Rodriguez, 2020[153] Klamroth-Marganska, 2021[140] Madden, 2020[103] Martin, 2021[154] Murphy, 2021[155] Parsons, 2021[142] Rosenthal-2021[107]	Moderate concerns about studies addressing barriers: Three studies weighed most heavily on this assessment, each of these three studies only partially addressed one to three of the following domains: data collection, recruitment, appropriate methodology and design. Additionally, two studies did not sufficiently define their aims; study design was only somewhat appropriate for two of the studies; seven studies did not sufficiently describe recruitment; survey instruments were not provided for three studies; and data analysis was not well described in two. Minor concerns about studies addressing facilitators: Thirteen studies did not sufficiently describe their recruitment strategies; seven did not sufficiently describe data analysis; survey instrument or interview guide were not provided in three studies; qualitative data was based on open-ended question in three studies. Methods, aims,	No or very minor concerns about studies addressing barriers: No or very minor concerns about studies addressing facilitators:	Barriers: 14 studies including 2768 participants (1 study did not report participant numbers of participants in the focus group) Moderate concerns. Fifteen studies contribute to this finding regarding data accuracy and transparency, including a lack of consistent and sufficient detail regarding data collection and data analyses across studies. The majority of the data related to outcomes is thoughtfully described in seven of the 15 articles. In the remaining eight articles, barriers to outcomes are only minimally described. Although a majority of the articles included here provide little information, the richness of this findings in the other seven articles provides adequate support for this finding. Facilitators: 23 studies including 2611 participants	No to very minor concerns about studies addressing barriers No to very minor concerns about studies addressing facilitators No to very minor concerns about studies addressing barriers	Moderate confidence.	Concerns related to the transparency and sufficiency of data collection and analytic procedures; findings related to outcomes are thoroughly described in 12 of the 22 included studies related to outcomes associate with telehealth.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
	Saliba-Gustafsson, 2020[156] Schindler-Ruwisch, 2021[157] Schoebel, 2021[125] Uscher-Pines, 2020[145] Uscher-Pines, 2021[158] Wilhite, 2021[159]	and findings were poorly described in two studies each.		Moderate concerns. Twenty studies contribute to this finding regarding data accuracy and transparency. Thirteen studies did not sufficiently describe their recruitment strategies; seven study insufficiently described processes of data analysis. A sufficient number of studies gave sufficient detail about facilitators of outcomes			

Communication Telehealth can impede communication between provider and patient, while also facilitating it through patient education and increased patient comfort from receiving care at home.	Barriers (11): Due, 2021[102] Gefen 2021[136] Lynch, 2021[160] Myers, 2020[161] Parsons, 2021[142] Schindler-Ruwisch, 2021[157] Sklar, 2021[143] Srinivasan, 2020[113] Uscher-Pines, 2020[115] Uscher-Pines, 2020[145] Wilhite, 2021[159] Facilitators (9): Feijt, 2020[135] Heiskanen, 2021[138] Lynch, 2021[160] Madden, 2020[103] Schindler-Ruwisch, 2021[157] Singh, 2021[106] Taylor, 2021[162] Uscher-Pines, 2020[145] Wilhite, 2021[159]	Minor concerns about studies addressing barriers: Concerns were primarily focused in the area of recruitment strategy where seven studies did not completely describe recruitment. Other areas of concern included three studies lacking information on surveys or interview guides, poorly described research design in; poorly described aims, and poor data analysis description in in one study each. Minor concerns about studies addressing Facilitators: The main area of concern was poor reporting of the recruitment strategy by eight of the studies; two studies lacked information on the survey instrument or interview guided; and research design and data analysis were poorly described in one study each	No or very minor concerns about studies addressing barriers: No or very minor concerns about studies addressing facilitators:	Barriers: 11 studies including 476 participants (1 did not report participant numbers) Moderate concerns. 11 studies contribute to this finding regarding data accuracy and transparency. There were insufficient descriptions of recruitment strategies in six studies; poorly described research design in two studies; insufficient descriptions of data analyses in two studies. Four studies thoroughly describe barriers to communication, with a moderate discussion or better in three studies. Three additional studies including only a minimal discussion of barriers to communication. Facilitators: 9 studies including 1334 participants (1 study did not report participant numbers) Moderate concerns. Nine studies contribute to this finding regarding facilitators of communication via	Minor concerns about studies addressing barriers: One study included care providers and hospital administrators Minor concerns about studies addressing facilitators One study included care providers and hospital administrators	Moderate confidence.	Concerns related to the transparency of data collection and analytic procedures, in addition to insufficient data regarding communication in 37.5% of included studies.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
				telehealth. Of concern was poor reporting of the recruitment strategy by seven of the studies; two studies lacked information on the survey instrument or interview guide; and data analysis was poorly described in one study. Discussion of findings regarding facilitators to communication via telehealth were well described in three studies and moderately described in three additional studies. Findings related to facilitators of communication via telehealth were only minimally discussed in the final three studies.			

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Inequity (19) Inequity, in the context of access to telehealth, is a concern of providers across specialty area	Barriers (19): Ashcroft, 2021[163] Barnett, 2021[147] Brunton, 2021[101] Dahl-Popolizio, 2020[149] Feijt, 2020[135] Johnson, 2021[164] Klamroth-Marganska, 2021[140] Lin, 2021[165] Luckett, 2021[141] Martin, 2021[154] Myers, 2020[161] Ross, 2021[166] Saliba-Gustafsson, 2020[156] Schoebel, 2021[125] Singh, 2021[106] Sklar, 2021[143] Srinivasan, 2020[113] Uscher-Pines, 2020[145] Wilhite, 2021[159]	Minor concerns about studies addressing barriers: All subsets of barriers to access to care were assessed as having minor concerns. 12 studies noted concerns about recruitment; three studies each did not provide survey instruments or interview guides, provided insufficient information on data analyses, and based conclusions on single questions.	No or very minor concerns about studies addressing barriers:	Barriers. 19 studies including 4200 participants Minor concerns. There were minor concerns regarding data accuracy and transparency, including a lack of consistent and sufficient detail regarding data collection and data analyses across studies, however these were not noted as a major concern. At least one study quantified qualitative data and thus did not present a good discussion of the qualitative findings. Fourteen of the 19 studies addressing equity in access thoughtfully describe these findings. No studies in this area presented less than moderate discussion related to inequity of access.	No to very minor concerns about studies addressing barriers: One study addressing inequity included only hospital administrators	High confidence.	Only minor concerns related to the adequacy of findings regarding access to telehealth.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Technology issues Technology issues: Providers feel that technology issues can negatively impact access to care across specialty area	Technical issues and digital literacy (27): Barsom, 2021[74] Barth, 2021[148] Cole, 2021[167] Courtney, 2021[168] Dahl-Popolizio, 2020[149] Franzosa, 2021[150] Gefen 2021[136] Gergerich, 2020[169] Goldberg, 2021[170] Hunter, 2021[111] Johnson, 2021[164] Klamroth-Marganska, 2021[140] Krok-Schoen, 2021[171] Luckett, 2021[141] Madden, 2020[103] Martin, 2021[154] Pagano, 2021[172] Parsons, 2021[142] Schindler-Ruwisch, 2021[157] Searby, 2021[173] Singh, 2021[106] Smithson, 2021[112] Stewart, 2020[144] Turchetti, 2021[174] Uscher-Pines, 2020[145] Uscher-Pines[115] Wilhite, 2021[159]	Minor concerns about studies addressing barriers: main concerns were recruitment strategy was not well described in 17 studies, survey instrument or interview guide were not provided in seven studies, aims and data analysis were poorly described in four studies each	No or very minor concerns about studies addressing barriers:	Barriers. 27 studies including 4500 participants Minor concerns. There were minor concerns regarding data accuracy and transparency, including a lack of consistent and sufficient detail regarding data collection and data analyses across studies, however these were not noted as a major concern. At least one study quantified qualitative data and thus did not present a good discussion of the qualitative findings. All but four studies address this finding at least moderately	No to very minor concerns about studies addressing barriers	High confidence	Only minor concerns related to the adequacy of findings regarding technology issues.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Appropriateness of fit: Telehealth can be used appropriately as long as alternative delivery of care is considered	Facilitators (4) Alkureeishi, 2021[108] Barth, 2021[148] Due, 2021[102] Hunter, 2021[111]	Minor concerns about studies addressing facilitators: All studies included concerns about recruitment, two studies did not sufficiently describe their analyses	No or very minor concerns about studies addressing facilitators:	Facilitators: 5 studies including 261 participants Minor concerns. There were moderate concerns regarding data accuracy and transparency, including a lack of consistent and sufficient detail regarding data collection and data analyses across studies. All studies describing appropriateness of fit presented at least a moderate discussion in this area	No to very minor concerns about studies addressing facilitators	High confidence	Only minor concerns related to the adequacy of findings regarding appropriateness of fit

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Future use Providers stressed the need for flexible modes of care delivery based on patient suitability and patient/provider preference, citing a blended/hybrid model as the best approach for future care delivery.	15 Studies: Handley, 2022[175] Chang, 2021[116] Hao, 2021[176] Hall-Mills, 2022[177] Aschcroft, 2021[178] Burton, 2022[179] Butt, 2022[180] Cartledge, 2021[181] Orlowski, 2022[129] Hersch, 2022[130] Negi, 2022[122] Sullivan, 2022[182] Davoodi, 2021[183] DePuccio, 2022[184] Marek, 2022[185] Uscher-Pines, 2021[158]	Minor Concerns Most studies did not provide sufficient information on data collection. Five studies did not sufficiently describe the data analysis. Two studies did not adequately describe the research design. One study each did not provide a clear aim or sufficient detal about recruitment. Further, three studies provided not information about recruitment.	No or very minor concerns about studies addressing future use.	16 Studies including 511 participants Minor concerns. There were moderate concerns regarding data accuracy and transparency, including a lack of consistent and sufficient detail regarding data collection and data analyses across studies, however these were not noted as a major concern. These minor concerns included: data collection not adequately described in 4 studies and data analysis (including efforts to minimize coder bias) not adequately described in 6 studies. Participant voices were adequately represented in all three reports.	No to very minor concerns about studies addressing future use	High confidence	No to very minor concerns about coherence and relevance, with minor concerns about methods and adequacy of findings related to future use.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Preparedness for future implementation Clinics that already used telehealth in their practice, and had adequate resources and infrastructures to support its use, were better able to pivot to increasing telehealth use.	3 studies: James, 2021[186] Der-Martirosian, 2021[187] Kryszak, 2022[121]	Moderate concerns. None of the studies provided sufficient information about how data was collected. One study each did not provide sufficient detail about study aims, or how ethical issues were addressed. Further, two studies provided no detail about recruitment strategy.	No or very minor concerns about studies addressing preparedness for future use.	3 studies including 94 participants Minor concerns. All three studies provided adequate detail regarding data collection, however data regarding analytic procedures was insufficient in two studies. Participant voices were adequately represented in all three reports.	No to very minor concerns about studies addressing barriers	Moderate confidence	No to very minor concerns about coherence and relevance, with minor concerns about adequacy of findings. Moderate concerns ab out methodology along with small sample size related to studies addressing preparedness for future use.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Changes in Practice Telehealth was largely regarded positively, but necessitated changes to workflow, better orientation for patients, and aligning of expectations of therapy.	7 Studies Cartledge, 2021[181] Frey, 2021[123] Orlowski, 2022[129] Burton, 2022[179] Walters, 2022[97] DePuccio, 2022[184] Alpert, 2022[120]	Minor concerns Most studies did not adequately describe their data collection. Three studies insufficiently described their data analysis. One study each did not adequately describe their data analysis, or recruitment strategy, and one study each did not describe their study design or recruitment strategy at all.	No or very minor concerns about studies addressing changes in practice.	7 studies including 293 participants Minor concerns. There were minor concerns regarding data accuracy and transparency, including a lack of consistent and sufficient detail regarding data collection and data analyses across studies, however these were not noted as a major concern. These minor concerns included: data collection not adequately described in one study, data analysis not adequately described in 3 studies, and methods to prevent coder bias were not adequate in 3 studies. Participant voices were adequately represented in all three reports.	No to very minor concerns about studies addressing changes in practice	High confidence	No to very minor concerns about coherence and relevance, with minor concerns about methods and adequacy of findings related to changes in practice.

CASP = Critical Appraisal Skills Programme; CERQual = Confidence in the Evidence from Reviews of Qualitative Research; NA = not available

Table C.7. Matrix comparing qualitative and quantitative studies addressing patient satisfaction and dissatisfaction.

Satisfaction or Dissatisfaction Category	Population	Qualitative Studies	Surveys
Ease of use (satisfaction)	Studies, participants: N (n)	4 (266)	8 (3363)
	Telehealth Mode	Video (1); telephone only (1); NR (2)	Video (3); telephone only (2); NR (4)
	Country (ies)	Australia (2); New Zealand (1), Ireland (1)	US (5); Australia (2); South Korea (1); Italy (1)
	Health concern	General (1), rheumatic (1), epilepsy (1), multiple sclerosis (1)	Cancer (2), allergy (1), dental surgery (1), dermatology (1), Orthopedics (1), COVID (1), NR (1)
	Demographics	Adult (3), NR (1); sex and race mixed	Adults (8), sex and race mixed
	Study period	Early COVID (1), general COVID (1); later COVID (1); comparative (1)	Early COVID (2), general COVID (1); later COVID (5)
Ease of use (dissatisfaction)	Studies, participants: N (n)	1 (30)	2 (248)
	Telehealth Mode	NR	NR (2)
	Country (ies)	Israel	US (2)
	Health concern	Oncology	Orthopedics (1), integrative (1)
	Demographics	Over 60	Adults (2), sex and race mixed
	Study period	General COVID	Early COVID (1); general COVID (1)
Access (satisfaction)	Studies, participants: N (n)	3 (449)	5 (595)
	Telehealth Mode	Tele-video (2); telephone only (1)	Video (3)telephone only (1); NR (1)
	Country (ies)	US (3)	US (1), Australia (2), UK (2)
	Health concern	General care (3)	Rheumatic (1), surgery (1), ob/gyn (1), genitourinary (1), NR (1)
	Demographics	Adult (3); sex and race mixed	Adult (3), elderly (1), NR (1); sex and race mixed
	Study period	Early COVID (3); later COVID (1)	Early COVID (3); general COVID (1); later COVID (1)
Access (dissatisfaction)	Studies, participants: N (n)	6 (530)	NR
	Telehealth Mode	Video (3); telephone or video (2), NR (1)	NR
	Country (ies)	US (2), UK (2); Australia (1), multi (1)	NR
	Health concern	Respiratory (1), heart failure (1); rheumatology/inflammatory disease (2), general or community medicine (2)	NR
	Demographics	Adult (3),Elderly (3), sex and race mixed	NR
	Study period	General COVID (4); later COVID (1), comparative (1)	NR
Outcomes (satisfaction)	Studies, participants: N (n)	9 (246)	2 (917)
	Telehealth Mode	Video* (3); telephone or video (2), telephone only (1), NR (3)	NR (2)
	Country (ies)	US (2), UK (2), Canada (1), Israel (2), Australia (1), multi (1)	Australia (1), Poland (1)

Satisfaction or Dissatisfaction Category	Population	Qualitative Studies	Surveys
	Health concern	Cancer (3), Kidney disease (2), physical therapy (1), mental health (1), general (1), NR (1)	Primary care (1), NR (1)
	Demographics	Adult (8), NR (1); sex and race mixed	Adult (1), elderly (1); sex and race NR
	Study period	Early COVID (2); general COVID (4); later COVID (4)	Early COVID (1); comparative 91)
Outcomes (dissatisfaction)	Studies, participants: N (n)	2 (39)	2 (493)
	Telehealth Mode	Telephone only (1), NR (1)	Telephone only (1), NR (1)
	Country (ies)	US (1), UK (1)	US (2)
	Health concern	Obstetrics (2)	Ob/gyn (1), mood disorder (1)
	Demographics	Adult (2), Female only (2); mixed race (2)	Adult (2);Female (1), race mixed
	Study period	General COVID (1), Later COVID (1)	Early COVID (1); later COVID (1)
Communication (satisfaction)	Studies, participants: N (n)	9 (410)	19 (3384)
	Telehealth Mode	Video (2); telephone only (1); NR (2)	Telephone only (1), NR (1)
	Country (ies)	US (4); UK (2); New Zealand (1), Canada (1), Israel (1)	US (11); Australia (2); Canada (1), France (1), Israel (1), Italy (1), Poland (1), UK (1)
	Health concern	Mental health (2), dementia (1), NICU (1), contraception (1), oncology (1), heart failure (1), respiratory (1), general (1)	Orthopedics (2), cancer (3), cystic fibrosis (1), dental (1), dermatology (1), ENT (1), geriatrics (1), heart failure (1), NR (2), prenatal (1), primary care (1), rheumatic (1), surgery (1), other (2)
	Demographics	Adult (6), elderly (2), NR (1); sex and race mixed	Adult (11), elderly, (2), NR (6); sex and race mixed
	Study period	Early COVID (3), general COVID (1); comparative (1)	Early COVID (2)
Communication (dissatisfaction)	Studies, participants: N (n)	4 (111)	3 (556)
	Telehealth Mode	Video (3), NR (1)	Video (20), Telephone only (1)
	Country (ies)	UK (2), Canada (2)	Australia (1), US (1), The Netherlands (1)
	Health concern	Cancer (1), parkinsons (1), orthopedic (1), respiratory (1)	Rheumatology (1), cancer (1), prenatal (1)
	Demographics	Adult (2), elderly (2), sex mixed; race NR	Adult (1), NR (2); sex and race mixed
	Study period	Early COVID (3), comparative (1)	Early COVID (2)
Privacy (satisfaction)	Studies, participants: N (n)	3 (72)	3 (556)
	Telehealth Mode	Video (3),	Video (2), telephone only (1)
	Country (ies)	US (1), The UK (1), Australia (1)	US (1), Australia (1), The Netherlands (1)
	Health concern	Primary care (1), exercise therapy (1), NR (1)	Rheumatology (1), cancer (1), prenatal (1)
	Demographics	Adult (2), adolescent (1); sex and race mixed	Adult (1), NR (2); sex and race mixed
	Study period	general COVID (2), Later COVID (1)	Early COVID (2), general COVID (1)
Privacy (dissatisfaction	Studies, participants: N (n)	5 (371)	NR

Satisfaction or Dissatisfaction Category	Population	Qualitative Studies	Surveys
	Telehealth Mode	Video* (1), telephone or video (2) Telephone only (1), NR (1)	NR
	Country (ies)	US (2), UK (1), Canada (1), , NR (1)	NR
	Health concern	Mental health (3), perinatal (1), general (1), mental health (1)	NR
	Demographics	Adult (5), sex mixed, race NR	NR
	Study period	General COVID (3), Later COVID (2)	NR
Benefits (satisfaction)	Studies, participants: N (n)	13 (727)	NR
	Telehealth Mode	Video (7), telephone only (2), NR (4)	NR
	Country (ies)	US (5), UK (2), Canada (2), Australia (3), New Zealand (1)	NR
	Health concern	Chronic conditions (1), multiple scleriosis (1), mental illness (1), cancer (1), parkinsons disease (1), general (1), ESRD (1), aborthion (1), contraception (1), eye disease (1), sleep (1), otoloaryngology(1), eating disorder (1)	NR
	Demographics	Adult (9), elderly (2), NR (2)	NR
	Study period	Early COVID (6), General COVID (3), later COVID (3), compares (1)	NR
Preferences (dissatisfaction)	Studies, participants: N (n)	10 (2169)	NR
	Telehealth Mode	Video (5), NR (5)	NR
	Country (ies)	US (4), Australia (1), Canada (1), Ireland (1), New Zealand (1), The Netherlands (1). UK (1)	NR
	Health concern	Multiple sclerosis (1), parkinsons (1), epilepsy (1), general med (1), orthopedic (1), palliative care (1), otolaryngology (1)surgery (1), NR (2)	NR
	Demographics	Adult (6), elderly (2), NR (2)l sex and race mixed	NR
	Study period	Early COVID (5), general COVID (3), later COVID (1), comparative (1)	NR
Concerns (dissatisfaction)	Studies, participants: N (n)	5 (1516)	NR
	Telehealth Mode	Video (3), NR (2)	NR
	Country (ies)	Australia (3), US (1), Canada (1)	NR
	Health concern	General health (1), otolaryngology (1), cancer (1), multiple sclerosis (1), chronic conditions (1)	NR
	Demographics	Adults; sex and race mixed	NR
	Study period	Early COVID (3), later COVID (2)	NR

Satisfaction or Dissatisfaction Category	Population	Qualitative Studies	Surveys
Suggestions (satisfaction)	Studies, participants: N (n)	4 (68)	NR
	Telehealth Mode	Video* (1), telephone only or video (2), NR (1)	NR
	Country (ies)	UK (1), Canada (1), New Zealand (1), Israel (1)	NR
	Health concern	General (2), oncology (1), mental health (1)	NR
	Demographics	Adults; sex and race mixed	NR
	Study period	General COVID (2), later COVID (2)	NR

* video=a combination of audio and video, either via telephone plus video feed, or video conference where the two are combined.

NR = not reported; US = United States; UK = United Kingdom; ESRD = end-stage renal disease

Table C.8. CERQual of studies addressing patient satisfaction and dissatisfaction

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Ease of use (5) Patients find telehealth easy to use	Satisfaction(4): Adams, 2021[67] Banks, 2021[188] Imlach, 2020[84] Parkinson, 2021[189] Dissatisfaction (1): Ben-Ayre, 2021[80]	Minor concerns about studies addressing satisfaction: Concerns about recruitment strategy were noted in half of the studies. One study each had concerns about research design and data collection. Data analysis was not described in one study. Moderate concerns about the one study addressing dissatisfaction: Study aims and statement of findings were poorly described, and the data analysis was insufficiently described.	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Satisfaction: 4 studies including 266 participants Moderate concerns. Four studies contributed to this finding. Only one study provided a thorough description of data collection and analyses and one study quantified the qualitative evidence, with little related synthesis. Satisfaction regarding ease of use was minimally described in 50% of the included studies. Dissatisfaction: 1 study including 30 participants Moderate concerns. One study contributed to this finding. This study did not sufficiently describe processes of data collection or analyses. In addition, this article presented only minimal findings and	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Moderate confidence.	Concerns related to sufficiency of details related to data collection and analyses. Three of five studies only minimally present / discuss satisfaction regarding ease of use.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
				discussion related to dissatisfaction with ease of use.			
Access (5) Telehealth facilitates access to care, but patients have some privacy concerns.	Satisfaction (3): Frayn, 2021[79] Newman-Casey, 2021[190] Stifani, 2021[72] Dissatisfaction (6): Birkhoff, 2021[81] Philip, 2020[85] Sloan, 2021[117] Dennett, 2021[100] Sloan, 2022[191] Sharma, 2022[66]	Minor concerns about studies addressing satisfaction: One study did not sufficiently describe data collection and data analysis. Minor concerns about studies addressing dissatisfaction: Five of the six studies did not sufficiently describe recruitment and data collection, and recruitment was not sufficiently described in three of the studies. Additionally, one study each did not clearly state aims, and did not describe methodology adequately. Data analysis was not or poorly described in two studiesdescribed.	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Satisfaction: 3 studies including 449 participants Minor concerns. Three studies contributed to this finding. Only one study offered rigorous description of qualitative data collection and analysis. Satisfaction with access was adequately described in two of the three studies. Dissatisfaction: 6 studies including 530 participants Minor concerns. Most studies lacked sufficient detail regarding qualitative data collection and analysis, however dissatisfaction with access was fully described in both studies.	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Moderate confidence.	Concerns related to sufficiency of details related to data collection and analyses, but only minor concerns regarding findings, which provide sufficient data regarding satisfaction, thus producing confidence in the reported findings.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Health Outcomes (11) Patients perceive telehealth as beneficial to their health outcomes.	Satisfaction (9): Di Lalla, 2021[192] Granberg, 2021[71] Ben-Ayre, 2021[80] Laden, 2021[193] Mozes, 2022[86] Barton, 2022[194] San Juan, 2021[99] Jassil, 2022[88] Sharma, 2022[66] Dissatisfaction (2) Stanhope, 2022[98] Silverio, 2021[90]	Minor concerns about studies addressing satisfaction: three studies each did not sufficiently describe data collection or recruitment, two studies did not clearly state aims, and one study each poorly described aims and did not have a clear statement of findings. One study did not describe the ethical considerations. Minor concerns about studies addressing dissatisfaction: One study did not describe the ethical considerations	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Satisfaction: 9 studies including 246 participants Minor concerns. Some methodologic concerns were found across studies, primariy poor reporting of how data was collected, and lack of detail about recruitment strategy. Satisfaction regarding outcomes were moderately described in two of the three studies, and minimally in the third. Dissatisfaction: 2 studies including 39 participants Minor concerns. Due to a lack of an ethics statement in one study. Clear statements of dissatisfaction in obstetrics populations were clearly described	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	High confidence.	Minor concerns related to sufficiency of detail related to data collection and analyses, but sufficient description of outcomes lead us to have confidence in the findings.
Communication (11) Patients are satisfied with	Satisfaction (9): Ben-Ayre, 2021[80] Birkhoff, 2021[81] CampbellYao, 2021[195]	Moderate concerns about studies addressing satisfaction: Over half (5) of the studies did not	No or very minor concerns about studies addressing satisfaction:	Satisfaction: 9 studies including 410 participants	No or very minor concerns about studies addressing satisfaction.	Moderate confidence.	Concerns related to sufficiency of details related to data collection and analyses. Concerns

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
telehealth and it's impacts on communication, but noted some concerns about it along with some suggestions for improvement	Cooper, 2021[196] Imlach, 2020[84] Kang, 2021[197] Philip, 2020[85] Stifani, 2021[72] Wood, 2021[198] Dissatisfaction (4): Anghelescu, 2021[76] Di Lalla, 2021[192] Philip, 2020[85] Robinson, 2021[199]	sufficiently describe data collection, and did not sufficiently describe recruitment strategy. Three studies did not sufficiently describe data analysis, state the study aims, or use an appropriate qualitative methodology. Two studies did not use an appropriate study design, or provide a clear statement of findings. Minor concerns about studies addressing dissatisfaction: three studies did not sufficiently describe recruitment, or sufficiently describe data collection. Two studies did not sufficiently describe data analysis. One study did not describe study aims.	No or very minor concerns about studies addressing dissatisfaction.	Moderate concerns. Nine studies contributed to this finding. Two of the nine studies did not adequately describe methods of qualitative data collection or analyses. Six of the nine (67%) studies present at least a moderate discussion regarding satisfaction with communication via telehealth. Dissatisfaction: 4 studies including 111 participants Moderate concerns. Five studies contribute to this finding. Data analyses were not thoroughly described in two studies. Three of the five studies engage only a minimal discussion of dissatisfaction with communication via telehealth.	No or very minor concerns about studies addressing dissatisfaction.		related to the sufficiency of discussions related to communication via telehealth.
Privacy (1)	Satisfaction (3) Allison, 2022[200] Jassil, 2022[88]	Minor concerns about studies addressing Satisfaction: Insufficient	No or very minor concerns about	Satisfaction: 3 studies including 72 participants	No or very minor concerns about studies	High confidence	Minor concerns related to the details related to the

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Patients have concerns related to privacy issues and telehealth	Van Dam, 2021[94] Dissatisfaction (5) Kang, 2021[197] San Juan, 2021[99] Singla, 2022[201] Sharma, 2022[66] Smith-MacDonald, 2021[202]	description of data collection tools was found in two studies, one study each did not sufficiently describe the recruitment strategy or data analysis Minor concerns about studies addressing Dissatisfaction One study each did not sufficiently describe methodology, recruitment strategy, data analysis, or aims. Ons study provided no information on aims. Two studies provided insufficient information about data collection tools, and one study provided no information about how data was collected.	studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Minor concerns. Insufficient information was provided about recruitment, data collection,and data analysis. Studies include extensive discussion of privacy Dissatisfaction: 5 study including 371 participants Minor concerns. Methodologic concerns were minor but evident across all studies. The studies included detailed description of privacy concerns of patients.	addressing dissatisfaction.		survey instrument. Detailed discussions of patient perspectives on privacy
Benefits (13) Patients report general satisfaction and benefits of telehealth	Imlach, 2020[84] Triantafillou, 2021[91] Di Lalla, 2021[192] Antoun, 2021[78] Boydell, 2021[69] Stifani, 2021[72] Newman-Casey, 2021[190] Donovan, 2021[70]	Minor concerns about studies addressing benefits: The primary area of concern was lack of sufficient detail in describing the data analysis (5 studies) and poorly described recruitment strategy (3). Interview/survey were not provided in two studies; ethical	No or very minor concerns about studies addressing benefits.	Benefits: 13 studies including 2078 participants Moderate concerns. Thirteen studies contribute to this finding. Only one of the studies did not adequately describe methods of qualitative data	No or very minor concerns about studies addressing benefits.	Moderate confidence.	Minor concerns related to sufficiency of details related to data collection and analyses. Moderate concerns related to the sufficiency of discussions regarding benefits contributing to

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
	Anghelescu, 2021[76] Parkinson, 2021[189] Cook, 2021[203] Javanparast, 2021[204] Frayn, 2021[79]	considerations were not noted in 2 studies, and on study did not include a clear statement of findings.		collection or analyses. Six of the thirteen studies (46.1%) present at least a moderate discussion regarding benefits contributing to satisfaction with telehealth.			satisfaction with telehealth.
Preferences (10) In general patients prefer face to face visits with their healthcare provider, but noted that telehealth was more convenient and may be better suited for some forms of care.	Imlach, 2020[84] Triantafillou, 2021[91] LaRoche, 2021[205] Zhu, 2020[206] Banks, 2021[188] Barsom, 2021[74] Anghelescu, 2021[76] Bethel, 2021[68] Parkinson, 2021[189] Robinson, 2021[199]	Minor concerns about studies addressing preferences: The main area of concern was poor description of recruitment strategy (9 studies). Data collection (either provision of survey or interview guide) was missing in 5 studies. Data analysis was poorly described in 4 studies. Other areas of concern were poor study design (2), or clear statement of aim, or findings (1 each).	No or very minor concerns about studies addressing benefits.	Preferences: 10 studies including 1991 participants Minor concerns. Minimal presentation of qualitative methods in three of the ten included studies. Discussion of preferences regarding telehealth were moderately or thoroughly discussed in 8 of the 10 included studies (80%).	Minor concerns about studies addressing benefits: One included study was a public opinion poll of abortion services via telehealth.	High confidence.	Minor concerns related to sufficiency of detail related to data collection and analyses, but sufficient description of preferences regarding telehealth and we have confidence in the findings.
Concerns (5) Patients have concerns about telehealth use for complex	Isautier, 2020[64] Triantafillou, 2021[91] Di Lalla, 2021[192] Parkinson, 2021[189] Javanparast, 2021[204]	Minor concerns about studies addressing concerns: Two studies did not sufficiently describe recruitment strategy, and one study did not include a statement on ethics, and the data analysis	No or very minor concerns about studies addressing concerns.	Concerns: 5 studies including 1573 participants Moderate concerns. Five studies contributed to this finding. Two of the studies provided insufficient detail	No or very minor concerns about studies addressing concerns.	Moderate confidence.	Concerns related to limited findings applicable to concerns relevant to satisfaction with telehealth.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
care. They also have concerns about setup, and the lack of personal care via telehealth.		was not sufficiently described.		regarding qualitative methods of data collection and analyses. Concerns were only moderately described in three of the five studies, and insufficiently described in the other two.			
Suggestions (4) Patients feel that trust and developing rapport with providers is beneficial to telehealth.	Imlach, 2020[84] Ben-Ayre, 2021[80] San Juan, 2021[99] Dainty, 2022[65]	Minor concerns about studies addressing suggestions / facilitators: One study each had the following concerns: no clear statement of aims, poor description of recruitment strategy, data analysis not described. Two studies each had inadequate statements of aims, and poor or no description of recruitment strategy.	No or very minor concerns about studies addressing suggestions/ facilitators.	Concerns: 4 studies including 122 participants Moderate concerns. Four studies including 122 participants contributed to this findingAll studies did not sufficiently describe their overall methodology, with one study lacking in multiple domains. Suggestions / facilitators were only minimally discussed in each study.	No or very minor concerns about studies addressing suggestions/facilitators.	Moderate confidence.	Some concerns related to sufficiency of detail regarding data collection, data analyses, and presentation of findings related to suggestions / facilitators.

CASP = Critical Appraisal Skills Programme ; CERQual = Confidence in the Evidence from Reviews of Qualitative Research; NA = not available

Table C.9. Matrix comparing qualitative and quantitative studies addressing provider satisfaction and dissatisfaction

Satisfaction or Dissatisfaction Category	Population	Qualitative Studies	Surveys
Ease of use (satisfaction)	Studies, participants: N (n)	5 (2306)	8 (711)
	Telehealth Mode	Video (1); telephone only (1); NR (3)	Video (1); telephone only (3); NR (3)
	Country (ies)	US (3); Australia (1), UK (1)	US (3); The Netherlands (2); Canada (1), South Korea (1), France (1)
	Healthcare system	Representative of a single large facility or organization (1); NR (4)	Representative of a single large facility or organization (2); NR (6)
	Clinical specialty/focus	Palliative care (1), surgical (1), cancer (1), opioid use (1), mental health (1)	Prenatal care (1), rheumatology (1), pediatrics (1), primary care (1), general medical (1), ENT (1), medical specialty (1), opioid use (1)
	Study period	Early COVID (1); general COVID (3); later COVID (1)	Early COVID (5); later COVID (2); comparative (1)
Ease of use (dissatisfaction)	Studies, participants: N (n)	1 (30)	6 (503)
	Telehealth Mode	NR	Video (1); telephone only (2); NR (3)
	Country (ies)	US	US (3); Canada (1), UK (1), The Netherlands (1)
	Healthcare system	NR	Representative of a single large facility or organization (1); large/regionally representative (1)NR (4)
	Clinical specialty/focus	Oncology	Rheumetology (2), primary care (1), surgical (1), lymphoedema (1), opioid use (1)
	Study period	General COVID	Early COVID (3); later COVID (2)
Access (satisfaction)	Studies, participants: N (n)	3 (114)	4 (1409)
	Telehealth Mode	Video (1); telephone only (1); NR (1)	Video (3); NR (1)
	Country (ies)	US (2); The Netherlands (1)	US (2); Norway (1), The Netherlands (1)
	Healthcare system	Representative of a single large facility or organization (1); NR (2)	Representative of a single large facility or organization (1); NR (3)
	Clinical specialty/focus	Mental health (1), rheumatology (1), dietician (1)	Primary care (1), ob.gyn (1), medical specialists (1), neonatology (1)
	Study period	Early COVID (1); later COVID (2)	Early COVID (3); later COVID (1)
Access (dissatisfaction)	Studies, participants: N (n)	2 (68)	1 (100)
	Telehealth Mode	NR	Video
	Country (ies)	US (1), The Netherlands (1)	US
	Healthcare system	Representative of a single large facility or organization (1); NR (1)	NR
	Clinical specialty/focus	Mental health (2)	Plastic surgery
	Study period	Early COVID (1); later COVID (1)	General COVID

Satisfaction or Dissatisfaction Category	Population	Qualitative Studies	Surveys
Outcomes (satisfaction)	Studies, participants: N (n)	10 (360)	6 (364)
	Telehealth Mode	Video (4); telephone only (1); NR (5)	Video (3); telephone only (2); NR (1)
	Country (ies)	US (4); UK (2), Australia (2); Multi (1), Italy (1)	US (5); The Netherlands (1)
	Healthcare system	Representative of a single large facility or organization (3); NR (7)	Representative of a single large facility or organization (2); NR (4)
	Clinical specialty/focus	Primary care (1), mental health (2), neurology (1), informatics (1), palliative care (1), lymphoedema (1), dieticians (1), Opioid use (1), genetic counseling (1)	Mental health (1), rheumatology (1), geriatrics (1), therapy (1), surgery (1), opioid use (1)
	Study period	Early COVID (2); general COVID (5); later COVID (3)	Early COVID (4); later COVID (2)
Outcomes (dissatisfaction)	Studies, participants: N (n)	8 (416)	7 (4054)
	Telehealth Mode	Video (3); telephone only (1); NR (4)	Video (1); telephone only (1); NR (5)
	Country (ies)	US (5); Australia, UK, Canada (1)	US (4); Norway (1), Lithuania (1), Multi (1)
	Healthcare system	Representative of a single large facility or organization (3); NR (5)	Representative of a single large facility or organization (1); NR (6)
	Clinical specialty/focus	Primary care (2), opioid use (2), neurology (2), physiotherapy (1), mental health (1)	Primary care (1), ob/gyn (1), neurology (2), opioid use (1), physical rehab (1), mental health (1)
	Study period	Early COVID (3); general COVID (4); later COVID (1)	Early COVID (4); later COVID (3)
Communication (satisfaction)	Studies, participants: N (n)	8 (624)	11 (1046)
	Telehealth Mode	Video (3); telephone only (2); NR (3)	Video (2); telephone only (2); NR (6)
	Country (ies)	US (5); Australia (1), UK (1), The Netherlands (1)	US (4); Australia (2); Canada (1), Multi (1), South Korea (1), UK (1), Lithuania (1)
	Healthcare system	Representative of a single large facility or organization (3); NR (5)	Representative of a single large facility or organization (3); Large/regionally representative (2); NR (6)
	Clinical specialty/focus	Primary care (2), physical rehab (2), neurology (1), rheumatology (1), social worker (1), opioid use (1)	Dermatology (1), ENT (1), rheumatology (1), medical/surgery (1), ophthalmology (1), neurology (1), surgery (1), opioid use (1), mental health (1), NR (2)
	Study period	Early COVID (5); general COVID (2); later COVID (1)	Early COVID (4); later COVID (5); compares (2)
Communication (dissatisfaction)	Studies, participants: N (n)	17 (4299)	4 (708)
	Telehealth Mode	Video (2); telephone only (2); NR (13)	Video (2); NR (2)
	Country (ies)	US (7); UK (4); Multi (2), The Netherlands (2); Italy (1), Australia (1)	US (2); Israel (1), multi (1)
	Healthcare system	Representative of a single large facility or organization (6); NR (11)	NR

Satisfaction or Dissatisfaction Category	Population	Qualitative Studies	Surveys
	Clinical specialty/focus	Mental health (4), opioid use (3), rheumatology (1), neurology (2), geriatrics (1), orthopedics (1), oncology (1), optometry (1), primary care (1), genetic counseling (1)	Mental/behavioral health (2), nutrition (1), rheumatology (1)
	Study period	Early COVID (9); general COVID (4); later COVID (4)	Early COVID (2); later COVID (2)
Benefits (satisfaction)	Studies, participants: N (n)	24 (3399)	NR
	Telehealth Mode	Video (8), telephone only (1), NR (14)	NR
	Country (ies)	US (11), UK (4), The Netherlands (3), Spain (1), Ne Zealand (1), Multi (1), France (1), Australia (1)	NR
	Healthcare system	Representative of a single large facility or organization (3), large reagiona1 (1), limited population (1), NR (19)	NR
	Clinical specialty/focus	Primary care (5), Mental health (3), neurology (2), rheumatology (1), social work (1), substance use (1), non-medical healthcare workers (1), surgical (1), medical specialists (2), dietician (1), cancer (1), opioid use (1), domestic violence (1), physical rehab (1), NR (2)	NR
	Study period	Early COVID (11), general COVID (8), later covid (5)	NR
Preferences (dissatisfaction)	Studies, participants: N (n)	16 (3175)	NR
	Telehealth Mode	Video (8), NR (8)	NR
	Country (ies)	US (6), UK (3), The Netherlands (2), New Zealand (1), Israel (1), France (1), Denmark (1), Australia (1)	NR
	Healthcare system	Representative of a single large facility or organization (5), NR (9)	NR
	Clinical specialty/focus	Primary care (2), mental/behavioral health (4), neurology (1), oncology (1), chronic disease (1), opioid treatment (1), physical rehab (2), domestic violence (1), specialists (3)	NR
	Study period	Early COVID (4), general COVID (8), later covid (4)	NR
Concerns (dissatisfaction)	Studies, participants: N (n)	17 (1084)	NR
	Telehealth Mode	Video (4), telephone only (2), NR (11)	NR

Satisfaction or Dissatisfaction Category	Population	Qualitative Studies	Surveys
	Country (ies)	US (6), The Netherlands (3), multi (2), Australia (2), Israel (1), Norway (1), Spain (1), UK (1)	NR
	Healthcare system	Large/regionally representative (1), Representative of a single large facility or organization (6), NR (10)	NR
	Clinical specialty/focus	Mental health (2), opioid use (2), physical rehab (2), oncology (2), neurology (3), palliative care (1), rheumatology (1), domestic violence (1), colorectal (1), primary care (1), NR (1)	NR
	Study period	Early COVID (6), general COVID (7), later covid (4)	NR
Suggestions (satisfaction)	Studies, participants: N (n)	11 ()	NR
	Telehealth Mode	Video (2), telephone only (1), NR (8)	NR
	Country (ies)	US (5), UK (2), The Netherlands (2), multi (1), Australia (1)	NR
	Healthcare system	Representative of a single large facility or organization (2), limited population (1), NR (8)	NR
	Clinical specialty/focus	Mental health (1), primary care (1), non-clinical healthcare workers (1), informatics (1), rheumatology (1), domestic violence (1), surgery (1), optometry (1), social work (1), abortion services (1), neurology (1)	NR
	Study period	Early COVID (6), general COVID (1), later covid (4)	NR

* video=a combination of audio and video, either via telephone plus video feed, or video conference where the two are combined.

NR = not reported; US = United States; UK = United Kingdom; ESRD = end-stage renal disease

Table C.10. CERQual of studies addressing provider satisfaction and dissatisfaction.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Ease of use (5) Providers find telehealth easy to use: it is more convenient, efficient, and provides better access to patients.	Satisfaction (5) Johnson, 2021[164] Marshall, 2021[104] Martin, 2021[154] Zhu, 2020[206] Luckett, 2021[141] Dissatisfaction (1) Marshall, 2021[104]	Minor concerns about studies addressing satisfaction: Three studies did not adequately describe recruitment strategy and two studies did not sufficiently describe the data analysis. No or very minor concerns about studies addressing dissatisfaction: all domains were adequately described in this one study.	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Satisfaction: 5 studies including 2306 participants Moderate concerns regarding specificity of qualitative methodology in all studies; only three provided at least a moderate description of the methods. Findings regarding satisfaction with ease of use were very well-described in three studies and inadequately described in two. Dissatisfaction: 1 study including 30 participants Serious concerns regarding specificity of qualitative methodology in the one included study. Findings regarding dissatisfaction with ease of use were not adequately described.	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Low confidence.	Concerns due to a lack of sufficient details regarding qualitative methodology, resulting in an inability to assess rigor. In addition, there is inadequate detail regarding ease of use in three of the five included studies.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Access (4) Providers believe telehealth can increase access to care for patients in terms of travel and time. Difficulties were noted by providers, specifically poor infrastructure and difficulty accessing technology for both providers and their patients.	Satisfaction (3) Bos, 2021[207] Brunton, 2021[101] Bommersbach, 2021[134] Dissatisfaction (2) Feijt, 2020[135] Bommersbach, 2021[134]	Moderate concerns about studies addressing satisfaction: The following domains were lacking sufficient description in two of the three studies: clear statement of Aims, poor description of recruitment strategy, no provision of survey instruments, data analysis was not sufficiently described. One study did not include an ethics statement. Minor concerns about studies addressing dissatisfaction: The following domains were lacking sufficient description in one of the two studies: clear statement of Aims, poor description of recruitment strategy, data analysis was not sufficiently described.	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Satisfaction: 3 studies including 114 participants Moderate concerns regarding specificity of qualitative methodology, which is inadequately described in all studies. Findings regarding satisfaction with access were at least moderately well-described in all three studies. Dissatisfaction: 2 studies including 68 participants Moderate concerns regarding specificity of qualitative methodology, which is inadequately described in both studies. Findings regarding dissatisfaction with access were at least moderately well-described in both studies.	No or very minor concerns about studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Moderate confidence.	Although the findings regarding access are well-described across studies, detail regarding qualitative methods is inadequate and thus we cannot assess methodological rigor.

Health Outcomes (15) Providers overall were satisfied with telehealth's impact on patient outcomes. They also provide conflicting views about telehealth's impact on patient outcomes (e.g., accountability).	Satisfaction (10) Barnett, 2021[147] Brunton, 2021[101] Courtney, 2021[168] Gabe-Walters, 2021[208] Luckett, 2021[141] Malden, 2021[209] Martin, 2021[154] Srinivasan, 2020[113] Turchetti, 2021[174] Cook, 2021[203] Dissatisfaction (8) Ashcroft, 2021[163] Barnett, 2021[147] Bennell, 2021[210] Courtney, 2021[168] Gomez, 2021[152] Hunter, 2021[111] Martin, 2021[154] Saliba-Gustafsson, 2020[156]	Minor concerns about studies addressing satisfaction: Six studies did not sufficiently describe recruitment strategy, three studies did not clearly describe data analysis. Two studies each poorly described aims, or did not provide survey instrument or interview guides, qualitative data was gathered from only one open-ended questions, ethics statement not included. One study did not include a clear statement of findings. Minor concerns about studies addressing dissatisfaction: Three studies did not sufficiently describe recruitment, two studies did not provide survey instruments. One study each did not completely state study aims, or gather data from more than one question.	No or very minor concerns about studies addressing satisfaction.	Satisfaction: 10 studies including 360 participants Moderate concerns regarding insufficient detail regarding methods of data collection and analysis in 20% of the included studies. Outcomes associated with telehealth are described in 60% of the included articles. Dissatisfaction: 8 studies including 416 participants Minor concerns regarding the level of detail provided regarding methods of qualitative data collection and analysis. Dissatisfaction with outcomes were at least moderately described in all but one study, in which little discussion was dedicated to outcomes associated with telehealth.	No or very minor concerns about studies addressing satisfaction.	Moderate confidence.	Concerns due to a lack of sufficient details regarding qualitative methodology, resulting in an inability to assess rigor. In addition, there is inadequate detail regarding outcomes in four of the fifteen included studies.
Communication (20)	Satisfaction (8)	Minor concerns about studies	No or very minor concerns about	Satisfaction: 8 studies including 624 participants	No or very minor concerns about	Moderate confidence.	Although the findings

Telehealth can impede provider / patient communication due to its impersonal nature.	Bennell, 2021[210] Bos, 2021[207] Courtney, 2021[168] Dahl-Popolizio, 2020[149] Gomez, 2021[152] Martin, 2021[154] Ross, 2021[166] Srinivasan, 2020[113] Dissatisfaction (17) Bos, 2021[207] Cook, 2021[203] Courtney, 2021[168] Feijt, 2020[135] Franzosa, 2021[211] Gilbert, 2021[137] Gomez, 2021[152] Hunter, 2021[111] Johnson, 2021[164] Krok-Schoen, 2021[171] Martin, 2021[154] Nagra, 2021[212] Saliba-Gustafsson, 2020[156] Searby, 2021[173]	addressing satisfaction: Four studies did not sufficiently describe recruitment strategy. Two studies each did not completely state their aims, or provide survey instruments. One study did not sufficiently describe the data analysis. Minor concerns about studies addressing dissatisfaction: eight studies did not sufficiently describe recruitment strategy. Four studies each did not clearly state their aims, or provide survey instrument or interview guides. Three studies did not sufficiently describe data analyses/ One study each did not clearly state their findings, or include an ethics statement.	studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.	Moderate concerns related to qualitative methods being insufficiently described in three of the included eight studies. Despite the lack of clarity regarding the methods, satisfaction with communication via telehealth was adequately described in all studies. Dissatisfaction: 17 studies including 4299 participants Moderate concerns related to qualitative methods being insufficiently described in six of the included 17 studies. This lack of clarity regarding methods is assuaged by all studies entering into at least a moderate discussion of findings regarding dissatisfaction with communication via telehealth.	studies addressing satisfaction. No or very minor concerns about studies addressing dissatisfaction.		regarding communication are well-described across studies, detail regarding qualitative methods is inadequate and thus we cannot assess methodological rigor.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
	Shklarski, 2021[126] Srinivasan, 2020[113] Turchetti, 2021[174]						

Benefits (24) Telehealth is seen as beneficial to patients from the provider perspective. Providers also found telehealth beneficial to their practices by improving efficiency, capacity, and collaboration.	Barsom, 2021[74] Bos, 2021[207] Brunton, 2021[101] Cole, 2021[167] Cormi, 2021[213] Courtney, 2021[168] Dahl-Popolizio, 2020[149] Franzosa, 2021[150] Gabe-Walters, 2021[208] Gomez, 2021[152] Hardy, 2021[214] Jimenez-Rodriguez, 2020[153] Johnson, 2021[164] Kang, 2020[139] Marshall, 2021[104] Murphy, 2021[155] Pagano, 2021[172] Ross, 2021[166] Srinivasan, 2020[113] Taylor, 2021[162] Treitler, 2021[215] Uscher-Pines[115] vanGelder, 2021[216] Wilson, 2021[114]	Minor concerns about studies addressing benefits: One study had deficits across all domains measured. Main concerns amongst the remaining studies: 15 studies did not sufficiently escribe their recruitment strategies; seven studies each did not include survey instruments or interview guides, or sufficiently describe analyses, six studies did not clearly state the aims, one study only included one open-ended question.	No or very minor concerns about studies addressing benefits.	Benefits: 24 studies including 3359 participants Minor concerns regarding lack of specificity of qualitative methodology in nine of the included studies; methods were at least moderately described in 15 studies. Findings regarding benefits were very well-described and thoroughly discussed in 11 of the 24 studies; four studies presented an inadequate discussion of benefits.	Minor concerns about studies addressing benefits: One study included hospital administrators only and another included hospital staff only.	Moderate confidence.	Concerns due to a lack of sufficient details regarding qualitative methodology in nine studies, resulting in an inability to fully assess rigor. Finding regarding benefits are at least moderately described in 20 of the 24 included studies.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Preferences (16) Providers are generally satisfied with telehealth, and believe it can replace many aspects of in person care, but, overtime providers noted a need to catch up on care put on hold during the pandemic.	Alkureeishi, 2021[108] Baadjou, 2020[146] Ben-Ayre, 2021[80] Cormi, 2021[213] Courtney, 2021[168] Dahl-Popolizio, 2020[149] Due, 2021[102] Hunter, 2021[111] Johnson, 2021[164] Murphy, 2021[155] Schoebel, 2021[125] Shklarski, 2021[217] Smithson, 2021[112] Uscher-Pines[115] vanGelder, 2021[216] Wilson, 2021[114]	Minor concerns about studies addressing preferences: Nine studies did not sufficiently describe recruitment strategy. Six studies did not sufficiently describe analyses. Focus group or interview guides were not included in five studies. Four studies did not clearly state aims, and three studies did not have a clear statement of findings. Two studies did not provide ethics statements.	No or very minor concerns about studies addressing preferences.	Preferences: 16 studies including 3022 participants Moderate concerns regarding specificity of qualitative methodology in six of the 16 included studies; methods were at least moderately described in 10 studies. Findings regarding benefits were very well-described and thoroughly discussed in only 2 of the 16 studies; a majority of 10 of the 16 studies presented an insufficient discussion regarding preferences.	Minor concerns about studies addressing preferences: two included studies surveyed opioid treatment staff, or conducted a focus group with administrators.	Low confidence.	Concerns due to a lack of sufficient details regarding qualitative methodology, resulting in an inability to assess rigor. In addition, there is inadequate detail regarding preferences in 10 of the 16 included studies.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Concerns (17) Providers feel that telehealth should not replace face to face visits; it prevents physical exam and telehealth is not suited for all types of care	Baadjou, 2020[146] Ben-Ayre, 2021[80] Bennell, 2021[210] Bos, 2021[207] Byrnes, 2020[218] Cole, 2021[167] Courtney, 2021[168] Gullslett, 2021[219] Jimenez-Rodriguez, 2020[153] Krok-Schoen, 2021[171] Luckett, 2021[141] Martin, 2021[154] Saliba-Gustafsson, 2020[156] Shklarski, 2021[126] Srinivasan, 2020[113] Treitler, 2021[215] vanGelder, 2021[216]	Minor concerns about studies addressing concerns: Ten studies did not sufficiently describe recruitment strategy. Seven studies did not sufficiently describe analyses. Interview guides or survey instruments were not included for five studies. Two studies did not have a clear statement of findings.	No or very minor concerns about studies addressing concerns.	Concerns: 17 studies including 925 participants Minor concerns regarding sufficiency of detail regarding overall qualitative methodology in five of the included studies; methods were at least moderately described in 11 studies. Findings regarding concern were very well-described and thoroughly discussed in 12 of the 17 studies.	No or very minor concerns about studies addressing concerns.	High confidence.	Although details regarding qualitative methods are inadequate in 29% of the included studies, the findings regarding concerns are well-described and supported across studies giving us confidence in the stated conclusions.

Summary of Review Findings	Number of Studies Contributing	Methodological Limitations (CASP Rating)	Coherence	Adequacy	Relevance	CERQual Assessment of Confidence in the Evidence	Explanation of CERQual Rating
Provider Suggestions (11) Providers felt that telehealth in combination with in person care should be considered for the future	Bos, 2021[207] Godfrey, 2021[220] Gomez, 2021[152] Kang, 2020[139] Malden, 2021[209] Nagra, 2021[212] Ross, 2021[166] Saliba-Gustafsson, 2020[156] Shklarski, 2021[126] Taylor, 2021[162] vanGelder, 2021[216]	Moderate concerns about studies addressing suggestions and facilitators: One study had deficits across all domains measured. Additionally, seven studies did not sufficiently describe recruitment. Five studies did not adequately describe the analyses. Four studies did not state their aims clearly. One study did not include the survey instrument.	No or very minor concerns about studies addressing suggestions/ facilitators.	Concerns: 11 studies including 1544 participants Moderate concerns regarding the sufficiency of detail regarding qualitative methods, which is insufficient in four of the 11 included studies. In addition, findings related to suggestions/facilitators are insufficiently described in four of the 11 included studies. Together, these descriptive inadequacies result in a lack of confidence of the findings.	No or very minor concerns about studies addressing suggestions/ facilitators.	Moderate confidence.	Concerns due to a lack of sufficient details regarding qualitative methodology, resulting in an inability to assess rigor. In addition, there is inadequate detail regarding provider suggestions in four of the 11 included studies.

CERQual = Confidence in the Evidence from Reviews of Qualitative Research

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Appendix D. Evidence Tables

Table D.1. Characteristics of patients using telehealth during COVID-19 era (Key Question 1)

Author, Year	COVID Era	Sex (%)	Age (%)	Race/Ethnicity	SES	Urban/Rural	Condition (Physician Specialty)
Alexander, 2020[1] IQVIA	2020 (Q1/Q2)	Male: 47.8% Female:52.2%	<19: 15.6% 19-35: 17.8% 36-55: 26.1% 56-65: 15.2% 66 +: 25.3%	Telehealth visits were 19.3% of all visits for White individuals and 20.5% of all visits for Black individuals	NR	NR	NR
Campion, 2021[2] Change Healthcare	Mar- Dec 2020	NR	NR	NR	NR	NR	Claims for 'behavioral and mental health' disorders 4-5 times more frequent than for other categories of diseases (i.e., >4m claims vs 1m or fewer claims for other diagnoses)
Ferguson, 2021[3] Veterans' Affairs	Jan-Jun 2020	Male: 91% Female: 9.2% RR for use of telehealth: 1.02 (1.02,1.03) for females	18-44 RR for use of telehealth: 18-44 ref 45-64 1.04 (1.04,1.05) 65+ 1.05 (1.04, 1.05)	White ref Black/African American 1.02 (1.01, 1.03) Asian 0.96 (0.95, 0.98) American Indian/Alaska Native 1.00 (0.99, 1.01) Native Hawaiian/Pacific Islander 1.01 (1.00, 1.01)) Unknown/missing 0.99 (0.99, 1.00) White 71% of new users	NR	RR for use of telehealth: Urban ref Rural 1.00 (0.99, 1.00) Highly rural 0.99 (0.97, 1.00) Urban 67% of new users	Mental health condition 1.03 (1.03, 1.04)

Author, Year	COVID Era	Sex (%)	Age (%)	Race/Ethnicity	SES	Urban/Rural	Condition (Physician Specialty)
Hatef, 2022[4]	Jul-Dec 2020	Male: 497% Female:50.3%	0-17: 22.3% 18-34: 24% 35-49: 24.7% ≥50: 29%	NR	Area Deprivation Index Quartile 1: 41.4% Quartile 2: 22.5% Quartile 3: 21.1% Quartile 4: 15%	Urban: 84.5% Rural: 15.5%	Ambulatory services
Koonin, 2020[5] CDC	Jan-Mar 2020	Female: 63%	18-49: 69%	NR	NR	NR	NR
Mansour, 2020[6] IQVIA	2020 (Q1/Q2)	2020 Q1 Female: 48% 2020 Q2 Female: 57%	2020 Q1 Up to 19: 19% 20-39: 21% 40-64: 34% 65+: 26% 2020 Q2 Up to 19: 28% 20-39: 31% 40-64: 28% 65+: 13%	2020 Q1 White: 85% Black: 4% Hispanic: 6% Asian: 1% Other: 4% 2020 Q2 White: 75% Black: 12% Hispanic: 7% Asian: 4% Other: 2%	NR	NR	NR
Patel 2021[7]	Mar-Jun 2020	Male: 41.5% Female:58.5%	0-19: 92% 20-29: 8.7% 30-39: 11.5 40-49: 12.9% 50-59: 15.7% 60-64: 8.5% 65+: 33.5%	County percentage of Caucastion Quartile 1: 19.7% Quartile 2: 30.2% Quartile 3: 26.9% Quartile 4: 23.2%	Median household income Quartile 1 (low): 32.8% Quartile 2: 25.2% Quartile 3: 23.6% Quartile 4 (high): 18.4%	Urban: 89.7% Rural: 10.3%	Ambulatory services
Rabbini, 2022[8]	Jan-Mar 2021	NR	NR	NR	NR	NR	Children's Ambulatory Services

Author, Year	COVID Era	Sex (%)	Age (%)	Race/Ethnicity	SES	Urban/Rural	Condition (Physician Specialty)
Weiner, 2021[9] Blue Health Intelligence	Mar-Jun 2020	NR	Percentage of contacts that were telehealth: 0-5: 16.4% 6-17: 25.7% 18-34: 28.1% 35-49: 25.4% 50-64: 20.2% 65+: 19.5%	NR	Percentage of contacts that were telehealth, Area of Deprivation scale quartiles: 1 (low) 27.4% 2 19.8% 3 19.8% 4 (high) 19.4%	Percentage of contacts that were telehealth: Urban 24% Rural 14.2%	Percentage of contacts that were telehealth, number of chronic conditions in 2019: None 17.4% 1 24.2% 2 26.2% 3+ 26.7%
Whaley, 2021[10] Castlight Health	Mar-Apr 2020	NR	NR	Compared with those in zip codes with 80% or more White residents, patients in zip codes with 80% or more residents who belong to racial/ethnic minority groups had smaller increases in the use of telehealth (absolute difference: −71.6 per 10 000; 95%CI, −87.6 to −55.5). For those in zip codes with 79% to 21% residents who belong to racial/ethnic minority groups, relative use use of telehealth decreased by 15.1 per 10 000 (95%CI, −19.8 to −10.4).	Smaller reductions in care use and lower rates of telemedicine use among patients residing in zip codes with lower-income.	NR	NR

Author, Year	COVID Era	Sex (%)	Age (%)	Race/Ethnicity	SES	Urban/Rural	Condition (Physician Specialty)
Zhu, 2022[11]	Mar- Dec 2020	Male: 32.5% Female:67.5%	12-17: 10.3% 18-24: 12.2% 25-34: 21.1% 35-44: 19.3% 45-54: 15.3% 55-64: 12.5% 65+: 9.2%	NR	NR	NR	Mental Health Ambulatory Services

CDC=Centers for Disease Control and Prevention; CI=confidence interval; FPL=federal poverty line; NR=not reported; Q1=calendar quarter 1; Q2=calendar quarter 2; ref=reference; RR=risk ratio; SES=socio-economic status

Table D.2. Study characteristics of studies investigating benefits and harms of telehealth during COVID-19 (Key Question 2)

Author, Year	Intervention	Study Design	Study Period	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/Healthcare System
Aazh, 2021[12]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	UK	Single site	NR	Patient
Afonso Noguueria, 2021[13]	Telephone only	Prospective Cohort	Compares pre-COVID to post-COVID	Portugal	Single Site	NR	NR
Aiken, 2021[14]	Telephone plus video	Cross-sectional	Compares pre-COVID to post-COVID	UK	Multiple site	NR	Patient
Akama-Garren, 2021[15]	Telephone only	Retrospective cohort	General COVID era	United States	Single site	NR	Patient
Akerly, 2021[16]	Telephone only	Descriptive	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Albornoz-Cabello, 2021[17]	Telephone only	RCT	Compares pre-COVID to post-COVID	Spain	Single site	Urban	Patient
Alvarez, 2020[18]	Telephone only	Prospective cohort	Early COVID era (March-June 2020)	Spain	Single site	Urban	Provider or Healthcare system
Arias, 2022[19]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single site	Urban	Patient
Barequet, 2021[20]	Telephone plus video	Retrospective cohort	General COVID era	Israel	Single site	Urban	Patient
Baughman, 2021[21]	Not stated	Retrospective cohort	Later COVID era (June 2020 and later)	United States	Not reported	Not reported	Patient
Bogin, 2022[22]	Telephone plus video	Cross-sectional	General COVID era	United States	Multiple site	Not reported	Patient
Boles, 2022[23]10805	Not stated	Prospective cohort	General COVID era	United States	Single site	Urban	Patient
Borgen, 2021[24]	Telephone plus video	Prospective Cohort	Early COVID era (March-June 2020)	United States	Multiple site	NR	Patient
Boscari, 2021[25]	Not stated	Retrospective cohort	Early COVID era (March-June 2020)	Italy	Single site	Urban	Patient
Boshara, 2022[26]	Not stated	Cross-sectional	General COVID era	United States	Multiple site	Urban	Patient
Cancer, 2021[27]	Not stated	Prospective cohort	General COVID era	Italy	Multiple site	Not reported	Patient
Candel, 2020[28]	Telephone plus video	Prospective quasi-expiremental	Early COVID era (March-June 2020)	Netherlan ds	Single Site	Urban	Provider or Healthcare system
Capozza, 2020[29]	Telephone only	Pre-post	Compares pre-COVID to post-COVID	0	Single site	NR	Patient
Carlberg, 2020[30]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Multiple site	NR	Patient
Casariego-Vales, 2021[31]	Telephone plus video	Retrospective cohort	Later COVID era (June 2020 and later)	Spain	Multiple site	NR	Patient

Author, Year	Intervention	Study Design	Study Period	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/Healthcare System
Chang, 2021[32]	Telephone plus video	Retrospective	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Chesnel, 2021[33]	Telephone only	Prospective cohort	Early COVID era (March-June 2020)	France	Single site	NR	Both
Cobo-Calbo, 2022[34]	Not stated	Retrospective cohort	Compares pre-COVID to post-COVID	Spain	Single site	Urban	Patient
Compton, 2020[35]	Telephone plus video	Descriptive	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Corden, 2020[36]	Telephone plus video	Retrospective	Early COVID era (March-June 2020)	UK	Single site	NR	Patient
Crawford, 2021[37]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Multiple site	NR	Patient
Cunningham, 2022[38]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Multiple site	Urban	Patient
Cvietusa, 2022[39]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Not reported	Not reported	Patient
D'Anna, 2021[40]	Telephone only	Retrospective cohort	Compares pre-COVID to post-COVID	UK	Single site	Urban	Patient
Darr, 2020[41]	Not stated	Retrospective cohort	Early COVID era (March-June 2020)	UK	Single site	NR	Patient
Das, 2021[42]	Not stated	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	Urban	Patient
De Marchi, 2021[43]	Not stated	Prospective cohort	Early COVID era (March-June 2020)	Italy	Single site	NR	Patient
Duryea, 2021[44]	Telephone only	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single site	NR	Patient
Etherton, 2021[45]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Multiple Sites	NR	Patient
Ferry, 2021[46]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	Australia	NR	NR	Patient
Fortier, 2022[47]	Telephone plus video	Prospective cohort	Compares pre-COVID to post-COVID	United States	Multiple site	Urban	Patient
Francis, 2021[48]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	UK	Single site	Urban, rural	Patient
Fredwall, 2021[49]	Telephone plus video	Prospective cohort	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Gaetani, 2021[50]	Telephone plus video	Prospective Cohort	Compares pre-COVID to post-COVID	Italy	Single site	NR	Patient
Garmendia, 2021[51]	Telephone plus video	Prospective cohort	Compares pre-COVID to post-COVID	Spain	Multiple site	NR	Patient

Author, Year	Intervention	Study Design	Study Period	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/Healthcare System
Grandizio, 2022[52]	Telephone plus video	Prospective cohort	General COVID era	United States	Single site	Rural	Patient
Gross, 2020[53]	Telephone plus video	Cross-sectional	Compares pre-COVID to post-COVID	Canada	Multiple site	NR	Patient
Hameed, 2021[54]	Telephone plus video	Prospective Cohort	General COVID era	United States	Single site	NR	Patient
Hamner, 2021[55]	Not stated	Cross-sectional	Compares pre-COVID to post-COVID	United States	Single site	Not reported	Patient
Hatef, 2022[4]	Telephone plus video	Prospective cohort	Compares pre-COVID to post-COVID	United States	Claims data	Urban and rural	Patient
Helmes, 2022[56]	Telephone only	RCT	General COVID era	Germany	Single site	Urban	Patient
Hernando-Garijo, 2021[57]	Telephone plus video	RCT	Early COVID era (March-June 2020)	Spain	Single site	NR	Patient
Hughes, 2021[58]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single Site	Rural	Patient
Hutchings, 2021[59]	Not stated	Prospective cohort	Early COVID era (March-June 2020)	Australia	NR	Urban	Patient
Irarrazaval, 2021[60]	Telephone only	Prospective cohort	General COVID era	Chile	Single site	Urban	Patient
Jaenisch, 2020[61]	Telephone plus video	Descriptive	General COVID era	Germany	Single site	NR	Patient
Jansen, 2020[62]	Telephone plus video	Descriptive	General COVID era	Germany	Single site	NR	Patient
Kablinger, 2022[63]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single site	Not reported	Patient
Kazi, 2021[64]	Telephone plus video	Cohort	Early COVID era (March-June 2020)	United States	NR	NR	Both
Kerestes, 2021[65]	Telephone plus video	Retrospective cohort	General COVID era	United States	Single site	NR	Patient
Khosla, 2022[66]	Telephone only	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single site	Urban	Patient
Kim, 2021[67]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	Urban	Patient
Klain, 2021[68]	Telephone only	Retrospective cohort	Compares pre-COVID to post-COVID	Italy	Single site	Urban	Patient
Kolb, 2021[69]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Korycinski, 2022[70]	Telephone only	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	Not reported	Patient

Author, Year	Intervention	Study Design	Study Period	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/Healthcare System
Kronenberger, 2021[71]	Telephone plus video	Prospective cohort	General COVID era	United States	NR	NR	Patient
Levinson, 2021[72]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Not reported	Not reported	Patient
Li, 2021[73]	Not stated	Retrospective cohort	General COVID era	UK	Multiple site	NR	Patient
Li, 2021[74]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	UK	Single site	NR	Patient
Lightsey, 2021[75]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Lindhagen, 2022[76]	Not stated	Retrospective cohort	Compares pre-COVID to post-COVID	Sweden	Single site	Urban	Patient
Liu, 2021[77]	Not stated	Prospective Cohort	Early COVID era (March-June 2020)	Australia	Single site	Urban	Patient
Loftus, 2022[78]	Telephone plus video	Prospective cohort	General COVID era	United States	Multiple site	Not reported	Patient
Longobardi, 2021[79]	Telephone plus video	Prospective Cohort	General COVID era	Italy	Single site	NR	Patient
Mair, 2021[80]	Not stated	Retrospective cohort	Compares pre-COVID to post-COVID	New Zealand	Single site	Urban	Patient
Malliaras, 2020[81]	Telephone plus video	RCT	General COVID era	Australia	Single site	Urban and rural	Patient
Margolius, 2021[82]	Not stated	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	Urban	Patient
Martin, 2021[83]	Telephone plus video	Prospective Cohort	Early COVID era (March-June 2020)	Belgium	Single Site	NR	Patient
Martinez-Garcia, 2020[84]	Telephone plus video	Prospective Cohort	Early COVID era (March-June 2020)	Spain	Multiple site	NR	Patient
McCoy, 2022[85]	Not stated	Cross-sectional	Compares pre-COVID to post-COVID	United States	Single site	Urban	Patient
McLachlan, 2021[86]	Telephone only	Prospective cohort	General COVID era	New Zealand	Single site	NR	Patient
McNamara, 2021[87]	Not stated	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Multiple site	Urban	Provider or Healthcare system
Mehtani, 2021[88]	Telephone only	Case series	Early COVID era (March-June 2020)	United States	Single Site	NR	Patient
Miller, 2021[89]	Not stated	Retrospective Case-Control	Compares pre-COVID to post-COVID	United States	Multiple site	NR	Patient
Minsky, 2021[90]	Telephone plus video	Prospective cohort	Compares pre-COVID to post-COVID	Israel	Single site	NR	Patient

Author, Year	Intervention	Study Design	Study Period	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/Healthcare System
Offiah, 2022[91]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	Ireland	Multiple site	Not reported	Patient
Okeefe, 2021[92]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Multiple site	NR	Patient
Onishi, 2021[93]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	Japan	Single site	NR	Patient
Ostberg, 2022[94]	Telephone plus video	Cross-sectional	General COVID era	United States	Multiple site	Suburban	Patient
Parise, 2021[95]	Telephone plus video	Prospective cohort	Early COVID era (March-June 2020)	Italy	Multiple site	NR	Patient
Phillips, 2021[96]	Not stated	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Pinsker, 2021[97]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Postorino, 2020[98]	Telephone only	Retrospective cohort	Early COVID era (March-June 2020)	Italy	Single site	Urban	Provider or Healthcare system
Rachmeil, 2020[99]	Telephone plus video	Prospective cohort	General COVID era	Israel	Multiple site	NR	Patient
Ragheb, 2021[100]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single site	Not reported	Patient
Reddy, 2021[101]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	Not reported	Patient
Reider-Demer, 2022[102]	Telephone plus video	Cross-sectional	Compares pre-COVID to post-COVID	United States	Multiple site	Urban	Both
Reynolds-Wright, 2021[103]	Telephone plus video	Prospective Cohort	General COVID era	UK	Single site	NR	Patient
Ripp, 2022[104]	Not stated	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single site	Not reported	Patient
Rizzoli, 2021[105]	Telephone only	Prospective cohort	Early COVID era (March-June 2020)	Italy	Single site	Urban	Patient
Rohan, 2021[106]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single site	NR	Patient
Rowe, 2021[107]	Telephone plus video	Retrospective cohort	General COVID era	Australia	Single site	NR	Patient
Russo, 2021[108]	Telephone only	Retrospective cohort	Early COVID era (March-June 2020)	Italy	Single site	NR	Patient
Rysinka, 2021[109]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Multiple site	Urban and Suburban	Patient
Sawka, 2021[110]	Telephone plus video	Prospective Cohort	Compares pre-COVID to post-COVID	Switzerla nd	Single site	NR	Patient

Author, Year	Intervention	Study Design	Study Period	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/Healthcare System
Schafer, 2022[111]	Not stated	Retrospective cohort	General COVID era	United States	Single site	Not reported	Patient
Schweiberger, 2020[112]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Multiple site	NR	Provider or Healthcare system
Seghezzo, 2021[113]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	UK	Single site	NR	Patient
Sevilis, 2022[114]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Multiple site	Not reported	Patient
Shabto, 2020[115]	Telephone only	Retrospective cohort	General COVID era	United States	Single Site	NR	Patient
Sharma, 2020[116]	Telephone only	Prospective cohort	Early COVID era (March-June 2020)	NR	Single site	NR	Patient
Sharma, 2020[117]	Telephone only	Retrospective cohort	Compares pre-COVID to post-COVID	UK	NR	NR	Both
Smith, 2021[118]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	Urban	Patient
Tailby, 2021[119]	Telephone plus video	Retrospective cohort	General COVID era	Australia	NR	NR	Patient
Tarn, 2021[120]	Telephone plus video	Cross-sectional	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Taxonera, 2020[121]	Telephone only	Cross-sectional	Early COVID era (March-June 2020)	Spain	Single site	NR	Patient
Tchang, 2022[122]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single site	Urban	Patient
Uppal, 2022[123]	Telephone plus video	Prospective cohort	General COVID era	United States	Single site	Not reported	Patient
Wabe, 2022[124]	Telephone plus video	Retrospective cohort	General COVID era	Australia	Multiple site	Urban, rural	Patient
Watson, 2021[125]	Telephone only	Cross-sectional	Compares pre-COVID to post-COVID	Australia	Single site	Not reported	Patient
Winkleman, 2020[126]	Telephone plus video	Retrospective cohort	General COVID era	United States	Single site	NR	Patient
Wu, 2021[127]	Telephone plus video	Prospective cohort	General COVID era	UK	Multiple site	NR	Patient
Ye, 2022[128]	Telephone plus video	Retrospective cohort	General COVID era	United States	Single site	Urban	Patient
Ye, 2022[129]	Telephone plus video	Cross-sectional	Compares pre-COVID to post-COVID	United States	Single site	Urban	Patient
Zayde, 2021[130]	Telephone plus video	Prospective cohort	Compares pre-COVID to post-COVID	United States	Single site	Urban	Patient

Author, Year	Intervention	Study Design	Study Period	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/Healthcare System
Zhang, 2021[131]	Telephone plus video	Retrospective cohort	Early COVID era (March-June 2020)	United States	Single site	NR	Patient
Zhao, 2021[132]	Telephone plus video	Retrospective cohort	Compares pre-COVID to post-COVID	United States	Single site	NR	Patient
Zhu, 2021[133]	Not stated	Retrospective cohort	Early COVID era (March-June 2020)	Australia	Multiple site	Urban	Patient
Zimmerman, 2021[134]	Telephone plus video	Prospective cohort	General COVID era	United States	Single site	NR	Patient

NR=not reported; UK=United Kingdom

Table D.3. Participant characteristics of studies investigating benefits and harms of telehealth during COVID-19 (Key Question 2)

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Aazh, 2021[12]	Arm 1	Declined internet video	23	Tinnitus rehabilitation	Adults (18-65)	Mean: 55	NR	NR
Aazh, 2021[12]	Arm 2	Accepted internet video	90	Tinnitus rehabilitation	Adults (18-65)	Mean: 49	NR	NR
Afonso Noguueria, 2021[13]	Full group	Individuals with Heart Failure attending outpatient cardiology appointments	196	Cardiology	NR	Mean: 71.4	Male: 0.68	NR
Afonso Noguueria, 2021[13]	Arm 1	Individuals with Heart Failure attending outpatient cardiology appointments (Pre-COVID)	160	Cardiology	NR	Mean: NR	NR	NR
Afonso Noguueria, 2021[13]	Arm 2	Individuals with Heart Failure attending outpatient cardiology appointments (Post COVID)	43	Cardiology	NR	Mean: NR	NR	NR
Aiken, 2021[14]	Arm 1	Individuals receiving medical abortion following in-person visit	22158	Pregnancy	Pregnant Women	Mean: 27.8	female: 1	Asian, Black, Multiracial, White, Other, Unknown
Aiken, 2021[14]	Arm 2	Individuals receiving medical abortion following telemedicine/hybrid visit	29984	Pregnancy	Pregnant Women	Mean: 28.5	female: 1	Asian, Black, Multiracial, White, Other, Unknown

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Akama-Garren, 2021[15]	Arm 1	Patients triaged by Medical students at a respiratory clinic - Cleared	693	COVID-19	NR	Mean: 47 Range: 36-60	Female: 0.66	Black, Hispanic, Other, White, American Indian, Asian, Missing
Akama-Garren, 2021[15]	Arm 2	Patients triaged by Medical students at a respiratory clinic - Referred to Clinic (RIC)	107	COVID-19	NR	Mean: 52 Range: 39-64	Female: 0.66	Black, Hispanic, Other, White, American Indian, Asian, Missing
Akama-Garren, 2021[15]	Arm 3	Patients triaged by Medical students at a respiratory clinic - Advised to isolate	478	COVID-19	NR	Mean: 42 Range: 33-53	Female: 0.66	Black, Hispanic, Other, White, American Indian, Asian, Missing
Akama-Garren, 2021[15]	Arm 4	Patients triaged by Medical students at a respiratory clinic - Referred to ED	8	COVID-19	NR	Mean: 44 Range: 36-50	Female: 0.5	Black, Hispanic, Other, White, American Indian, Asian, Missing
Akerly, 2021[16]	Full group	Cancer patients receiving nursing weekly telehealth calls	7	Oncology	NR	Mean: NR Median: NR Range: NR	NR	NR
Albornoz-Cabello, 2021[17]	Full group	Overall	54	Patellofemoral Pain Syndrome	Adults (18-65)	Mean: 51	NR	Caucasian
Albornoz-Cabello, 2021[17]	Arm 1	Control (telematics)	54	Patellofemoral Pain Syndrome	Adults (18-65)	Mean: 51	NR	Caucasian
Albornoz-Cabello, 2021[17]	Arm 2	TPE (telematic + telephone advice)	54	Patellofemoral Pain Syndrome	Adults (18-65)	Mean: 51	NR	Caucasian
Alvarez, 2020[18]	Full group	Overall	5031 telephone calls	Orthopaedic	NR	Mean: NR Median: NR Range: NR	NR	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Arias, 2022[19]	Arm 1	Pre-telehealth implementation	780	Postpartum visits	Adults (18-65)	Median: 30.07	Female: 780 (100)	White, Black, Asian, Other, Hispanic
Arias, 2022[19]	Arm 2	Post-telehealth implementation	799	Postpartum visits	Adults (18-65)	Median: 30.35	Female: 799 (100)	White, Black, Asian, Other, Hispanic
Barequet, 2021[20]	Full group	Full group	102	Keratoconus patients	Children and adults	Mean: 29.36	Male: 67 (66)	NR
Baughman, 2021[21]	Full group	Full group	63722	Diabetes	Adult and Elderly	Mean: 62	Female: 27667 (51.5)	NR
Bogin, 2022[22]	Full group	Full group	722	Postacute and long-term care	Elders (65+)	Mean: 82.8	Female: 472 (65.4)	White, Latino
Boles, 2022[23]10805	Arm 1	In-person	66	Thyroid/parathyroid surgical patients	Adult and Elderly	Mean: 53.3	Female: 45 (68.2)	White, Hispanic, Black, Asian, Other
Boles, 2022[23]10805	Arm 2	Telemedicine (not specified)	28	Thyroid/parathyroid surgical patients	Adult and Elderly	Mean: 47.1	Female: 22 (78.6)	White, Hispanic, Black, Asian, Other
Borgen, 2021[24]	Arm 1	Individuals with new COVID-19 not receiving telehealth care management discharged from the hospital	593	COVID-19	Adult and Elderly (19-93)	Mean: 57.74	Male: 0.54	African American, Asian, Native Hawaiian or Other Pacific Islander, White
Borgen, 2021[24]	Arm 2	Individuals with new COVID-19 receiving telehealth care management	193	COVID-19	Adult and Elderly (19-93)	Mean: 57.44	Male: 0.61	African American, Asian, Native Hawaiian or Other Pacific Islander, White
Boscari, 2021[25]	Full group	Overall	71	Type-1 diabetes	Adults (18-65)	Mean: 41.9	Male: 32 (45.1)	NR
Boshara, 2022[26]	Full group	Full group	347	HIV	Adults (18-65)	Mean: 44.2	Male: 217 (62.5)	White, Black, Asian, Hispanic
Cancer, 2021[27]	Full group	Full group	30	Dyslexia, children	Children (<18)	Mean: 9.89	Female: 12 (40)	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Candel, 2020[28]	Arm 1	ED providers seeing patients via standard of care	25	Emergency	NR	Mean: 60	Female: 0.48	NR
Candel, 2020[28]	Arm 2	ED providers seeing patients via telehealth	25	Emergency	NR	Mean: 57.6	Female: 0.52	NR
Capozza, 2020[29]	Arm 1	Pre-COVID: Individuals with Frontotemporal Dementia	32	Dementia	NR	Mean: 66.25	Male: 0.562	NR
Carlberg, 2020[30]	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	149	COVID-19	NR	Mean: 39.3	NR	NR
Carlberg, 2020[30]	Arm 2	Patients receiving telehealth only evaluation in the ED	153	COVID-19	NR	Mean: 34.4	NR	NR
Casariego-Vales, 2021[31]	Full group	Diagnosed with COVID in Galicia/ASLAM	4384	COVID-19 Infection	Adults 18+	Mean: NR Median: NR Range: NR	NR	NR
Casariego-Vales, 2021[31]	Arm 1	Primary Care Monitoring	3197	COVID-19 Infection	Adults 18+	Mean: NR Median: NR Range: NR	Female: 0.536	NR
Casariego-Vales, 2021[31]	Arm 2	TELEA Telehealth Monitoring	1187	COVID-19 Infection	Adults 18+	Mean: 65.6 Range: 15-99	Female: 0.534	NR
Chang, 2021[32]	Arm 1	Patients seen by telemedicine at dermatology clinic for nail issues (New Visit)	46	Dermatology	NR	Mean: 44.4	Female: 0.7	White, Black, Asian, Other, Declined, Hispanic/Latino, Non-Hispanic/Latino, Unknown

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Chang, 2021[32]	Arm 2	Patients seen by telemedicine at dermatology clinic for nail issues (Follow-up visit)	50	Dermatology	NR	Mean: 48.6	Female: 0.58	White, Black, Asian, Other, Declined, Hispanic/Latino, Non-Hispanic/Latino, Unknown
Chesnel, 2021[33]	Full group	Overall	328	Neurological diseases	NR	Mean: 55	Female: 211 (58.9)	NR
Cobo-Calbo, 2022[34]	Full group	Full group	28230 visits	Multiple sclerosis	Not reported	Mean: NR	NR	NR
Compton, 2020[35]	Full group	Patients with Cystic Fibrosis who were originally scheduled for in-person	63	Cystic Fibrosis	NR	Mean: NR Median: NR Range: NR	NR	NR
Corden, 2020[36]	Full group	Patients rescheduled from outpatient dermatology appointments to telehealth appointments	488	Dermatology	NR	Mean: NR Median: NR Range: NR	NR	NR
Crawford, 2021[37]	Full group	Patients receiving orthopaedic pre-op surgical planning via telemedicine then in-person	303	Orthopaedic Surgery	NR	Mean: 54	Female: 0.452	NR
Cunningham, 2022[38]	Arm 1	Pre-pandemic (in-person)	72	Opioid use disorder	Adult and Elderly	Mean: 45.4	Female: 23 (31.9)	White, Black, Hispanic, Other
Cunningham, 2022[38]	Arm 2	Pandemic (telemedicine)	35	Opioid use disorder	Adult and Elderly	Mean: 46.9	Female: 12 (34.3)	White, Black, Hispanic, Other
Cvietusa, 2022[39]	Arm 1	No asthma care	2977	Asthma	Adult and Elderly	Mean: NR	Female: 1730 (35.2)	White, Black, Asian, Other, Hispanic

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Cvietusa, 2022[39]	Arm 2	In-person only	1792	Asthma	Adult and Elderly	Mean: NR	Female: 1139 (23.2)	White, Black, Asian, Other, Hispanic
Cvietusa, 2022[39]	Arm 3	Mixed (in-person and virtual)	1084	Asthma	Adult and Elderly	Mean: NR	Female: 758 (15.4)	White, Black, Asian, Other, Hispanic
Cvietusa, 2022[39]	Arm 4	Virtual care only	1952	Asthma	Adult and Elderly	Mean: NR	Female: 1293 (26.3)	White, Black, Asian, Other, Hispanic
D'Anna, 2021[40]	Arm 1	In-person (2019)	180	Stroke patients	Adult and Elderly	Median: 68.5	Male: 121 (67.22)	NR
D'Anna, 2021[40]	Arm 2	Telephone (2020)	136	Stroke patients	Adult and Elderly	Median: 65	Male: 99 (72.79)	NR
Darr, 2020[41]	Full group	Overall	200	Otolaryngology	Children (<18)	Mean: 6.4 Range: 0.3-15	Male: 119 (59.5)	White: 103 (51.5), Black: 23 (11.5), Asian: 55 (27.5), Mixed: 11 (5.5), Other: 8 (4)
Das, 2021[42]	Arm 1	Patients attending post-partum visits Pre-COVID (in-person)	660	Pregnancy	Pregnant Women	Mean: Median: NR Range: NR	female: 1	Asian, White, Black/African American, Other
Das, 2021[42]	Arm 2	Patients attending post-partum visits during COVID era (mixed telehealth/in-person)	585	Pregnancy	Pregnant Women	Mean: Median: NR Range: NR	female: 1	Asian, White, Black/African American, Other
De Marchi, 2021[43]	Full group	Overall	19	ALS	Adults (18-65)	Mean: 51.48	Male: 7 (37)	NR
Duryea, 2021[44]	Arm 1	Pregnant individuals who received in-person pre-natal care	6559	Pregnancy	Pregnant Women	Mean: 27.8	Female: 1	Hispanic, Black, White, Other

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Duryea, 2021[44]	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	6048	Pregnancy	Pregnant Women	Mean: 27.7	Female: 1	Hispanic, Black, White, Other
Etherton, 2021[45]	Arm 1	Individuals recieveing telestroke consult pre-March 1	590	Stroke	NR	Mean: NR	NR	NR
Etherton, 2021[45]	Arm 2	Individuals recieveing telestroke consult Post-March 1	254	Stroke	NR	Mean: NR	NR	NR
Ferry, 2021[46]	Full group	Overall	223	COVID-19	Adults (18-65)	Median: 45 Range: 14-78	Female: NR (52.9)	NR
Fortier, 2022[47]	Arm 1	in-person (usual care)	29	U.S. Veterans mental health treatment	Adults (18-65)	Mean: 39.9	Male: 25 (86.2)	White, Black, Asian, American Indian, Other, Hispanic
Fortier, 2022[47]	Arm 2	Telehealth (virtual care)	45	U.S. Veterans mental health treatment	Adults (18-65)	Mean: 41.8	Male: 36 (80.0)	White, Black, Asian, American Indian, Other, Hispanic
Francis, 2021[48]	Full group	Overall	900	COVID-19	Adults (18-65)	Mean: Post-inpatient admission: 61; Straight from community admission: 48.9	Female: Post-inpatient admission: 202 (45.5); Straight from community admission: 275 (60.4)	Black, Asian, Minority Ethnic
Fredwall, 2021[49]	Arm 1	Patients seen in-person at Epilepsy Clinic	101	Epilepsy	Children (<18)	Mean: NR Median: NR Range: NR	NR	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Fredwall, 2021[49]	Arm 2	Patients seen by telemedicine at Epilepsy Clinic	23	Epilepsy	Children (<18)	Mean: 14	Female: 0.65	NR
Gaetani, 2021[50]	Arm 1	Pre-COVID: Individuals with Hereditary Hemorrhagic Telangectasia	45	HHT	NR	Mean: 56.7	Female: 0.53	NR
Gaetani, 2021[50]	Arm 2	Post-COVID: Individuals with Hereditary Hemorrhagic Telangectasia (receiving telehealth)	45	HHT	NR	Mean: 56.7	Female: 0.53	NR
Garmendia, 2021[51]	Arm 1	Individuals with Sleep Apnea attending outpatient clinic, pre-covid/in-person	193	Sleep Apnea	NR	Mean: NR	NR	NR
Garmendia, 2021[51]	Arm 2	Individuals with Sleep Apnea attending outpatient clinic, post-covid, telehealth	77	Sleep Apnea	NR	Mean: 56	male: 75	NR
Grandizio, 2022[52]	Full group	Full group	32	Carpal tunnel syndrome	Adult and Elderly	Mean: 46	Male: 8 (25)	NR
Gross, 2020[53]	Arm 1	Pre-COVID: Rehabilitation Services for Workers Compensation	3293	Occupational rehabilitation	Adults (18-65)	Mean: 45.9	Male: 0.593	NR
Gross, 2020[53]	Arm 2	Post-COVID: Rehabilitation Services for Workers Compensation	1223	Occupational rehabilitation	Adults (18-65)	Mean: 45.8	Male: 0.603	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Hameed, 2021[54]	Arm 1	individuals with COVID-19 who received no services post-discharge	20	COVID-19	NR	Median: 58	female: 0.55	White, Black, Hispanic, Asian, Unknown
Hameed, 2021[54]	Arm 2	Individuals with COVID-19 who received virtual physical therapy	44	COVID-19	NR	Median: 60	female: 0.57	White, Black, Hispanic, Asian, Unknown
Hameed, 2021[54]	Arm 3	Individuals with COVID-19 who received home physical therapy	25	COVID-19	NR	Median: 57	female: 0.24	White, Black, Hispanic, Asian, Unknown
Hameed, 2021[54]	Arm 4	Individuals with COVID-19 who performed independent at home exercise program	17	COVID-19	NR	Median: 59	female: 0.35	White, Black, Hispanic, Asian, Unknown
Hamner, 2021[55]	Arm 1	In-person	608	General patient	Children (<18)	Mean: 10.1	Female: 232 (38.6)	White, Black, Other
Hamner, 2021[55]	Arm 2	Telehealth	285	General patient	Children (<18)	Mean: 10.2	Female: 113 (39.6)	White, Black, Other
Hatef, 2022[4]	Full group	Full group	40739915	Blue Health Blue Shield Claims data	All age groups	Range: 0-50+	Female: 20480768 (50.3)	NR
Helmes, 2022[56]	Full group	Full group	60	Dentoalveolar surgery	Adults (18-65)	Mean: 51.6	Female: NR (54.4)	NR
Hernando-Garijo, 2021[57]	Arm 1	Women with Fibromyalgia receiving no exercise program	17	Fibromyalgia	Women	Mean: 55.06	Female: 1	NR
Hernando-Garijo, 2021[57]	Arm 2	Women with Fibromyalgia receiving telerehabilitiation aerobic exercise program	17	Fibromyalgia	Women	Mean: 51.81	Female: 1	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Hughes, 2021[58]	Arm 1	Individuals receiving office based opioid treatment pre-covid	196	Opioid Use Disorder	NR	Mean: 38.1	Male: 0.413	White
Hughes, 2021[58]	Arm 2	Individuals receiving office based opioid treatment during "transition time"	171	Opioid Use Disorder	NR	Mean: 37.4	Male: 0.427	White
Hughes, 2021[58]	Arm 3	Individuals receiving office based opioid treatment during COVID	221	Opioid Use Disorder	NR	Mean: 37.4	Male: 0.425	White
Hutchings, 2021[59]	Full group	Overall	173	COVID-19	NR	Median: 38 Range: 29160	NR	NR
Irarrazaval, 2021[60]	Arm 1	In-person	113	Abdominal surgery patients	Adult and Elderly	Median: 53	Male: 54 (48)	NR
Irarrazaval, 2021[60]	Arm 2	Telemedicine	106	Abdominal surgery patients	Adult and Elderly	Median: 49	Male: 48 (45)	NR
Jaenisch, 2020[61]	Full group	Patients in German Hospital with no Hip Pathology receiving telehealth exam	29	Hip Pathology	NR	Mean: 61.9	Male: 0.517	NR
Jansen, 2020[62]	Full group	Patients with spinal complaints examined via video	43	Back Pain	NR	Mean: 60	Female: 0.5581	NR
Kablinger, 2022[63]	Full group	Full group	2145	Psychiatric patients	Adult and Elderly	Range: 18-87	Female: 1485 (69.23)	White, Other
Kazi, 2021[64]	Full group	Overall	Number of visits: 2623	Dermatology patients	NR	Mean: 39.4	Male: 843 (32.1)	NR
Kazi, 2021[64]	Arm 2	Asynchronous visits	Number of visits: 951	Dermatology patients	NR	Mean: 35.3	Male: 300 (31.5)	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Kazi, 2021[64]	Arm 3	Synchronous visits	Number of visits: 1672	Dermatology patients	NR	Mean: 41.8	Male: 543 (32.5)	NR
Kerestes, 2021[65]	Arm 1	Patients who received abortion services in-person	110	Family Planning	Pregancy	Mean: 28.1	Female: 1	NR
Kerestes, 2021[65]	Arm 2	Patients who received abortion services via telehealth	224	Family Planning	Pregnancy	Mean: 27.3	Female: 1	NR
Khosla, 2022[66]	Arm 1	Pre-pandemic	215	Hypertensive disorder of pregnancy	Adults (18-65)	Mean: 29	Female: 215 (100)	White, Black, Asian, Other, Hispanic
Khosla, 2022[66]	Arm 2	Post-pandemic	258	Hypertensive disorder of pregnancy	Adults (18-65)	Mean: 30	Female: 258 (100)	White, Black, Asian, Other, Hispanic
Kim, 2021[67]	Full group	Pediatric patients evaluated by telehealth	406	COVID-19	Children (<18)	Median: 4.4 Range: 0-17	NR	NR
Klain, 2021[68]	Arm 1	2019 visit (corresponding period to first visit during COVID-19)	75	Differentiated thyroid cancer	Adults (18-65)	Mean: 46	Male: 21 (28)	NR
Klain, 2021[68]	Arm 2	2020 first telemedicine visit during COVID-19	54	Differentiated thyroid cancer	Adults (18-65)	Mean: 45	Male: 13 (24)	NR
Klain, 2021[68]	Arm 3	2019 visit (corresponding period to followup visit during COVID-19)	450	Differentiated thyroid cancer	Adults (18-65)	Mean: 50	Male: 83 (18)	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Klain, 2021[68]	Arm 4	2020 telemedicine followup visit during COVID-19	391	Differentiated thyroid cancer	Adults (18-65)	Mean: 51	Male: 91 (23)	NR
Kolb, 2021[69]	Arm 1	Patients receiving in-person outpatient care at ENT clinic (Recurrent Acute Otitis Media Cohort)	50	Otolaryngology	Children (<18)	Mean: 24.4 (months)	Male: 0.62	White, Black, Hispanic, Other
Kolb, 2021[69]	Arm 2	Patients receiving telehealth outpatient care at ENT clinic, (Reccurent Acute Otitis Media Cohort)	50	Otolaryngology	Children (<18)	Mean: 17 (months)	Male: 0.6	White, Black, Hispanic, Other
Kolb, 2021[69]	Arm 1	Patients receiving in-person outpatient care at ENT clinic, (Sleep-Disorderd Breathing Cohort)	64	Otolaryngology	Children (<18)	Mean: 5.29 (years)	Male: 0.55	White, Black, Hispanic, Other
Kolb, 2021[69]	Arm 2	Patients receiving telehealth outpatient care at ENT clinic, (Sleep-Disorderd Breathing Cohort)	64	Otolaryngology	Children (<18)	Mean: 5.47 (years)	Male: 0.5	White, Black, Hispanic, Other
Korycinski, 2022[70]	Full group	Full group	293	COVID-19	Adult and Elderly	Mean: 46.03	Female: 163 (55.6)	White, Black, Other

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Kronenberger, 2021[71]	Arm 1	Normal hearing	38	Cochlear implants	Other (define)	Mean: 14.6	Male: 17	NR
Kronenberger, 2021[71]	Arm 2	Cochlear implant	28	Cochlear implants	Other (define)	Mean: 14.8	Male: 15	NR
Levinson, 2021[72]	Arm 1	In-person	60	Eating disorder	Adults (18-65)	Mean: 25.07	Cisgender women: 51 (85)	White, Black, Hispanic, Asian, Multiracial
Levinson, 2021[72]	Arm 2	Telehealth (Zoom)	33	Eating disorder	Adults (18-65)	Mean: 24.52	Cisgender women: 29 (87.88)	White, Black, Hispanic, Asian, Multiracial
Li, 2021[73]	Arm 1	F2F	39	Acute tonsillitis	NR	Median: 18	M/F ratio: 1.05:1	NR
Li, 2021[73]	Arm 2	Remote consultation	151	Acute tonsillitis	NR	Median: 23	M/F ratio: 0.62:1	NR
Li, 2021[74]	Arm 1	Patients triaged in-person for ophthalmologic issue	451	Ophthalmology	NR	Median: 49	Male: 0.55	NR
Li, 2021[74]	Arm 2	Patients receiving virtual triage for ophthalmologic issue	404	Ophthalmology	NR	Median: 43	Female: 0.54	NR
Lightsey, 2021[75]	Full group	Patients receiving pre-op surgical planning via telemedicine then in-person	33	Spine Surgery	NR	Mean: 59.3	Male: 0.667	NR
Lindhagen, 2022[76]	Full group	Full group	894	Inflammatory bowel disease	Adults (18-65)	Mean: 47.6	Female: 422 (47.2)	NR
Liu, 2021[77]	Full group	Full Group clinic patients at various outpatient facilities	1376	Gastroenterology/Rheumatology	NR	Mean: 55.06	Female: 0.5233	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Liu, 2021[77]	Arm 1	Pre-COVID clinic patients at various outpatient facilities	692	Gastroenterology/Rheumatology	NR	Mean: 55.63	Female: 0.5361	NR
Liu, 2021[77]	Arm 2	Post-COVID clinic patients at various outpatient facilities	684	Gastroenterology/Rheumatology	NR	Mean: 54.47	Female: 0.5102	NR
Loftus, 2022[78]	Full group	Full group	129	Suspected fibromyalgia and chronic abdominal pain	Adult and Elderly	Mean: 45	Female: 98 (76)	White, Black, Native American, Other
Longobardi, 2021[79]	Full group	Patients who underwent laryngectomy receiving depression screening via telehealth	37	Laryngectomy	NR	Mean: 67.72	Male: 0.946	NR
Mair, 2021[80]	Arm 1	Pre-COVID (2019)	210	Rheumatology patients	NR	Mean: 54.6	Female: 142 (67.6)	NR
Mair, 2021[80]	Arm 2	Telerheum	340	Rheumatology patients	NR	Mean: 55.6	Female: 244 (71.8)	NR
Malliaras, 2020[81]	Arm 1	Advice only	12	Rotator cuff–related shoulder pain	Adults (18-65)	Mean: 53.7	Female: 11 (92)	NR
Malliaras, 2020[81]	Arm 2	Recommended care	12	Rotator cuff–related shoulder pain	Adults (18-65)	Mean: 51.3	Female: 10 (83)	NR
Malliaras, 2020[81]	Arm 3	Recommended and telerehabilitation	12	Rotator cuff–related shoulder pain	Adults (18-65)	Mean: 56.6	Female: 11 (92)	NR
Margolius, 2021[82]	Full group	Patients with COVID-19 symptoms evaluated over Telehealth	10208	COVID-19	NR	Mean: 41.9	Female: 0.67	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Martin, 2021[83]	Arm 1	Individuals discharged from hospital due to covid receiving standard of care	13	Rehabilitation, COVID-19	NR	Mean: 61.5	Male: 0.785	NR
Martin, 2021[83]	Arm 2	Individuals discharged from hospital due to covid receiving telerehabilitation	14	Rehabilitation, COVID-19	NR	Mean: 60.8	Male: 0.461	NR
Martinez-Garcia, 2020[84]	Full group	Full Group receiveing telehealth and monitoring after COVID-19 diagnosis	313	COVID-19 Infection	Other (define)	Mean: 60.9 Range: 18-92	Male: 0.476	NR
McCoy, 2022[85]	Arm 1	In-person before telemedicine	113	Pediatric otolaryngology patients	Children (<18)	Mean: 4.99	Female: 43 (38.1)	White, Black, Not specified
McCoy, 2022[85]	Arm 2	Telemedicine	59	Pediatric otolaryngology patients	Children (<18)	Mean: 6.15	Female: 30 (50.8)	White, Black, Not specified
McCoy, 2022[85]	Arm 3	In-person during telemedicine	4	Pediatric otolaryngology patients	Children (<18)	Mean: 8.78	Female: 3 (75)	White, Black, Not specified
McLachlan, 2021[86]	Full group	Individuls with Heart Failure receiving outpatient telehealth monitoring	50	Heart Failure	NR	Mean: 58.9	male: 76	Maori
McNamara, 2021[87]	Full group	Full group	537	Primary care, pharmacy visit	Adult and Elderly	Mean: 62.52	Female: 273 (50.8)	White, Black, Asian, Native, Other, Hispanic

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Mehtani, 2021[88]	Full group	Patients recieveing Additicion Telehealth Program consult while in Isolation and Quarentine for COVID-19	59	Opioid Use Disorder	NR	Mean: NR	Male: 0.67	Black or African American
Miller, 2021[89]	Arm 1	Pre-COVID: Acute Rhinosinusitis Diagnosis	3654	Rhinosinusitis	NR	Mean: 51.1	Female: 0.707	NR
Miller, 2021[89]	Arm 2	Post-COVID: Acute Rhinosinusitis Diagnosis	2075	Rhinosinusitis	NR	Mean: 51.9	Female: 0.733	NR
Minsky, 2021[90]	Full group	Overall	279	Overweight	NR	Mean: 53	Female: NR (69)	NR
Offiah, 2022[91]	Arm 1	Traditional clinic	1220	Cardiology patients	Adult and Elderly	Mean: 61	Female: 548 (44.9)	NR
Offiah, 2022[91]	Arm 2	Virtual clinic	496	Cardiology patients	Adult and Elderly	Mean: 60	Female: 208 (41.9)	NR
Okeefe, 2021[92]	Full group	Patients diagnosed with COVID-19 assigned to home monitoring program	496	COVID-19	NR	Mean: 47.6	Female: 0.665	Black, White, Other
Okeefe, 2021[92]	Arm 1	Patients (Risk Tier 1, Low Risk) diagnosed with COVID-19 assigned to home monitoring program	237	COVID-19	NR	Mean: 41.5	Female: 0.658	Black, White, Other

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Okeefe, 2021[92]	Arm 2	Patients (Risk Tier 2, Intermediate Risk)diagnosed with COVID-19 assigned to home monitoring program	185	COVID-19	NR	Mean: 52.5	Female: 0.676	Black, White, Other
Okeefe, 2021[92]	Arm 3	Patients (Risk Tier 3, High Risk)diagnosed with COVID-19 assigned to home monitoring program	74	COVID-19	NR	Mean: 54.9	Female: 0.554	Black, White, Other
Onishi, 2021[93]	Full group	Patients with diabetes treated before and after COVID-19/Telehealth	2727	Diabetes	NR	Median: 68.6	Male: 0.791	NR
Ostberg, 2022[94]	Arm 1	In-person	455	Patients with chest pain	Adults (18-65)	Median: 43	Male: 227 (49.9)	NR
Ostberg, 2022[94]	Arm 2	Telehealth (Zoom)	455	Patients with chest pain	Adults (18-65)	Median: 44	Male: 228 (50.1)	NR
Parise, 2021[95]	Arm 1	Not included in telemedicine study	43	Type-1 diabetes	Adults (18-65)	Mean: 37	Male: 21 (49)	NR
Parise, 2021[95]	Arm 2	Included in telemedicine study	166	Type-1 diabetes	Adults (18-65)	Mean: 40	Male: 80 (48.2)	NR
Phillips, 2021[96]	Arm 1	Individuals presenting to initial in-person visit at respiratory assessment center	741	Pulmonary	NR	Median: 43.5	female: 0.636	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Phillips, 2021[96]	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	564	Pulmonary	NR	Median: 42.05	female: 0.668	NR
Pinsker, 2021[97]	Arm 1	Individuls with diabetes receiving in-person insulin pump training	NR	Diabetes	Other (define)	Mean: NR Median: NR Range: NR	NR	NR
Pinsker, 2021[97]	Arm 2	Individuls with diabetes receiving virtual insulin pump training	8984	Diabetes	Other (define)	Mean: NR Median: NR Range: NR	NR	NR
Postorino, 2020[98]	Full group	Overall	3828	hematological disorders	General adult	Mean: 58 Range: 18-93	Male: NR (58)	NR
Rachmeil, 2020[99]	Full group	Children with Type 1 diabetes rescheduled to a telehealth visit	195	Diabetes	Children (<18)	Mean: 16.5	Male: 0.514	NR
Ragheb, 2021[100]	Arm 1	In-person	171	High-risk obstetric patients	Adults (18-65)	Mean: NR	Female: 171 (100)	White, Black, Asian, Native, Other, Hispanic
Ragheb, 2021[100]	Arm 2	Telehealth	51	High-risk obstetric patients	Adults (18-65)	Median: NR	Female: 51 (100)	White, Black, Asian, Native, Other, Hispanic
Reddy, 2021[101]	Full group	Full group	1744	Cancer patients	Adult and Elderly	Median: 60	Female: 924 (53)	White, Black, Asian, Hispanic, Other

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Reider-Demer, 2022[102]	Arm 1	Pre-COVID19 patients	485	Neurology patients	Adult and Elderly (32-67)	Mean: 46	Female: 288 (59)	White, Black, Asian, American Indian, Pacific Islander, Other, Unknown
Reider-Demer, 2022[102]	Arm 2	COVID19 patients	6709	Neurology patients	Adult and Elderly (32-67)	Mean: 51	Female: 3854 (57)	White, Black, Asian, American Indian, Pacific Islander, Other, Unknown
Reynolds-Wright, 2021[103]	Full group	Individuals receiving medical abortion at home after telehealth visit	663	Abortion	Other (define)	Mean: 27.6	female: 100	NR
Ripp, 2022[104]	Arm 1	In-person (2019)	1077	Developmental-behavioral pediatrics	Children (<18)	Mean: 9.4	Female: 270 (25.1)	White, Black, Native Hawaiian, Native American, Other, Hispanic
Ripp, 2022[104]	Arm 2	Telehealth (2020)	354	Developmental-behavioral pediatrics	Children (<18)	Mean: 9.3	Female: 91 (25.7)	White, Black, Native Hawaiian, Native American, Other, Hispanic
Rizzoli, 2021[105]	Full group	Overall	14	Medication overuse for headaches	Adults (18-65)	Mean: 45.2	Male: 3 (27.3)	NR
Rohan, 2021[106]	Arm 1	Individauls referred for Kidney transplant pre-covid in-person	1639	Kidney Transplant	NR	Mean: NR Median: NR Range: NR	NR	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Rohan, 2021[106]	Arm 2	Individauls evaluated for Kidney transplant post-covid via telehealth	1258	Kidney Transplant	NR	Mean: 54	Female: 0.4157	African American, White
Rowe, 2021[107]	Arm 1	Telephone Cardiology Outpatient Visits	1118	Cardiology	NR	Median: 67 Range: 54-76	Male: 0.564	NR
Rowe, 2021[107]	Arm 2	Video Cardiology Outpatient Visits	327	Cardiology	NR	Median: 61 Range: 46-71	Male: 0.651	NR
Russo, 2021[108]	Full group	Patients with cardiovascular disease receiving nursing teleconsultation	150	Cardiovascular disease	NR	Mean: 67	Male: 0.68	NR
Rysinka, 2021[109]	Arm 1	Patients having having in-person primary care appointment	6792	Primary Care	Elders (65+)	Mean: 74.8	female: 0.608	White, Blck, Asian, Other, Hispanic
Rysinka, 2021[109]	Arm 2	Patients having having telehealth primary care appointment	10311	Primary Care	Elders (65+)	Mean: 75.1	female: 0.605	White, Blck, Asian, Other, Hispanic
Sawka, 2021[110]	Full group	Full Group of individuals enrolled in Observational Study during COVID	181	Thyroid Cancer	NR	Mean: 52 Range: 20-85	Male: 0.231	NR
Sawka, 2021[110]	Arm 1	Choice of Active Surveillance for Thyroid Cancer	141	Thyroid Cancer	NR	Mean: NR Median: NR Range: NR	NR	NR
Sawka, 2021[110]	Arm 2	Choice of Surgery for Thyroid Cancer	41	Thyroid Cancer	NR	Mean: NR Median: NR Range: NR	NR	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Schafer, 2022[111]	Arm 1	In-person	384	Recurrent acute otitis media patients	Children (<18)	Median: 1.58	NR	White, Black, Other
Schafer, 2022[111]	Arm 2	Telemedicine (not specified)	140	Recurrent acute otitis media patients	Children (<18)	Median: 1.32	NR	White, Black, Other
Schweiberger, 2020[112]	Arm 1	Outpatient practices with low telemedicine use	NR	NR	NR	Mean: NR Median: NR Range: NR	NR	NR
Schweiberger, 2020[112]	Arm 2	Outpatient practices with intermediate telemedicine use	NR	NR	NR	Mean: NR Median: NR Range: NR	NR	NR
Schweiberger, 2020[112]	Arm 3	Outpatient practices with high telemedicine use	NR	NR	NR	Mean: NR Median: NR Range: NR	NR	NR
Seghezzo, 2021[113]	Full group	In-person then Virtual visits for diagnostic test	43	Concussion	NR	Median: 63	NR	NR
Sevilis, 2022[114]	Arm 1	Pre-COVID	15226	Stroke patients	Adult and Elderly	Mean: 67	Female: 8082 (53.1)	NR
Sevilis, 2022[114]	Arm 2	COVID	11105	Stroke patients	Adult and Elderly	Mean: 66.7	Female: 5802 (52.2)	NR
Shabto, 2020[115]	Full group	Individuals enrolled in virtual outpatient management clinic (ECVMOC) with diabetes	49	Diabetes and COVID-19	NR	Mean: NR	Male: 0.27	White
Sharma, 2020[116]	Full group	Overall	215	Tonsillitis, sleep apnea, stridor, neck lumps, blocked nose, epistaxis OME/RAOM/AOM	Children (<18)	Mean: NR Median: NR Range: NR	NR	NR
Sharma, 2020[117]	Arm 1	IBD Services before COVID (2019)	1036	Irritable Bowel Disease (IBD)	NR	Median: 36 Range: 22-76	Female: 0.46	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicit y
Sharma, 2020[117]	Arm 2	IBD Services after COVID (2020)	334	Irritable Bowel Disease (IBD)	NR	Median: 29 Range: 17-91	Female: 0.36	NR
Smith, 2021[118]	Full group	Patients receiving virtual urgent care services	18278	Urgent Care	NR	Median: 40 Range: 32-53	NR	NR
Tailby, 2021[119]	Full group	Individuals with Epilepsy receiving neuropsychologi cal assessment	29	Epilepsy	NR	Mean: NR Median: NR Range: NR	NR	NR
Tarn, 2021[120]	Arm 1	Patients receiving in-person outpatient care at primary care clinic	52	Primary Care	NR	Mean: 26.4 Range: 1-72	Female: 0.423	Asian, Black. Hispanic, Other, White, Unknown
Tarn, 2021[120]	Arm 2	Patients receiving telephone outpatient care at primary care clinic	55	Primary Care	NR	Mean: 40.7 Range: 1-89	Female: 0.709	Asian, Black. Hispanic, Other, White, Unknown
Tarn, 2021[120]	Arm 3	Patients receiving telehealth(video) outpatient care at primary care clinic	89	Primary Care	NR	Mean: 40.3 Range: 4-73	Female: 0.64	Asian, Black. Hispanic, Other, White, Unknown
Taxonera, 2020[121]	Arm 1	Individuals with IBD attending virtual IBD clinic, scheduled visits	123	Inflammatory Bowel Disease	NR	Mean: 49	male: 45	NR
Taxonera, 2020[121]	Arm 2	Individuals with IBD attending virtual IBD clinic, urgent visits	48	Inflammatory Bowel Disease	NR	Mean: 47	male: 50	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Tchang, 2022[122]	Arm 1	In-person	69	Overweight/Obese patients	Adults (18-65)	Median: 56	Female: 50 (72)	White, Black, Asian, Pacific Islander, Other
Tchang, 2022[122]	Arm 2	Hybrid	85	Overweight/Obese patients	Adults (18-65)	Median: 49	Female: 64 (75)	White, Black, Asian, Pacific Islander, Other
Tchang, 2022[122]	Arm 3	Video	91	Overweight/Obese patients	Adults (18-65)	Median: 49	Female: 71 (78)	White, Black, Asian, Pacific Islander, Other
Uppal, 2022[123]	Arm 1	In-person	437	Surgical patients postoperative visit	Adult and Elderly	Mean: 59.1	Female: 186 (42.6)	White, Black, Asian, Other, Hispanic
Uppal, 2022[123]	Arm 2	Telehealth	98	Surgical patients postoperative visit	Adult and Elderly	Mean: 56.6	Female: 46 (46.9)	White, Black, Asian, Other, Hispanic
Wabe, 2022[124]	Arm 1	Face to face	8303233	General practice	Adult and Elderly	Mean: NR	Female: 4684918 (56.4)	NR
Wabe, 2022[124]	Arm 2	Telehealth	5304983	General practice	Adult and Elderly	Mean: NR	Female: 3324348 (62.7)	NR
Watson, 2021[125]	Arm 1	Pre-telephone clinic (face to face)	814	Cancer patients	Adult and Elderly	Mean: 62.52	NR	NR
Watson, 2021[125]	Arm 2	Post-introduction (telephone)	910	Cancer patients	Adult and Elderly	Mean: 62.77	NR	NR
Winkleman, 2020[126]	Full group	Pediatric Urology patients scheduled for telehealth visit	116	Pediatric Urology	Children (<18)	Median: 5 Range: 1.6-11	Male: 0.621	White, Black, Hispanic/Latino, Asian, American Indian/Alaskan Native
Wu, 2021[127]	Full group	Overall	66	Patients undergoing cancer treatment	Adults (18-65)	Mean: NR Median: NR Range: NR	Male: 34 (52)	White British: 61 (92), Asian: 1 (2), Black: 2 (3), Other White: 2 (3)

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Ye, 2022[128]	Arm 1	In-person	20745	High blood pressure	Adult and Elderly	Mean: 66.7	Female: 10256 (49.4)	White, Black, Asian, Pacific Islander, Other, Hispanic
Ye, 2022[128]	Arm 2	1 telemedicine visit	6878	High blood pressure	Adult and Elderly	Mean: 65.7	Female: 3553 (51.7)	White, Black, Asian, Pacific Islander, Other, Hispanic
Ye, 2022[128]	Arm 3	2 or more telemedicine visits	5104	High blood pressure	Adult and Elderly	Mean: 65.4	Female: 3236 (63.4)	White, Black, Asian, Pacific Islander, Other, Hispanic
Ye, 2022[129]	Arm 1	In-person	3810	Orthopedic spine patients	Adults (18-65)	Mean: 55	Female: 2051 (53.8)	White, Black, Asian, Other, Hispanic
Ye, 2022[129]	Arm 2	Telehealth	4387	Orthopedic spine patients	Adults (18-65)	Mean: 55.6	Female: 2505 (57.1)	White, Black, Asian, Other, Hispanic
Zayde, 2021[130]	Full group	Full group	12 dyads	Caregivers and children (general mental health)	Children and adult caregivers	Mean: Caregiver age: 44.17 Child age: 11.08	Female (for children): 3 (25)	White, Black, multi-racial
Zhang, 2021[131]	Full group	Patients scheduled for telehealth outpatient at orthopaedic office	298	Orthopaedics	NR	Mean: 48	Male: 0.41	NR
Zhao, 2021[132]	Arm 1	Individuals with heart failure attending in-person outpatient appointments	39	Heart Failure	NR	Mean: 71	female: 0.256	NR

Author, Year	Arm/ Group	Arm Label	N Patients	Patient Health Concern/Clinical Condition	Target Population	Age	Sex, n (%)	Race/Ethnicity
Zhao, 2021[132]	Arm 2	Individuals with heart failure attending in-person telehealth appointments	43	Heart Failure	NR	Mean: 70.4	female: 0.279	NR
Zhu, 2021[133]	Arm 1	2019 cohort (face to face)	1443	Rheumatology patients	Adults (18-65)	Median: 55	Female: 902 (70.1)	NR
Zhu, 2021[133]	Arm 2	2020 cohort (telehealth)	1597	Rheumatology patients	Adults (18-65)	Median: 54	Female: 1042 (69.8)	NR
Zimmerman, 2021[134]	Arm 1	In-person	207	General	Adults (18-65)	Mean: 38.16	Male: 62 (30)	White, Black, Asian, Other, Hispanic
Zimmerman, 2021[134]	Arm 2	Telehealth	207	General	Adults (18-65)	Mean: 35.88	Male: 55 (26.6)	White, Black, Asian, Other, Hispanic

ED=emergency department; ENT= ear, nose, and throat; F2F=face to face; N=sample size; NR=not reported; RIC=referred to clinic

Table D.4. Provider characteristics of studies investigating benefits and harms of telehealth during COVID-19 (Key Question 2)

Author, Year	N Providers	Healthcare System	Specialty/Clinical Focus
Aazh, 2021[12]	NR	NR	NR
Afonso Noguueria, 2021[13]	1	Representative of a single large facility or organization	Heart failure clinic in hospital
Aiken, 2021[14]	3	NR	Abortion providers
Akama-Garren, 2021[15]	NR	NR	NR
Akerly, 2021[16]	NR	NR	NR
Albornoz-Cabello, 2021[17]	NR	NR	NR
Albornoz-Cabello, 2021[17]	NR	NR	NR
Alvarez, 2020[18]	1	Representative of a single large facility or organization	NR
Arias, 2022[19]	1	Representative of a single large facility or organization	Postpartum care
Barequet, 2021[20]	1	Limited study of less than above	Primary care (wide, full-range care)
Baughman, 2021[21]	1	Large/Regionally representative	Primary care (wide, full-range care)
Bogin, 2022[22]	14	Limited study of less than above	Primary care (wide, full-range care)
Boles, 2022[23]	1	Representative of a single large facility or organization	Surgical
Borgen, 2021[24]	NR	NR	Home-care services
Boscari, 2021[25]	NR	NR	NR
Boshara, 2022[26]	1	Large/Regionally representative	HIV
Cancer, 2021[27]	3	Representative of a single large facility or organization	Rehab/PT/OT/etc.
Candel, 2020[28]	NR	NR	NR
Capozza, 2020[29]	NR	NR	NR
Carlberg, 2020[30]	1	Limited study of less than above	Tertiary care, Level I trauma center
Casariego-Vales, 2021[31]	3 hospitals, 84 clinics	Regional healthcare network	At home monitoring
Chang, 2021[32]	NR	NR	NR
Chesnel, 2021[33]	1	Representative of a single large facility or organization	Neurology department
Cobo-Calbo, 2022[34]	1	Limited study of less than above	MS/Autoimmune disorder center
Compton, 2020[35]	1	NR	Adult cystic fibrosis clinic
Corden, 2020[36]	NR	NR	NR
Crawford, 2021[37]	NR	NR	NR
Cunningham, 2022[38]	6	Representative of a single large facility or organization	Rehab/PT/OT/etc.

Author, Year	N Providers	Healthcare System	Specialty/Clinical Focus
Cvietusa, 2022[39]	1	Large/Regionally representative	Primary care (wide, full-range care)
D'Anna, 2021[40]	1	Representative of a single large facility or organization	Primary care (wide, full-range care)
Darr, 2020[41]	NR	NR	Paediatric otolaryngology outpatient services
Das, 2021[42]	NR	NR	NR
De Marchi, 2021[43]	1	NR	ALS center
Duryea, 2021[44]	1	NR	Antenatal and postpartum care clinic
Etherton, 2021[45]	1	Telestroke hospital network	Telestroke hospital network
Ferry, 2021[46]	NR	NR	NR
Fortier, 2022[47]	1	Large/Regionally representative	Mental health
Francis, 2021[48]	NR	NR	General hospital
Fredwall, 2021[49]	1	NR	Epilepsy clinic
Gaetani, 2021[50]	1	NR	Hereditary hemorrhagic telangiectasia center
Garmendia, 2021[51]	NR	NR	Sleep unit
Grandizio, 2022[52]	1	Limited study of less than above	Surgical
Gross, 2020[53]	NR	NR	NR
Hameed, 2021[54]	NR	NR	NR
Hamner, 2021[55]	1	Representative of a single large facility or organization	Mental health
Hatef, 2022[4]	1	Nationally representative	Not reported
Helmes, 2022[56]	1	Limited study of less than above	Dental surgery
Hernando-Garijo, 2021[57]	NR	NR	NR
Hernando-Garijo, 2021[57]	NR	NR	NR
Hughes, 2021[58]	NR	NR	NR
Hutchings, 2021[59]	NR	NR	NR
Irarrazaval, 2021[60]	1	Representative of a single large facility or organization	Surgical
Jaenisch, 2020[61]	NR	NR	NR
Jansen, 2020[62]	NR	NR	NR
Kablinger, 2022[63]	1	Limited study of less than above	Mental health
Kazi, 2021[64]	1	Large/Regionally representative	Dermatology
Kerestes, 2021[65]	NR	NR	Family planning clinic

Author, Year	N Providers	Healthcare System	Specialty/Clinical Focus
Khosla, 2022[66]	1	Limited study of less than above	Primary care (wide, full-range care)
Kim, 2021[67]	NR	NR	NR
Klain, 2021[68]	1	NR	Radiometabolic Unit
Kolb, 2021[69]	NR	NR	NR
Korycinski, 2022[70]	1	Limited study of less than above	Primary care (wide, full-range care)
Kronenberger, 2021[71]	NR	NR	NR
Levinson, 2021[72]	1	Limited study of less than above	Eating disorder
Li, 2021[73]	NR	NR	NR
Li, 2021[74]	NR	NR	Eye hospital
Lightsey, 2021[75]	NR	NR	NR
Lindhagen, 2022[76]	1	Representative of a single large facility or organization	Gastroenterology department
Liu, 2021[77]	NR	NR	NR
Loftus, 2022[78]	3	Limited study of less than above	Multidisciplinary clinics
Longobardi, 2021[79]	NR	NR	Otolaryngology Clinic
Mair, 2021[80]	1	NR	Rheumatoloty clinic
Malliaras, 2020[81]	NR	NR	Recruited from community
Margolius, 2021[82]	NR	NR	NR
Martin, 2021[83]	NR	NR	NR
Martinez-Garcia, 2020[84]	NR	NR	NR
McCoy, 2022[85]	1	Representative of a single large facility or organization	Otolaryngology
McLachlan, 2021[86]	NR	NR	NR
McNamara, 2021[87]	9	Representative of a single large facility or organization	Pharmacy visit
Mehtani, 2021[88]	NR	NR	Pharmacy
Miller, 2021[89]	NR	NR	NR
Minsky, 2021[90]	1	NR	Weight management clinic
Offiah, 2022[91]	41	Large/Regionally representative	General cardiology clinics in hospital
Okeefe, 2021[92]	NR	NR	NR
Onishi, 2021[93]	1	NR	Diabetes clinic
Ostberg, 2022[94]	2	Not reported	Primary care (wide, full-range care)

Author, Year	N Providers	Healthcare System	Specialty/Clinical Focus
Parise, 2021[95]	3	Representative of a single large facility or organization	Diabetes care center
Phillips, 2021[96]	1	NR	Primary care run respiratory assessment center
Pinsker, 2021[97]	NR	NR	Diabetic center
Postorino, 2020[98]	NR	NR	Onco-Haematology
Rachmeil, 2020[99]	NR	NR	NR
Ragheb, 2021[100]	1	Representative of a single large facility or organization	Obstetric anesthesia
Reddy, 2021[101]	1	Limited study of less than above	Cancer care
Reider-Demer, 2022[102]	1	Representative of a single large facility or organization	Neurology clinic
Reynolds-Wright, 2021[103]	NR	NR	NR
Ripp, 2022[104]	1	Representative of a single large facility or organization	Mental health
Rizzoli, 2021[105]	NR	NR	NR
Rohan, 2021[106]	NR	NR	NR
Rowe, 2021[107]	1	NR	Cardiology clinic
Russo, 2021[108]	NR	NR	NR
Rysinka, 2021[109]	32	Regional healthcare network	Primary care clinic
Sawka, 2021[110]	NR	NR	NR
Schafer, 2022[111]	1	Representative of a single large facility or organization	Surgical
Schweiberger, 2020[112]	15	Large/Regionally representative	Primary care (wide, full-range care)
Seghezzo, 2021[113]	NR	NR	NR
Sevilis, 2022[114]	171	Nationally representative	Stroke care
Shabto, 2020[115]	1	NR	Virtual COVID-19 outpatient clinic
Sharma, 2020[116]	1	NR	Pediatric ENT
Sharma, 2020[117]	NR	NR	NR
Smith, 2021[118]	5	Large/Regionally representative	Virtual urgent care
Tailby, 2021[119]	NR	NR	NR
Tarn, 2021[120]	NR	NR	NR
Taxonera, 2020[121]	1	NR	Irritable Bowel Disease unit
Tchang, 2022[122]	1	Limited study of less than above	Wellness/Health education
Uppal, 2022[123]	1	Representative of a single large facility or organization	Surgical

Author, Year	N Providers	Healthcare System	Specialty/Clinical Focus
Wabe, 2022[124]	5	Large/Regionally representative	Primary care (wide, full-range care)
Watson, 2021[125]	1	Representative of a single large facility or organization	Cancer care
Winkleman, 2020[126]		NR	NR
Wu, 2021[127]	NR	NR	Hospital
Ye, 2022[128]	1	Representative of a single large facility or organization	Primary care (wide, full-range care)
Ye, 2022[129]	1	Representative of a single large facility or organization	Surgical
Zayde, 2021[130]	1	Limited study of less than above	Mental health
Zhang, 2021[131]	NR	NR	Orthopedic surgery department
Zhao, 2021[132]	1	Representative of a single large facility or organization	Multidisciplinary clinic in hospital
Zhu, 2021[133]	1	Representative of a single large facility or organization	Rheumatology
Zimmerman, 2021[134]	1	Representative of a single large facility or organization	Hospital

N=sample size; NR=not reported

Table D.5.1. Healthcare utilization (emergency department visits) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Hatef, 2022[4]	1c	Arm 1	First encounter in-person	Acute ambulatory care, ED followup	full group	14 days	493716	NR (NR)	NR	Ref	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.
Hatef, 2022[4]	1c	Arm 2	First encounter telemedicine	Acute ambulatory care, ED followup	full group	14 days	113857	NR (NR)	NR	Ref: Arm 1 Odds ratio: 1.11 (95% CI: 1.06 to 1.16), p=NR	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.
Hatef, 2022[4]	1c	Arm 1	First encounter in-person	Chronic ambulatory care, ED followup	full group	14 days	410743	NR (NR)	NR	Ref	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Hatef, 2022[4]	1c	Arm 2	First encounter telemedicine	Chronic ambulatory care, ED followup	full group	14 days	94481	NR (NR)	NR	Ref: Arm 1 Odds ratio: 0.96 (95% CI: 0.92 to 1.01), p=NR	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.
Phillips, 2021[96]	1c	Arm 1	Individuals presenting to initial in-person visit at respiratory assessment center	ED Visit	full group	14 Days	741	Events: 29 (3.9)	NR	Ref	No
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	ED Visit	full group	14 Days	564	Events: 28 (5)	NR	Ref: Arm 1 Chi Squared: NR, p=0.357	No
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	ED Visit	Age	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1 (95% CI: 0.99 to 1.02), p=NR	initial type of visit, age, gender and the number of comorbidities

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	ED Visit	Age	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.04 (95% CI: 1.01 to 1.06), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	ED Visit	Gender	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.61 (95% CI: 0.33 to 1.13), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	ED Visit	Comorbidities	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.09 (95% CI: 0.89 to 1.33), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	ED Visit	Initial Visit Type	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.24 (95% CI: 0.73 to 2.11), p=NR	initial type of visit, age, gender and the number of comorbidities

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Borgen, 2021[24]	2a	Arm 1	Individuals with new COVID-19 not receiving telehealth care manaagement discharged from the hospital	Hospital re-encounters (ED or Observation Unit)	full group	30 days	593	167 (28.2)	NR	Ref	No
Borgen, 2021[24]	2a	Arm 2	Individuals with new COVID-19 receiving telehealth care management	Hospital re-encounters (ED or Observation Unit)	full group	30 days	192	24 (12.5)	NR	Ref: Arm 1 Chi-squared test of independence: 19.3, p≤0.001	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	ED Follow-up within study period	Group B (Higher Risk, Unable to use App)	68 days	484	Events: 176 (36.4)	NR	REF	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	ED Follow-up within study period	Group C (Lower Risk, Symptomatic)	68 days	198	Events: 31 (15.6)	NR	Ref: Group B Assumed Chi-Squared: NR, p≤.0001	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	ED Follow-up within study period	Group D (Lower Risk, Asymptomatic)	68 days	263	Events: 16 (6.1)	NR	Ref: Group B Assumed Chi-Squared: NR, p≤.0001	No
Casariego-Vales, 2021[31]	2a	Arm 1	Primary Care Monitoring	ED Follow-up within study period	full group	68 days	3197	Events: 227 (7.1)	NR	REF	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	ED Follow-up within study period	full group	68 days	1187	Events: 307 (25.9)	NR	Ref: Arm 1 Assumed t-test/man whitney: NR, p≤.0001	No
Korycinski, 2022[70]	2a	Arm 1	Control	ED visit	full group	30 days	154	24 (15.6)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	ED visit	full group	30 days	139	13 (10.1)	NR	Ref: Arm 1 p-value only: p=0.117	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age <30, ED visit	Age	30 days	NR	4 (16)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age <30, ED visit	Age	30 days	NR	0 (0)	NR	Ref: Arm 1 p-value only: p=0.04	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age 30-39, ED visit	Age	30 days	NR	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 30-39, ED visit	Age	30 days	NR	2 (6.5)	NR	Ref: Arm 1 p-value only: p=0.514	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Korycinski, 2022[70]	2a	Arm 1	Control	Age 40-49, ED visit	Age	30 days	NR	9 (20.5)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 40-49, ED visit	Age	30 days	NR	4 (12.1)	NR	Ref: Arm 1 p-value only: p=0.376	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age 50-59, ED visit	Age	30 days	NR	3 (9.1)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 50-59, ED visit	Age	30 days	NR	2 (14.3)	NR	Ref: Arm 1 p-value only: p=0.627	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age 60-69, ED visit	Age	30 days	NR	6 (23.1)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 60-69, ED visit	Age	30 days	NR	1 (5.3)	NR	Ref: Arm 1 p-value only: p=0.211	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age 70-79, ED visit	Age	30 days	NR	2 (40)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 70-79, ED visit	Age	30 days	NR	1 (25)	NR	Ref: Arm 1 p-value only: p=1	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age >80, ED visit	Age	30 days	NR	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age >80, ED visit	Age	30 days	NR	3 (33.3)	NR	Ref: Arm 1 p-value only: p=1	No
Korycinski, 2022[70]	2a	Arm 1	Control	White, ED visit	Race	30 days	128	21 (16.4)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	White, ED visit	Race	30 days	105	12 (11.4)	NR	Ref: Arm 1 p-value only: p=0.346	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Korycinski, 2022[70]	2a	Arm 1	Control	Black, ED visit	Race	30 days	17	1 (5.9)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Black, ED visit	Race	30 days	21	1 (4.8)	NR	Ref: Arm 1 p-value only: p=1	No
Korycinski, 2022[70]	2a	Arm 1	Control	Other, ED visit	Race	30 days	9	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Other, ED visit	Race	30 days	13	0 (0)	NR	Ref: Arm 1 p-value only: p=NA	No
Korycinski, 2022[70]	2a	Arm 1	Control	Hispanic, ED visit	Race	30 days	2	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Hispanic, ED visit	Race	30 days	5	0 (0)	NR	Ref: Arm 1 p-value only: p=NA	No
Korycinski, 2022[70]	2a	Arm 1	Control	Non-Hispanic, ED visit	Race	30 days	144	24 (15.6)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Non-Hispanic, ED visit	Race	30 days	128	13 (9.5)	NR	Ref: Arm 1 p-value only: p=0.276	No
Korycinski, 2022[70]	2a	Arm 1	Control	Sex: Male, ED visit	Gender	30 days	71	11 (15.5)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Sex: Male, ED visit	Gender	30 days	59	3 (5.1)	NR	Ref: Arm 1 p-value only: p=0.086	No
Korycinski, 2022[70]	2a	Arm 1	Control	Sex: Female, ED visit	Gender	30 days	83	13 (15.7)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Sex: Female, ED visit	Gender	30 days	82	10 (12.5)	NR	Ref: Arm 1 p-value only: p=0.655	No
Korycinski, 2022[70]	2a	Arm 1	Control	Smoking, ED visit	Comorbidity	30 days	NR	1 (8.3)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Smoking, ED visit	Comorbidity	30 days	NR	0 (0)	NR	Ref: Arm 1 p-value only: p=0.48	No
Korycinski, 2022[70]	2a	Arm 1	Control	Non-smoking, ED visit	Comorbidity	30 days	NR	22 (17.5)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Non-smoking, ED visit	Comorbidity	30 days	NR	13 (12)	NR	Ref: Arm 1 p-value only: p=0.274	No
Korycinski, 2022[70]	2a	Arm 1	Control	Underweight, ED visit	Comorbidity	30 days	NR	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Underweight, ED visit	Comorbidity	30 days	NR	0 (0)	NR	Ref: Arm 1 p-value only: p=NA	No
Korycinski, 2022[70]	2a	Arm 1	Control	Normal weight, ED visit	Comorbidity	30 days	NR	3 (10)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Normal weight, ED visit	Comorbidity	30 days	NR	4 (19)	NR	Ref: Arm 1 p-value only: p=0.427	No
Korycinski, 2022[70]	2a	Arm 1	Control	Overweight, ED visit	Comorbidity	30 days	NR	7 (25.9)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Overweight, ED visit	Comorbidity	30 days	NR	4 (10)	NR	Ref: Arm 1 p-value only: p=0.103	No
Korycinski, 2022[70]	2a	Arm 1	Control	Obese, ED visit	Comorbidity	30 days	NR	14 (16.7)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Obese, ED visit	Comorbidity	30 days	NR	5 (7.9)	NR	Ref: Arm 1 p-value only: p=0.141	No
Kerestes, 2021[65]	2b	Arm 1	In person	Complication: ER Visit	full group	252 days	94	2 (2.1)	NR	NR	No
Kerestes, 2021[65]	2b	Arm 2	Telemedicine + med pick up	Complication: ER Visit	full group	253 days	124	5 (4)	NR	NR	No
Kerestes, 2021[65]	2b	Arm 2	Telemedicine + Mailed Medicine	Complication: ER Visit	full group	254 days	69	4 (5.8)	NR	NR	No
Afonso Noguueria, 2021[13]	2c	Arm 1	Individuals with Heart Failure attending outpatient cardiology appointments	ED Visits for Heart Failure	full group	497 days	160	214 (NR)	NR	Ref	No
Afonso Noguueria, 2021[13]	2c	Arm 2	Individuals with Heart Failure attending outpatient cardiology appointments (Pre-COVID)	ED Visits for Heart Failure	full group	70 days	43	52 (NR)	NR	Ref: Arm 1 Chi Squared: NR, p=0.27	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Cvietusa, 2022[39]	2c	Arm 1	No asthma care	ED/urgent care visit	full group	NR	Baseline: NR Followup: 2977	Continuous data Baseline: NR Followup: Mean: 0 (SE 0)	NR	Ref	Age, sex, race, baseline value of outcome, person-year, overdispersion
Cvietusa, 2022[39]	2c	Arm 2	In-person only	ED/urgent care visit	full group	NR	Baseline: NR Followup: 1792	Continuous data Baseline: NR Followup: Mean: 0.048 (SE 0.012)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	Age, sex, race, baseline value of outcome, person-year, overdispersion
Cvietusa, 2022[39]	2c	Arm 3	Mixed (in-person and virtual)	ED/urgent care visit	full group	NR	Baseline: NR Followup: 1084	Continuous data Baseline: NR Followup: Mean: 0.137 (SE 0.033)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	Age, sex, race, baseline value of outcome, person-year, overdispersion
Cvietusa, 2022[39]	2c	Arm 4	Virtual care only	ED/urgent care visit	full group	NR	Baseline: NR Followup: 1952	Continuous data Baseline: NR Followup: Mean: 0 (SE 0)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	Age, sex, race, baseline value of outcome, person-year, overdispersion
Gaetani, 2021[50]	2c	Arm 1	Pre-COVID: Individuals with Hereditary Hemorrhagic Telangectasia	Emergency Room Visit or Hospitalization	full group	244 Days	45	11 (24.4)	NR	REF	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Gaetani, 2021[50]	2c	Arm 2	Post-COVID: Individuals with Hereditary Hemorrhagic Telangectasia (receiving telehealth)	Emergency Room Visit or Hospitalization	full group	244 Days	45	9 (20)	NR	Ref: Arm 1 % change from baseline: -0.044, p=not significant	No
Reddy, 2021[101]	2c	Arm 1	Before virtual care (in-person)	Emergency center visit	full group	4 weeks before transition	763	24 (3.1)	NR	Ref	No
Reddy, 2021[101]	2c	Arm 2	Transition to virtual care	Emergency center visit	full group	1 week during transition	168	2 (1.2)	NR	Ref: Arm 1 p-value only: p=0.0031	No
Reddy, 2021[101]	2c	Arm 3	After transition to virtual care	Emergency center visit	full group	4 weeks after transition	813	7 (0.9)	NR	Ref: Arm 1 p-value only: p=0.0031	No
Watson, 2021[125]	2c	Arm 1	Pre-telephone clinic (face to face)	Presentations (excluding hospitalization) within 24-hours	full group	24 hours	814	3 (0.37)	NR	Ref	No
Watson, 2021[125]	2c	Arm 2	Post-introduction (telephone)	Presentations (excluding hospitalization) within 24-hours	full group	24 hours	910	4 (0.44)	NR	Ref: Arm 1 p-value only: p=1	No
Watson, 2021[125]	2c	Arm 1	Pre-telephone clinic (face to face)	Presentations (excluding hospitalization) within 7 days	full group	7 days	814	3 (0.37)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Watson, 2021[125]	2c	Arm 2	Post-introduction (telephone)	Presentations (excluding hospitalization) within 7 days	full group	7 days	910	7 (0.77)	NR	Ref: Arm 1 p-value only: p=0.343	No
Irarrazaval, 2021[60]	3	Arm 1	In-person	Emergency department visit	full group	NR	113	7 (6.2)	NR	NR	No
Irarrazaval, 2021[60]	3	Arm 2	Telemedicine	Emergency department visit	full group	NR	106	2 (1.9)	NR	NR	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnancy/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation;
CI=confidence interval; ED=emergency department; N=sample size; NR=not reported; OR=odds ratio; p=p-value; Ref=reference

TableD.5.2. Healthcare utilization (emergency department visits) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Schweiberger, 2020[112]	1b	Arm 1	Outpatient practices with low telemedicine use	Emergency Department visits per 1000 patients per week	full group	22 days	NR	Events: 1 (NR)	NR	Ref: Arm 2, Arm 3 Kruskal-Wallis Test: NR, p=0.02	No
Schweiberger, 2021[135]	1b	Arm 2	Outpatient practices with intermediate telemedicine use	Emergency Department visits per 1000 patients per week	full group	23 days	NR	Events: 2 (NR)	NR	NR	No
Schweiberger, 2022[136]	1b	Arm 3	Outpatient practices with high telemedicine use	Emergency Department visits per 1000 patients per week	full group	24 days	NR	Events: 2 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	ED visit within 72 hours	full group	3 days	18278	Events: 405 (1.8)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Return virtual urgent care visit in 72 hours	full group	3 days	18278	Events: 1521 (6.8)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	ED visit within 72 hours	age 18-29	6 days	18278	Events: 59 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	ED visit within 72 hours	age 30-39	7 days	18278	Events: 105 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	ED visit within 72 hours	age 40-49	8 days	18278	Events: 79 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	ED visit within 72 hours	age 50-59	9 days	18278	Events: 65 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	ED visit within 72 hours	age 60-69	10 days	18278	Events: 56 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Return virtual urgent care visit in 72 hours	age 18-29	3 days	18278	Events: 284 (NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Compariso n	Adjusted
Smith, 2021[118]	1a	Full group	Full group	Return virtual urgent care visit in 72 hours	age 30-39	3 days	18278	Events: 495 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Return virtual urgent care visit in 72 hours	age 40-49	3 days	18278	Events: 347 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Return virtual urgent care visit in 72 hours	age 50-59	4 days	18278	Events: 235 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Return virtual urgent care visit in 72 hours	age 60-69	5 days	18278	Events: 15 (NR)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 1	Patients triaged by Medical students at a respiratory clinic - Cleared	Emergency Room Encounter	full group	214 Days	693	41 (6)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 2	Patients triaged by Medical students at a respiratory clinic - Referred to Clinic (RIC)	Emergency Room Encounter	full group	214 Days	107	12 (11)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 3	Patients triaged by Medical students at a respiratory clinic - Advised to isolate	Emergency Room Encounter	full group	214 Days	478	25 (5)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Compariso n	Adjusted
Akama-Garren, 2021[15]	2a	Arm 4	Patients triaged by Medical students at a respiratory clinic - Referred to ED	Emergency Room Encounter	full group	214 Days	8	0 (0)	NR	NR	No
Compton, 2020[35]	2c	Full group	Full group	Referred to Emergency Department	seen by multidi sciplin ary telehea lth team	38 days	38	1 (NR)	NR	NR	NR
Compton, 2020[35]	2c	Full group	Full group	Referred to Emergency Department	seen by multidi sciplin ary telehea lth team	38 days	38	1 (NR)	NR	NR	NR
Margolius, 2021[82]	2a	Full group	Full group	ED Visit	full group	48 days	10208	287 (0.07)	NR	NR	No
Margolius, 2021[82]	2a	Full group	Full group	ED Visit	Age	NR	NR	NR	NR	Ref: Age (per 10 years) Odds ratio: 1.14 (95% CI: 0.95 to 1.37), p=0.15	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Compariso n	Adjusted
Margolius, 2021[82]	2a	Full group	Full group	ED Visit	Male	NR	NR	NR	NR	Ref: Female Odds ratio: 1.29 (95% CI: 0.72 to 2.22), p=0.42	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status
Margolius, 2021[82]	2a	Full group	Full group	ED Visit	NH White	NR	NR	NR	NR	Ref	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status
Margolius, 2021[82]	2a	Full group	Full group	ED Visit	NH Black	NR	NR	NR	NR	Ref: NH White Odds ratio: 1.03 (95% CI: 0.56 to 1.87), p=0.93	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status
Margolius, 2021[82]	2a	Full group	Full group	ED Visit	Hispan ic	NR	NR	NR	NR	Ref: NH White Odds ratio: 1.57 (95% CI: 0.59 to 4.19), p=0.36	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status
Margolius, 2021[82]	2a	Full group	Full group	ED Visit	Other Race	NR	NR	NR	NR	Ref: NH White Odds ratio: 0.93 (95% CI: 0.28 to 3.14), p=0.9	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Rowe, 2021[107]	2c	Arm 1	Telephone Cardiology Outpatient Visits	ED Follow-up for Cardiac Reason	full group	148 Days	118	25 (21.2)	NR	REF	NR
Rowe, 2021[107]	2c	Arm 2	Video Cardiology Outpatient Visits	ED Follow-up for Cardiac Reason	full group	148 Days	18	3 (16.7)	NR	Ref: Arm 1 Measure of association not mentioned (used, assumed relative risk): NR, p=0.511	Age, Gender, English as First Language, Rural Status, initial appointment status, cardiologist seen
Rowe, 2021[107]	2c	Arm 1	Telephone Cardiology Outpatient Visits	ED Follow-up within study period	full group	148 Days	1118	118 (9.9)	NR	REF	NR
Rowe, 2021[107]	2c	Arm 2	Video Cardiology Outpatient Visits	ED Follow-up within study period	full group	148 Days	327	18 (5.5)	NR	Ref: Arm 1 Measure of association not mentioned (used, assumed relative risk): NR, p=0.165	Age, Gender, English as First Language, Rural Status, initial appointment status, cardiologist seen
Taxonera, 2020[121]	2c	Full group	Full group	Emergency Departement visit for possible IBD complication	full group	28 Days	216	Events: 5 (NR)	NR	NR	No
Zhang, 2021[131]	3	Full group	Full group	Unplanned visit to ED	full group	6 weeks	298	3 (1)	NR	NR	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnancy/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; CI=confidence interval; ED=emergency department; N=sample size; NR=not reported; OR=odds ratio; p=p-value; Ref=reference

Table D.5.3. Healthcare utilization (hospitalization) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	In-person telemedicine	NR	6792	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Virtual telemedicine	NR	10311	NR	NR	Ref: In-Person Visit Odds ratio: 0.78 (95% CI: 0.61 to 1), p=0.049	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	In-person telemedicine	NR	6792	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Virtual telemedicine	NR	10311	NR	NR	Ref: In-Person Visit Odds ratio: 0.72 (95% CI: 0.57 to 0.9), p=0.004	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Age 65-74	NR	NR	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Age 75-84	NR	NR	NR	NR	Ref: Age 65-74 Odds ratio: 1.01 (95% CI: 0.77 to 1.32), p=0.96	age, sex, race, ethnicity, and the weighted CCI

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Age ≥85	NR	NR	NR	NR	Ref: Age 65-74 Odds ratio: 1.37 (95% CI: 0.98 to 1.93), p=0.07	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Age 65-74	NR	NR	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Age 75-84	NR	NR	NR	NR	Ref: Age 65-74 Odds ratio: 1.02 (95% CI: 0.79 to 1.3), p=0.9	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Age ≥85	NR	NR	NR	NR	Ref: Age 65-74 Odds ratio: 1.26 (95% CI: 0.91 to 1.73), p=0.17	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Non-Hispanic	NR	NR	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Hispanic	NR	NR	NR	NR	Ref: Non-hispanic Odds ratio: 1.53 (95% CI: 0.73 to 3.21), p=0.27	age, sex, race, ethnicity, and the weighted CCI

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Unknown Ethnicity	NR	NR	NR	NR	Ref: Non-hispanic Odds ratio: 0.48 (95% CI: 0.06 to 3.81), p=0.49	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	White Race	NR	NR	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Black Race	NR	NR	NR	NR	Ref: White Race Odds ratio: 1.18 (95% CI: 0.91 to 1.54), p=0.21	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Asian Race	NR	NR	NR	NR	Ref: White Race Odds ratio: 1.28 (95% CI: 0.55 to 2.97), p=0.57	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Other Race	NR	NR	NR	NR	Ref: White Race Odds ratio: 1.23 (95% CI: 0.68 to 2.21), p=0.5	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Non-Hispanic	NR	NR	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Hispanic	NR	NR	NR	NR	Ref: Non-hispanic Odds ratio: 1.79 (95% CI: 0.94 to 3.41), p=0.08	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Unknown Ethnicity	NR	NR	NR	NR	Ref: Non-hispanic Odds ratio: 0.42 (95% CI: 0.05 to 3.32), p=0.41	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	White Race	NR	NR	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Black Race	NR	NR	NR	NR	Ref: White Race Odds ratio: 1.01 (95% CI: 0.79 to 1.29), p=0.96	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Asian Race	NR	NR	NR	NR	Ref: White Race Odds ratio: 0.97 (95% CI: 0.42 to 2.25), p=0.95	age, sex, race, ethnicity, and the weighted CCI

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Other Race	NR	NR	NR	NR	Ref: White Race Odds ratio: 1.1 (95% CI: 0.64 to 1.91), p=0.73	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Male	NR	NR	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Female	NR	NR	NR	NR	Ref: Male Odds ratio: 0.88 (95% CI: 0.69 to 1.13), p=0.31	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Male	NR	NR	NR	NR	Ref	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Female	NR	NR	NR	NR	Ref: Male Odds ratio: 0.96 (95% CI: 0.76 to 1.21), p=0.73	age, sex, race, ethnicity, and the weighted CCI
Rysinka, 2021[109]	1a	Full group	Full group	ACSC Hospitalization	Charlson Comorbidity Index	NR	NR	NR	NR	Ref: NR Odds ratio: 1.75 (95% CI: 1.68 to 1.82), p≤.001	age, sex, race, ethnicity, and the weighted CCI

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Rysinka, 2021[109]	1a	Full group	Full group	Any Hospitalization	Charlson Comorbidity Index	NR	NR	NR	NR	NR	age, sex, race, ethnicity, and the weighted CCI
Zimmerman, 2021[134]	1a	Arm 1	In-person	Transfer to in-patient care	full group	NR	207	7.038 (3.4)	NR	Ref	No
Zimmerman, 2021[134]	1a	Arm 2	Telehealth	Transfer to in-patient care	full group	NR	207	2.898 (1.4)	NR	Ref: Arm 1 p=NS	No
Hatef, 2022[4]	1c	Arm 1	First encounter in-person	Acute ambulatory care, Hospitalization followup	full group	14 days	493716	NR (NR)	NR	Ref	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.
Hatef, 2022[4]	1c	Arm 2	First encounter telemedicine	Acute ambulatory care, Hospitalization followup	full group	14 days	113857	NR (NR)	NR	Ref: Arm 1 Odds ratio: 1.03 (95% CI: 0.98 to 1.08), p=NR	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Hatef, 2022[4]	1c	Arm 1	First encounter in-person	Chronic ambulatory care, Hospitalization followup	full group	14 days	410743	NR (NR)	NR	Ref	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.
Hatef, 2022[4]	1c	Arm 2	First encounter telemedicine	Chronic ambulatory care, Hospitalization followup	full group	14 days	94481	NR (NR)	NR	Ref: Arm 1 Odds ratio: 0.94 (95% CI: 0.9 to 0.99), p=NR	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	Hospital admission	Age	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.04 (95% CI: 1.01 to 1.06), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	Hospital admission	Comorbidities	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.09 (95% CI: 0.85 to 1.38), p=NR	initial type of visit, age, gender and the number of comorbidities

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	Hospital admission	Gender	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.65 (95% CI: 0.29 to 1.46), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	1c	Arm 1	Individuals presenting to initial in-person visit at respiratory assessment center	Hospital admission	full group	14 Days	741	Events: 21 (2.8)	NR	Ref	No
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	Hospital admission	full group	14 Days	564	Events: 11 (2)	NR	Ref: Arm 1 Chi Squared: NR, p=0.307	No
Phillips, 2021[96]	1c	Arm 2	Individuals presenting to initial telehealth visit at respiratory assessment center	Hospital admission	Initial Visit Type	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.64 (95% CI: 0.31 to 1.35), p=NR	initial type of visit, age, gender and the number of comorbidities
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	ED Follow-up within study period	Group A (Higher Risk, Able to use App)	68 days	242	Events: 84 (34.7)	NR	REF	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	ED Follow-up within study period	Group C (Lower Risk, Symptomatic)	68 days	198	Events: 31 (15.6)	NR	Ref: Group A Assumed Chi-Squared: NR, p≤.0001	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	ED Follow-up within study period	Group D (Lower Risk, Asymptomatic)	68 days	263	Events: 16 (6.1)	NR	Ref: Group A Assumed Chi-Squared: NR, p≤.0001	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization	Group A (Higher Risk, Able to use App)	68 days	242	Events: 45 (18.6)	NR	REF	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization	Group C (Lower Risk, Symptomatic)	68 days	198	Events: 12 (6.1)	NR	Ref: Group A Assumed Chi-Squared: NR, p≤.0001	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization	Group D (Lower Risk, Asymptomatic)	68 days	263	Events: 4 (1.5)	NR	Ref: Group A Assumed Chi-Squared: NR, p≤.0001	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization	Group B (Higher Risk, Unable to use App)	68 days	484	Events: 123 (25.4)	NR	REF	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization	Group C (Lower Risk, Symptomatic)	68 days	198	Events: 12 (6.1)	NR	Ref: Group B Assumed Chi-Squared: NR, p≤.0001	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization	Group D (Lower Risk, Asymptomatic)	68 days	263	Events: 4 (1.5)	NR	Ref: Group B Assumed Chi-Squared: NR, p≤.0001	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization after ED visit	Group A (Higher Risk, Able to use App)	68 days	242	Events: 45 (53.6)	NR	REF	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization after ED visit	Group C (Lower Risk, Symptomatic)	68 days	198	Events: 12 (38.7)	NR	NR	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization after ED visit	Group B (Higher Risk, Unable to use App)	68 days	484	Events: 123 (69.9)	NR	REF	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization after ED visit	Group D (Lower Risk, Asymptomatic)	68 days	263	Events: 4 (25)	NR	NR	No
Casariego-Vales, 2021[31]	2a	Arm 1	Primary Care Monitoring	Hospitalization	full group	68 days	3197	Events: 65 (2)	NR	REF	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization	full group	68 days	1187	Events: 184 (NR)	NR	Ref: Arm 1 Assumed t-test/man whitney: NR, p≤.0001	No
Casariego-Vales, 2021[31]	2a	Arm 1	Primary Care Monitoring	Hospitalization after ED visit	full group	68 days	3197	Events: 65 (28.6)	NR	REF	No
Casariego-Vales, 2021[31]	2a	Arm 2	TELEA Telehealth Monitoring	Hospitalization after ED visit	full group	68 days	1187	Events: 184 (NR)	NR	Ref: Arm 1 Assumed t-test/man whitney: NR, p≤.0001	No
Korycinski, 2022[70]	2a	Arm 1	Control	Hospital admission	full group	30 days	154	10 (6.5)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Hospital admission	full group	30 days	139	6 (4.3)	NR	Ref: Arm 1 Hazard ratio: 0.578 (95% CI: 0.29 to 1.13), p=0.452	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age <30, Hospital admission	Age	30 days	NR	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age <30, Hospital admission	Age	30 days	NR	0 (0)	NR	Ref: Arm 1 p-value only: p=NA	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age 30-39, Hospital admission	Age	30 days	NR	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 30-39, Hospital admission	Age	30 days	NR	1 (3.2)	NR	Ref: Arm 1 p-value only: p=1	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Korycinski, 2022[70]	2a	Arm 1	Control	Age 40-49, Hospital admission	Age	30 days	NR	2 (4.5)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 40-49, Hospital admission	Age	30 days	NR	1 (3)	NR	Ref: Arm 1 p-value only: p=1	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age 50-59, Hospital admission	Age	30 days	NR	1 (3)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 50-59, Hospital admission	Age	30 days	NR	1 (7.1)	NR	Ref: Arm 1 p-value only: p=0.512	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age 60-69, Hospital admission	Age	30 days	NR	6 (23.1)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 60-69, Hospital admission	Age	30 days	NR	0 (0)	NR	Ref: Arm 1 p-value only: p=0.032	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age 70-79, Hospital admission	Age	30 days	NR	1 (20)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age 70-79, Hospital admission	Age	30 days	NR	1 (25)	NR	Ref: Arm 1 p-value only: p=1	No
Korycinski, 2022[70]	2a	Arm 1	Control	Age >80, Hospital admission	Age	30 days	NR	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Age >80, Hospital admission	Age	30 days	NR	2 (22.2)	NR	Ref: Arm 1 p-value only: p=1	No
Korycinski, 2022[70]	2a	Arm 1	Control	White, Hospital admission	Race	30 days	128	8 (6.3)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	White, Hospital admission	Race	30 days	105	6 (5.7)	NR	Ref: Arm 1 p-value only: p=1	No
Korycinski, 2022[70]	2a	Arm 1	Control	Black, Hospital admission	Race	30 days	17	1 (5.9)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Black, Hospital admission	Race	30 days	21	0 (0)	NR	Ref: Arm 1 p-value only: p=0.447	No
Korycinski, 2022[70]	2a	Arm 1	Control	Other, Hospital admission	Race	30 days	9	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Other, Hospital admission	Race	30 days	13	0 (0)	NR	Ref: Arm 1 p-value only: p=NA	No
Korycinski, 2022[70]	2a	Arm 1	Control	Hispanic, Hospital admission	Race	30 days	2	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Hispanic, Hospital admission	Race	30 days	5	0 (0)	NR	Ref: Arm 1 p-value only: p=NA	No
Korycinski, 2022[70]	2a	Arm 1	Control	Non-Hispanic, Hospital admission	Race	30 days	144	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Non-Hispanic, Hospital admission	Race	30 days	128	2 (9.5)	NR	Ref: Arm 1 p-value only: p=0.607	No
Korycinski, 2022[70]	2a	Arm 1	Control	Sex: Male, Hospital admission	Gender	30 days	71	5 (7)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Sex: Male, Hospital admission	Gender	30 days	59	1 (1.7)	NR	Ref: Arm 1 p-value only: p=0.22	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Korycinski, 2022[70]	2a	Arm 1	Control	Sex: Female, Hospital admission	Gender	30 days	83	5 (6)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Sex: Female, Hospital admission	Gender	30 days	82	5 (6.3)	NR	Ref: Arm 1 p-value only: p=1	No
Korycinski, 2022[70]	2a	Arm 1	Control	Smoking, Hospital admission	Comorbidity	30 days	NR	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Smoking, Hospital admission	Comorbidity	30 days	NR	0 (0)	NR	Ref: Arm 1 p-value only: p=NA	No
Korycinski, 2022[70]	2a	Arm 1	Control	Non-smoking, Hospital admission	Comorbidity	30 days	NR	10 (7.9)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Non-smoking, Hospital admission	Comorbidity	30 days	NR	6 (5.6)	NR	Ref: Arm 1 p-value only: p=0.606	No
Korycinski, 2022[70]	2a	Arm 1	Control	Underweight, Hospital admission	Comorbidity	30 days	NR	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Underweight, Hospital admission	Comorbidity	30 days	NR	0 (0)	NR	Ref: Arm 1 p-value only: p=NA	No
Korycinski, 2022[70]	2a	Arm 1	Control	Normal weight, Hospital admission	Comorbidity	30 days	NR	0 (0)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Normal weight, Hospital admission	Comorbidity	30 days	NR	2 (9.5)	NR	Ref: Arm 1 p-value only: p=0.165	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Korycinski, 2022[70]	2a	Arm 1	Control	Overweight, Hospital admission	Comorbidity	30 days	NR	4 (14.8)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Overweight, Hospital admission	Comorbidity	30 days	NR	2 (5)	NR	Ref: Arm 1 p-value only: p=0.211	No
Korycinski, 2022[70]	2a	Arm 1	Control	Obese, Hospital admission	Comorbidity	30 days	NR	6 (7.1)	NR	Ref	No
Korycinski, 2022[70]	2a	Arm 2	Telephone based intervention	Obese, Hospital admission	Comorbidity	30 days	NR	2 (3.2)	NR	Ref: Arm 1 p-value only: p=0.467	No
Arias, 2022[19]	2b	Arm 1	Pre-telehealth implementation	Intensive care nursery		NR	780	102 (13.1)	NR	Ref	No
Arias, 2022[19]	2b	Arm 2	Post-telehealth implementation	Intensive care nursery		NR	799	115 (14.4)	NR	Ref: Arm 1 p-value only: p=0.45	No
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Full Term NICU Admission	full group	183 Days	6559	98 (1.5)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Full Term NICU Admission	full group	183 Days	6048	94 (1.6)	NR	Ref: Arm 1 Relative risk: 1.03 (95% CI: 0.78 to 1.36), p=0.78	BMI at delivery, race

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Full Term NICU Admission	0 audio prenatal visits	183 Days	1981	28 (1.4)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Full Term NICU Admission	1 audio prenatal visits	183 Days	1612	28 (1.7)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Full Term NICU Admission	2 audio prenatal visits	183 Days	1239	23 (1.9)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Full Term NICU Admission	≥3 audio prenatal visits	183 Days	1216	15 (1.2)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.87	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	NICU Admission	0 audio prenatal visits/Live-born infants without major malformations	183 Days	1960	123 (6.3)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	NICU Admission	1 audio prenatal visits/Live-born infants without major malformations	183 Days	1590	82 (5.2)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	NICU Admission	2 audio prenatal visits/Live-born infants without major malformations	183 Days	1227	44 (3.6)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	NICU Admission	≥3 audio prenatal visits/Live-born infants without major malformations	183 Days	1220	47 (5)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.12	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Afonso Noguuer ia, 2021[13]	2c	Arm 1	Individuals with Heart Failure attending outpatient cardiology appointme nts (Pre-COVID)	Hospitalized for Heart Failure	full group	497 days	160	71 (44.4)	NR	Ref	No
Afonso Noguuer ia, 2021[13]	2c	Arm 2	Individuals with Heart Failure attending outpatient cardiology appointme nts (Post COVID)	Hospitalized for Heart Failure	full group	70 days	43	11 (25.6)	NR	Ref: Arm 1 Chi Squared: NR, p=0.83	No
Cvietusa , 2022[39]	2c	Arm 1	No asthma care	Hospitalizati ons	full group	NR	Baseline: NR Followup: 2977	Continuous data Baseline: NR Followup: Mean: 0 (SE 0)	NR	Ref	Age, sex, race, baseline value of outcome, person-year, overdispers ion
Cvietusa , 2022[39]	2c	Arm 2	In-person only	Hospitalizati ons	full group	NR	Baseline: NR Followup: 1792	Continuous data Baseline: NR Followup: Mean: <0.001 (SE 0.062)	NR	Ref: Assuming Arm1 p-value only: p=0.034	Age, sex, race, baseline value of outcome, person-year, overdispers ion

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Cvietusa, 2022[39]	2c	Arm 3	Mixed (in-person and virtual)	Hospitalizations	full group	NR	Baseline: NR Followup: 1084	Continuous data Baseline: NR Followup: Mean: <0.001 (SE 0.291)	NR	Ref: Assuming Arm1 p-value only: p=0.034	Age, sex, race, baseline value of outcome, person-year, overdispersion
Cvietusa, 2022[39]	2c	Arm 4	Virtual care only	Hospitalizations	full group	NR	Baseline: NR Followup: 1952	Continuous data Baseline: NR Followup: Mean: 0 (SE 0)	NR	Ref: Assuming Arm1 p-value only: p=0.034	Age, sex, race, baseline value of outcome, person-year, overdispersion
D'Anna, 2021[40]	2c	Arm 1	In-person (2019)	Admission to hospital for recurrent transient ischaemic attack/stroke	full group	3 months	180	3 (1.67)	NR	Ref	No
D'Anna, 2021[40]	2c	Arm 2	Telephone (2020)	Admission to hospital for recurrent transient ischaemic attack/stroke	full group	3 months	136	2 (1.47)	NR	Ref: Assuming Arm1 p-value only: p=0.445	No
D'Anna, 2021[40]	2c	Arm 1	In-person (2019)	Cardiovascular admission to hospital	full group	3 months	180	2 (1.11)	NR	Ref	No
D'Anna, 2021[40]	2c	Arm 2	Telephone (2020)	Cardiovascular admission to hospital	full group	3 months	136	1 (0.74)	NR	Ref: Assuming Arm1 p-value only: p=0.367	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
D'Anna, 2021[40]	2c	Arm 1	In-person (2019)	Nonvascular admission to hospital	full group	3 months	180	13 (7.22)	NR	Ref	No
D'Anna, 2021[40]	2c	Arm 2	Telephone (2020)	Nonvascular admission to hospital	full group	3 months	136	4 (2.94)	NR	Ref: Assuming Arm1 p-value only: p=0.048	No
Ostberg, 2022[94]	2c	Arm 1	In-person	Admit to in-patient	full group	NR	455	27 (5.9)	NR	Ref	No
Ostberg, 2022[94]	2c	Arm 2	Telehealth (Zoom)	Admit to in-patient	full group	NR	455	29 (6.4)	NR	Ref: Assuming Arm1 p-value only: p=0.054	No
Sevilis, 2022[114]	2c	Arm 1	Pre-COVID	Inpatient thrombolytic s	full group	24 hours	15226	66 (4)	NR	Ref	No
Sevilis, 2022[114]	2c	Arm 2	COVID	Inpatient thrombolytic s	full group	24 hours	11105	70 (5.7)	NR	Ref: Assuming Arm1 p-value only: p=0.033	No
Sharma, 2020[117]	2c	Arm 1	IBD Services before COVID (2019)	Inpatient Contact	"Service Evaluation " - Inpatient	NR	1036	Events: 17 (1.6)	NR	REF	No
Sharma, 2020[117]	2c	Arm 2	IBD Services after COVID (2020)	Inpatient Contact	"Service Evaluation " - Inpatient	NR	334	Events: 3 (0.9)	NR	Ref: Arm 1 % change from baseline: -0.82, p=NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Watson, 2021[125]	2c	Arm 1	Pre-telephone clinic (face to face)	Hospitalization within 24hrs	full group	24 hours	814	18 (2.21)	NR	Ref	No
Watson, 2021[125]	2c	Arm 2	Post-introduction (telephone)	Hospitalization within 24hrs	full group	24 hours	910	22 (2.42)	NR	Ref: Arm 1 p-value only: p=0.531	No
Zhao, 2021[132]	2c	Arm 1	Individuals with heart failure attending in-person outpatient appointments	Hospitalization for Heart Failure	full group	66 days	39	0 (NR)	NR	NR	No
Zhao, 2021[132]	2c	Arm 2	Individuals with heart failure attending in-person telehealth appointments	Hospitalization for Heart Failure	full group	82 days	43	2 (NR)	NR	NR	No
Zhu, 2021[133]	2c	Arm 1	2019 cohort (face to face)	Planned Admission or Procedure	full group	NR	1286	33 (2.6)	NR	Ref	No
Zhu, 2021[133]	2c	Arm 2	2020 cohort (telehealth)	Planned Admission or Procedure	full group	NR	1493	15 (1)	NR	Ref: Arm 1 Odds ratio: 0.38 (95% CI: 0.208 to 0.71), p=0.002	No
Zhu, 2021[133]	2c	Arm 1	2019 cohort (face to face)	Unplanned admission	full group	NR	1286	53 (4.1)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Zhu, 2021[133]	2c	Arm 2	2020 cohort (telehealth)	Unplanned admission	full group	NR	1493	39 (2.6)	NR	Ref: Arm 1 Odds ratio: 0.62 (95% CI: 0.41 to 0.95), p=0.027	No
Zhu, 2021[133]	2c	Arm 1	2019 cohort (face to face)	Unplanned hospital presentation	full group	NR	1286	94 (7.3)	NR	Ref	No
Zhu, 2021[133]	2c	Arm 2	2020 cohort (telehealth)	Unplanned hospital presentation	full group	NR	1493	80 (5.4)	NR	Ref: Arm 1 Odds ratio: 0.72 (95% CI: 0.528 to 0.977), p=0.034	No
Zhu, 2021[133]	2c	Arm 1	2019 cohort (face to face)	Unplanned rheumatolog ical hospital presentation	full group	NR	1286	42 (44.7)	NR	Ref	No
Zhu, 2021[133]	2c	Arm 2	2020 cohort (telehealth)	Unplanned rheumatolog ical hospital presentation	full group	NR	1493	28 (35)	NR	Ref: Arm 1 Odds ratio: 0.67 (95% CI: 0.361 to 1.231), p=0.194	No
Uppal, 2022[123]	3	Arm 1	In-person	Postoperativ e ICU admission	full group	NR	437	2 (0.5)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Postoperativ e ICU admission	full group	NR	98	0 (0)	NR	Ref: Arm 1 p-value only: p=1	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioral; 5=physical rehabilitation; ACSC= ambulatory care sensitive conditions; CCI= Charlson Comorbidity Index; CI=confidence interval; ED=emergency department; N=sample size; NICU=neonatal intensive care unit; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; Ref=reference

Table D.5.4. Healthcare utilization (hospitalization) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Smith, 2021[118]	1a	Full group	Full group	Hospital Admission	full group	3 days	18278	Events: 118 (0.5)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Hospital Admission	age 18-29	11 days	18278	NR	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Hospital Admission	age 30-39	12 days	18278	Events: 14 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Hospital Admission	age 40-49	13 days	18278	Events: 22 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Hospital Admission	age 50-59	14 days	18278	Events: 24 (NR)	NR	NR	No
Smith, 2021[118]	1a	Full group	Full group	Hospital Admission	age 60-69	15 days	18278	Events: 25 (NR)	NR	NR	No
Schweiberger, 2020[112]	1b	Arm 1	Outpatient practices with low telemedicine use	Urgent Care Visits per 1000 patients per week	full group	19 days	NR	Events: 0.4 (NR)	NR	Ref: Arm 2, Arm 3 Kruskal-Wallis Test: NR, p=0.1	No
Schweiberger, 2021[112]	1b	Arm 2	Outpatient practices with intermediate telemedicine use	Urgent Care Visits per 1000 patients per week	full group	20 days	NR	Events: 1 (NR)	NR	NR	No
Schweiberger, 2022[112]	1b	Arm 3	Outpatient practices with high telemedicine use	Urgent Care Visits per 1000 patients per week	full group	21 days	NR	Events: 1 (NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Okeefe, 2021[92]	2a	Arm 1	Patients (Risk Tier 1, Low Risk) diagnosed with COVID-19 assigned to home monitoring program	Hospitalization	full group	NR	237	3 (NR)	NR	Ref	No
Okeefe, 2021[92]	2a	Arm 2	Patients (Risk Tier 2, Intermediate Risk)diagnosed with COVID-19 assigned to home monitoring program	Hospitalization	full group	NR	185	15 (NR)	NR	Ref: Arm 1 Hazard ratio: 5.29 (95% CI: 1.53 to 18.32), p=0.009	No
Okeefe, 2021[92]	2a	Arm 3	Patients (Risk Tier 3, High Risk)diagnosed with COVID-19 assigned to home monitoring program	Hospitalization	full group	NR	74	17 (NR)	NR	Ref: Arm 1 Hazard ratio: 16.24 (95% CI: 4.74 to 55.59), p≤.001	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Okeefe, 2021[92]	2a	Arm 1	Patients (Risk Tier 1, Low Risk) diagnosed with COVID-19 assigned to home monitoring program	Hospitalization	full group	NR	237	NR	NR	Ref	Risk Tier, Reported Obesity, Age ≥ 60, Gender
Okeefe, 2021[92]	2a	Arm 2	Patients (Risk Tier 2, Intermediate Risk)diagnosed with COVID-19 assigned to home monitoring program	Hospitalization	full group	NR	185	NR	NR	Ref: Arm 1 Hazard ratio: 3.74 (95% CI: 1.06 to 13.27), p=0.02	Risk Tier, Reported Obesity, Age ≥ 60, Gender
Okeefe, 2021[92]	2a	Arm 3	Patients (Risk Tier 3, High Risk)diagnosed with COVID-19 assigned to home monitoring program	Hospitalization	full group	NR	74	NR	NR	Ref: Arm 1 Hazard ratio: 10.87 (95% CI: 3.09 to 38.27), p≤.001	Risk Tier, Reported Obesity, Age ≥ 60, Gender
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Age 18-29	NR	78	0 (NR)	NR	NR	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Age 30-39	NR	84	3 (NR)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Age 40-49	NR	106	3 (NR)	NR	Ref: Age 30-39 Hazard ratio: 0.71 (95% CI: 0.14 to 3.53), p=0.68	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Age 50-59	NR	115	10 (NR)	NR	Ref: Age 30-39 Hazard ratio: 2.16 (95% CI: 0.59 to 7.85), p=0.24	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Age 60-69	NR	84	16 (NR)	NR	Ref: Age 30-39 Hazard ratio: 4.89 (95% CI: 1.42 to 16.79), p=0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Age ≥ 70	NR	29	3 (NR)	NR	Ref: Age 30-39 Hazard ratio: 2.32 (95% CI: 0.47 to 11.52), p=0.31	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Age ≥ 60	NR	NR	NR	NR	Ref: NR Hazard ratio: 3.77 (95% CI: 1.94 to 7.34), p≤.001	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Age ≥ 60	NR	NR	NR	NR	Ref: NR Hazard ratio: 2.53 (95% CI: 1.27 to 5.02), p=0.005	Risk Tier, Reported Obesity, Age ≥ 60, Gender
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Other Race	NR	147	6 (NR)	NR	Ref	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Black Race	NR	252	18 (NR)	NR	Ref: Other Race Hazard ratio: 1.5 (95% CI: 0.63 to 4.01), p=0.33	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	White Race	NR	97	11 (NR)	NR	Ref: Other Race Hazard ratio: 2.59 (95% CI: 0.96 to 7.01), p=0.06	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Female	NR	330	19 (NR)	NR	Ref	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Male	NR	166	16 (NR)	NR	Ref: Female Hazard ratio: 1.76 (95% CI: 0.91 to 3.43), p=0.1	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Male	NR	NR	NR	NR	Ref: NR Hazard ratio: 1.76 (95% CI: 0.91 to 3.43), p=0.1	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Male	NR	NR	NR	NR	Ref: NR p=0.09	Risk Tier, Reported Obesity, Age ≥ 60, Gender

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Reported Obesity	NR	NR	NR	NR	Ref: NR Hazard ratio: 2.27 (95% CI: 1.17 to 4.41), p=0.02	No
Okeefe, 2021[92]	2a	Full group	Full group	Hospitalization	Reported Obesity	NR	NR	NR	NR	Ref: NR Hazard ratio: 2.09 (95% CI: 4.06 to 4.13), p=0.048	Risk Tier, Reported Obesity, Age ≥ 60, Gender
Akama-Garren, 2021[15]	2a	Arm 1	Patients triaged by Medical students at a respiratory clinic - Cleared	Inpatient Encounter	full group	214 Days	693	26 (4)	NR	Ref: Arm 2, Arm 3, Arm 4 for Inpatient, Outpatient, Emergency, and Missing groups Chi-Squared: NR, p≤.001	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Akama-Garren, 2021[15]	2a	Arm 2	Patients triaged by Medical students at a respiratory clinic - Referred to Clinic (RIC)	Inpatient Encounter	full group	214 Days	107	9 (8)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 3	Patients triaged by Medical students at a respiratory clinic - Advised to isolate	Inpatient Encounter	full group	214 Days	478	12 (3)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 4	Patients triaged by Medical students at a respiratory clinic - Referred to ED	Inpatient Encounter	full group	214 Days	8	2 (25)	NR	NR	No
Margolius, 2021[82]	2a	Full group	Full group	Hospitalization	full group	48 days	10208	44 (0.01)	NR	NR	No
Margolius, 2021[82]	2a	Full group	Full group	Hospitalization	Age	NR	NR	NR	NR	Ref: Age (per 10 years) Odds ratio: 1.09 (95% CI: 0.77 to 1.54), p=0.62	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Margolius, 2021[82]	2a	Full group	Full group	Hospitalization	NH White	NR	NR	NR	NR	Ref	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status
Margolius, 2021[82]	2a	Full group	Full group	Hospitalization	NH Black	NR	NR	NR	NR	Ref: NH White Odds ratio: 0.85 (95% CI: 0.28 to 2.6), p=0.77	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status
Margolius, 2021[82]	2a	Full group	Full group	Hospitalization	Hispanic	NR	NR	NR	NR	Ref: NH White Odds ratio: 1.19 (95% CI: 0.14 to 9.8), p=0.87	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status
Margolius, 2021[82]	2a	Full group	Full group	Hospitalization	Other Race	NR	NR	NR	NR	Ref: NH White Odds ratio: 1.17 (95% CI: 0.14 to 9.67), p=0.88	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Margolius, 2021[82]	2a	Full group	Full group	Hospitalization	Male	NR	NR	NR	NR	Ref: Female Odds ratio: 0.7 (95% CI: 0.22 to 2.25), p=0.55	Age, Sex, Race, Insurance Type, COVID-19 disposition, Smoking Status
Ferry, 2021[46]	2a	Full group	Full group	Admitted to ICU	Full group	NR	223	2 (0.9)	NR	NR	No
Ferry, 2021[46]	2a	Full group	Full group	Admitted to inpatient ward	Full group	NR	223	12 (5.4)	NR	NR	No
Hutchings, 2021[59]	2a	Full group	Full group	Care escalation, ambulance attendance rate	full group	NR	173	5 (3)	NR	NR	No
Hutchings, 2021[59]	2a	Full group	Full group	Care escalation, emergency department attendance rate	full group	NR	173	4 (2.5)	NR	NR	No
Hutchings, 2021[59]	2a	Full group	Full group	Care escalation, hospital admission rate	full group	NR	173	3 (1.9)	NR	NR	No
Francis, 2021[48]	2a	Full group	Full group	Clinical deterioration (hospital admission)	Full group	4 weeks	900	58 (6.44)	NR	NR	No
Kim, 2021[67]	2a	Full group	Full group	Admission to hospital	Referred to ED	91 days	16	6 (37.5)	NR	NR	No
Kim, 2021[67]	2a	Full group	Full group	Referral to Urgent Care/ED	full group	91 days	406	42 (10)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Martinez-Garcia, 2020[84]	2a	Full group	Full group	Readmission to hospital	full group	30 days	304	1 (0.3)	NR	NR	No
Reynolds-Wright, 2021[103]	2b	Full group	Full group	Visit to hospital	full group	99 days	663	16 (2.4)	NR	NR	No
Taxonera, 2020[121]	2c	Full group	Full group	Hospitalization for complicated IBD	full group	28 Days	216	Events: 2 (NR)	NR	NR	No
McLachlan, 2021[86]	2c	Full group	Full group	Hospital Admission	full group	203 Days	50	19 (0.38)	NR	NR	No
McLachlan, 2021[86]	2c	Full group	Full group	Hospital admission: Heart Failure	full group	203 Days	50	4 (8)	NR	NR	No
Shabto, 2020[115]	2c	Full group	Full group	Hospitalized	full group	NR	49	5 (0.102)	NR	NR	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; CI=confidence interval; ED=emergency department; N=sample size; NICU=neonatal intensive care unit; NR=not reported; OR=odds ratio; p=p-value; Ref=reference

Table D.5.5. Healthcare utilization (readmission) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between A Compariso
Borgen, 2021[24]	2a	Arm 1	Individuals with new COVID-19 not receiving telehealth care management discharged from the hospital	Hospital Readmission	Enrolled from inpatient	30 days	593	26 (4.4)	NR	Ref
Borgen, 2021[24]	2a	Arm 2	Individuals with new COVID-19 receiving telehealth care management	Hospital Readmission	Enrolled from inpatient	30 days	114	4 (3.5)	NR	Ref: Arm 1 Chi-squarec test of independen 0.18, p=0.6
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Admitted upon return, within 72 hours, COVID-19 related	full group	72 hours	132	1 (8)	NR	NR
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Admitted upon return, within 72 hours, COVID-19 related	full group	72 hours	153	0 (0)	NR	NR
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Admitted upon return, Within 72 hours, Non-COVID-19 related	full group	72 hours	132	0 (0)	NR	NR

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between A Compariso
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Admitted upon return, Within 72 hours, Non-COVID-19 related	full group	72 hours	153	0 (0)	NR	NR
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Admitted upon return, overall, COVID-19 related	full group	NR (assumed 25 days)	132	2 (1.5)	NR	NR
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Admitted upon return, overall, COVID-19 related	full group	NR (assumed 25 days)	153	1 (7)	NR	NR
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Admitted upon return, overall, Non-COVID-19 related	full group	NR (assumed 25 days)	132	1 (0.8)	NR	NR
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Admitted upon return, overall, Non-COVID-19 related	full group	NR (assumed 25 days)	153	0 (0)	NR	NR
Khosla, 2022[66]	2b	Arm 1	Pre-pandemic	Readmission	full group	6 weeks	215	38 (17.8)	NR	Ref
Khosla, 2022[66]	2b	Arm 2	Post-pandemic	Readmission	full group	6 weeks	258	45 (17.4)	NR	Ref: Arm 1 p-value only p=0.91
Khosla, 2022[66]	2b	Arm 1	Pre-pandemic	Race: Non-hispanic Black, Readmission	Race	6 weeks	171	33 (19.5)	NR	Ref

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between A Compariso
Khosla, 2022[66]	2b	Arm 2	Post-pandemic	Race: Non-hispanic Black, Readmission	Race	6 weeks	190	37 (19.5)	NR	Ref: Arm 1 p-value only p=0.99
Khosla, 2022[66]	2b	Arm 1	Pre-pandemic	Race: Non-hispanic White, Readmission	Race	6 weeks	26	3 (11.5)	NR	Ref
Khosla, 2022[66]	2b	Arm 2	Post-pandemic	Race: Non-hispanic White, Readmission	Race	6 weeks	30	3 (10)	NR	Ref: Arm 1 p-value only p=0.85
Boles, 2022[23]	3	Arm 1	In-person	Readmission	full group	NR	66	0 (0)	NR	NR
Boles, 2022[23]	3	Arm 2	Telemedicine (not specified)	Readmission	full group	NR	23	0 (0)	NR	NR
Irarrazaval, 2021[60]	3	Arm 1	In-person	Elective surgery	full group	NR	113	6 (5.3)	NR	Ref
Irarrazaval, 2021[60]	3	Arm 2	Telemedicine	Elective surgery	full group	NR	106	2 (1.9)	NR	Ref: Assum Arm1 p-value only p=0.32
Irarrazaval, 2021[60]	3	Arm 1	In-person	Urgent/emergency surgery	full group	NR	113	3 (2.7)	NR	Ref
Irarrazaval, 2021[60]	3	Arm 2	Telemedicine	Urgent/emergency surgery	full group	NR	106	4 (3.8)	NR	Ref: Assum Arm1 p-value only p=0.94
Uppal, 2022[123]	3	Arm 1	In-person	Readmission, 90 days	full group	90 days	437	NR (NR)	NR	Ref
Uppal, 2022[123]	3	Arm 2	Telehealth	Readmission, 90 days	full group	90 days	98	NR (NR)	NR	Ref: Arm 1 Odds ratio: 0.89 (95% C 0.43 to 1.7) p=0.77

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnancy/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; CI=confidence interval; N=sample size; NR=not reported; OR=odds ratio; p=p-value; Ref=reference

Table D.5.6. Healthcare utilization (readmission) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Martinez-Garcia, 2020[84]	2a	Full group	Full group	Readmission to hospital	full group	30 days	304	1 (0.3)	NR	NR	No

2a=specialized care, COVID-19; N=sample size; NR=not reported

Table D.6.1. Clinical outcome (mortality) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Aiken, 2021[14]	2b	Arm 1	Individuals receiving medical abortion following in-person visit	Adverse Effect: Death	full group	59 days	22158	0 (0)	NR	Ref	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.
Aiken, 2021[14]	2b	Arm 2	Individuals receiving medical abortion following telemedicine/hybrid visit	Adverse Effect: Death	full group	85 days	29984	0 (0)	NR	Ref: Arm 1 Covariate adjusted test of difference or proportions: NR, p=NR	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.
Arias, 2022[19]	2b	Arm 1	Pre-telehealth implementation	Fetal death	full group	NR	780	11 (1.4)	NR	Ref	No
Arias, 2022[19]	2b	Arm 2	Post-telehealth implementation	Fetal death	full group	NR	799	13 (1.6)	NR	Ref: Arm 1 p-value only: p=0.72	No
Afonso Noguueria, 2021[13]	2c	Arm 1	Individuals with Heart Failure attending outpatient cardiology appointments (Pre-COVID)	Mortality	full group	497 days	160	20 (12.5)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Afonso Noguueria, 2021[13]	2c	Arm 2	Individuals with Heart Failure attending outpatient cardiology appointments (Post COVID)	Mortality	full group	70 days	43	1 (2.3)	NR	Ref: Arm 1 t-test of real vs estimated mortality: NR, p=NR	No
Watson, 2021[125]	2c	Arm 1	Pre-telephone clinic (face to face)	30-day mortality post systemic therapy	full group	30 days	814	7 (0.86)	NR	Ref	No
Watson, 2021[125]	2c	Arm 2	Post-introduction (telephone)	30-day mortality post systemic therapy	full group	30 days	910	0 (0)	NR	Ref: Arm 1 p-value only: p=0.008	No
Zhao, 2021[132]	2c	Arm 1	Individuals with heart failure attending in-person outpatient appointments	Mortality and Major Cardiovascular Event	full group	66 days	39	NR (5.1)	NR	Ref	No
Zhao, 2021[132]	2c	Arm 2	Individuals with heart failure attending in-person telehealth appointments	Mortality and Major Cardiovascular Event	full group	82 days	43	NR (2.33)	NR	Ref: Arm 1 Assumed Chi-squared: NR, p=0.6	No
Irarrazaval, 2021[60]	3	Arm 1	In-person	Mortality	full group	NR	113	0 (0)	NR	NR	No
Irarrazaval, 2021[60]	3	Arm 2	Telemedicine	Mortality	full group	NR	106	0 (0)	NR	NR	No
Uppal, 2022[123]	3	Arm 1	In-person	Death during followup	full group	90 days	437	NR (NR)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Death during followup	full group	90 days	98	NR (NR)	NR	Ref: Arm 1 Odds ratio: 2.26 (95% CI: 0.48 to 7.72), p=0.32	No

2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; N=sample size; NR=not reported; p=p-value; Ref=reference

Table D.6.2. Clinical outcome (mortality) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Akama-Garren, 2021[15]	2a	Arm 2	Patients triaged by Medical students at a respiratory clinic - Referred to Clinic (RIC)	Died	full group	214 Days	107	0 (0)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 4	Patients triaged by Medical students at a respiratory clinic - Referred to ED	Died	full group	214 Days	8	1 (12.5)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 3	Patients triaged by Medical students at a respiratory clinic - Advised to isolate	Died	full group	214 Days	478	2 (0.42)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 1	Patients triaged by Medical students at a respiratory clinic - Cleared	Died	full group	214 Days	693	3 (0.43)	NR	NR	No
Ferry, 2021[46]	2a	Full group	Full group	Mortality	Full group	NR	223	0 (0)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Hutchings, 2021[59]	2a	Full group	Full group	Deaths	Full group	NR	173	0 (0)	NR	NR	No
Shabto, 2020[115]	2a	Full group	Full group	Mortality	full group	NR	49	2 (4.1)	NR	NR	No
Francis, 2021[48]	2a	Full group	Full group	Clinical deterioration (deaths)	Full group	4 weeks	900	18 (2)	NR	NR	No
Smith, 2021[118]	2c	Full group	Full group	Died	full group	50 days	18278	NR	NR	NR	No
De Marchi, 2021[43]	2c	Full group	Full group	Died due to rapid worsening of clinical conditions	Full group	NR	19	1 (5.3)	NR	NR	No
McLachlan, 2021[86]	2c	Full group	Full group	Mortality	full group	203 Days	50	0 (0)	NR	NR	No
Rowe, 2021[107]	2c	Arm 1	Telephone Cardiology Outpatient Visits	Cardiac mortality	full group	148 Days	1118	4 (0.35)	NR	NR	No
Rowe, 2021[107]	2c	Arm 2	Video Cardiology Outpatient Visits	Cardiac mortality	full group	148 Days	327	1 (0.3)	NR	Ref: Arm 1 Measure of association not mentioned (used, assumed relative risk): NR, p=0.759	Age, Gender, English as First Language, Rural Status, initial appointment status, cardiologist seen

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Rowe, 2021[107]	2c	Arm 1	Telephone Cardiology Outpatient Visits	All-cause mortality	full group	148 Days	1118	12 (1.1)	NR	REF	NR
Rowe, 2021[107]	2c	Arm 2	Video Cardiology Outpatient Visits	All-cause mortality	full group	148 Days	327	2 (0.6)	NR	Ref: Arm 1 Measure of association not mentioned (used, assumed relative risk): NR, p=0.806	Age, Gender, English as First Language, Rural Status, initial appointment status, cardiologist seen

2a=specialized care, COVID-19; 2c=specialized care, other; N=sample size; NR=not reported; p=p-value; Ref=reference;

Table D.6.3. Clinical outcome (patient-reported) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Category	Arm	Arm Defini-tion	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Arias, 2022[19]	2b	Arm 1	Pre-telehealth implementation	Postpartum depression screening	Full group	NR	780	368 (65.1)	NR	Ref	Prenatal care provider only
Arias, 2022[19]	2b	Arm 2	Post-telehealth implementation	Postpartum depression screening	Full group	NR	799	571 (86.3)	NR	Ref: Arm 1 Odds ratio: 4.61 (95% CI: 3.38 to 6.28), p=<0.001	Prenatal care provider only
Minsky, 2021[90]	2c	Arm 1	Not using telemedicine	Deterioration in dietary habit score	Full group	NR	228	97 (42.54)	NR	NR	No
Minsky, 2021[90]	2c	Arm 2	Using telemedicine	Deterioration in dietary habit score	Full group	NR	51	17 (33.33)	NR	NR	No
Kablinger, 2022[63]	4	Arm 1	Pre-pandemic	BASE-6	Full group	NR	Baseline: NR Followup: 196	Continuous data Baseline: NR Followup: Mean: 23.91 (NR)	NR	Ref	No
Kablinger, 2022[63]	4	Arm 2	Post-pandemic	BASE-6	Full group	NR	Baseline: NR Followup: 196	Continuous data Baseline: NR Followup: Mean: 21.01 (NR)	NR	Ref: Arm 1 Difference: p=<0.00	No

Author, Year	Category	Arm	Arm Defini-tion	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Kablinger, 2022[63]	4	Arm 1	Pre-pandemic	GAD-7	Full group	NR	Baseline: NR Followup: 199	Continuous data Baseline: NR Followup: Mean: 10.55 (NR)	NR	Ref	No
Kablinger, 2022[63]	4	Arm 2	Post-pandemic	GAD-7	Full group	NR	Baseline: NR Followup: 199	Continuous data Baseline: NR Followup: Mean: 8.39 (NR)	NR	Ref: Arm 1 Difference: p=<0.00	No
Kablinger, 2022[63]	4	Arm 1	Pre-pandemic	PHQ-9	Full group	NR	Baseline: NR Followup: 176	Continuous data Baseline: NR Followup: Mean: 11.88 (NR)	NR	Ref	No
Kablinger, 2022[63]	4	Arm 2	Post-pandemic	PHQ-9	Full group	NR	Baseline: NR Followup: 176	Continuous data Baseline: NR Followup: Mean: 9.7 (NR)	NR	Ref: Arm 1 Difference: p=0.00	No
Levinson, 2021[72]	4	Arm 1	In-person	Eating Disorder Examination Questionnaire v4 (EDE-Q-IV)	Full group	Mean stay: 11.32 weeks Discharge	Baseline: 60 Followup: 60	Continuous data Baseline: Mean: 4.1 (SD 1.07) Followup: Mean: 2.73 (SD 1.24)	NR	Ref	No

Author, Year	Category	Arm	Arm Defini-tion	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Levinson, 2021[72]	4	Arm 2	Telehealth (Zoom)	Eating Disorder Examination Questionnaire v4 (EDE-Q-IV)	Full group	Mean stay: 11.32 weeks Discharge	Baseline: 33 Followup: 33	Continuous data Baseline: Mean: 3.56 (SD 1.42) Followup: Mean: 2.56 (SD 1.14)	NR	Ref: Arm 1 p-value only: p=NS	No
Levinson, 2021[72]	4	Arm 1	In-person	Beck Depression Inventory II (BDI-II)	Full group	Mean stay: 11.32 weeks Discharge	Baseline: 60 Followup: 60	Continuous data Baseline: Mean: 31.2 (SD 11.64) Followup: Mean: 23.37 (SD 14.42)	NR	Ref	No
Levinson, 2021[72]	4	Arm 2	Telehealth (Zoom)	Beck Depression Inventory II (BDI-II)	Full group	Mean stay: 11.32 weeks Discharge	Baseline: 33 Followup: 33	Continuous data Baseline: Mean: 26.16 (SD 12.62) Followup: Mean: 20.13 (SD 11.8)	NR	Ref: Arm 1 p-value only: p=NS	No
Zayde, 2021[130]	4	Full group	Full sample	Patient Health Questionnaire–9 score (before vs after)	Full group	20 Weeks	Baseline: 12 Followup: 12	Continuous data Baseline: Mean: 7.8 (SD 5.96) Followup: Mean: 3.1 (SD 2.02)	Cohen's d: -0.75 (95% CI: -0.62 to 8.78), p=NR	NR	No
Zayde, 2021[130]	4	Full group	Full sample	Generalized Anxiety Disorder Scale–7 score (before vs after)	Full group	20 Weeks	Baseline: 12 Followup: 12	Continuous data Baseline: Mean: 8.2 (SD 5.47) Followup: Mean: 2.8 (SD 1.75)	Cohen's d: -0.94 (95% CI: 2.23 to 8.57), p=NR	NR	No

2b=specialized care, pregnancy/prenatal/obstetrics and gynecology; 2c=specialized care, other; 4=behavioral or mental health; BASE-6= Brief adjustment scale-6; BDI-II= Beck Depression Inventory II; CI=confidence interval; EDE-Q-IV= Eating Disorder Examination Questionnaire version 4; GAD-7= Generalized anxiety disorder-7; N=sample size; NR=not reported**;** NS=non-significant; p=p-value; PHQ-9= The patient health questionnaire -9; Ref=reference; SD=standard deviation

Table D.6.4. Clinical outcome (patient-reported) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Malliaras, 2020[81]	1a	Arm 1	Advice only	Pain and function, Shoulder Pain and Disability Index (SPADI)	Full group	12 weeks	Baseline: 12 Followup: 11	Score Baseline Mean: 30.6 (SD 17.7) Followup Mean: 26.6 (SD 22.3)	Mean change from baseline: -4.8 (95% CI: -20.3 to 10.8), p=NR	NR	No
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Pain and function, Shoulder Pain and Disability Index (SPADI)	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Mean: 37.3 (SD 16.7) Followup Mean: 21.7 (SD 17.8)	Mean change from baseline: -16 (95% CI: -26 to -6), p=NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Pain and function, Shoulder Pain and Disability Index (SPADI)	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Mean: 41.8 (SD 19.1) Followup Mean: 12.9 (SD 6.9)	Mean change from baseline: -28.9 (95% CI: -40.9 to -28.7), p=NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Malliaras, 2020[81]	1a	Arm 1	Advice only	Worst pain in the last 7 days, VAS	Full group	12 weeks	Baseline: 12 Followup: 11	Score Baseline Mean: 56.8 (SD 17.9) Followup Mean: 41.8 (SD 23.1)	Mean change from baseline: -15.8 (95% CI: -33.1 to 1.5), p=NR	NR	No
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Worst pain in the last 7 days, VAS	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Mean: 51.6 (SD 22.4) Followup Mean: 44.8 (SD 28.1)	Mean change from baseline: -3.2 (95% CI: -19.7 to 13.4), p=NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Worst pain in the last 7 days, VAS	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Mean: 59.7 (SD 21.1) Followup Mean: 28.1 (SD 25.6)	Mean change from baseline: -31.6 (95% CI: -49.89 to -13.28), p=NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Malliaras, 2020[81]	1a	Arm 1	Advice only	Pain Self-Efficacy Questionnaire (PSEQ)	Full group	12 weeks	Baseline: 12 Followup: 11	Score Baseline Mean: 50.4 (SD 9.4) Followup Mean: 50.5 (SD 7.9)	Mean change from baseline: 1.3 (95% CI: -4.1 to 6.7), p=NR	NR	No
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Pain Self-Efficacy Questionnaire (PSEQ)	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Mean: 50.1 (SD 9.3) Followup Mean: 54.8 (SD 6.5)	Mean change from baseline: 4.2 (95% CI: -1.6 to 9.9), p=NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Pain Self-Efficacy Questionnaire (PSEQ)	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Mean: 52.3 (SD 6.9) Followup Mean: 55.6 (SD 5.8)	Mean change from baseline: 3.3 (95% CI: 1 to 5.6), p=NR	NR	No
Malliaras, 2020[81]	1a	Arm 1	Advice only	RCRSP knowledge	Full group	12 weeks	Baseline: 12 Followup: 11	Score Baseline Median: 6 (IQR NR) Followup Mean: 8.4 (IQR NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Malliaras, 2020[81]	1a	Arm 2	Recommended care	RCRSP knowledge	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Median: 8.7 (IQR NR) Followup Mean: 13.6 (IQR NR)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	RCRSP knowledge	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Median: 6.7 (IQR NR) Followup Mean: 14.4 (IQR NR)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 1	Advice only	Pain catastrophizing, PCS	Full group	12 weeks	Baseline: 12 Followup: 11	Score Baseline Mean: 7.3 (SD 9.2) Followup Mean: 5.1 (95% CI: 0.5 to 9.7)	Mean change from baseline: -3.4 (95% CI: -7.3 to 0.5), p=NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Pain catastrophizing, PCS	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Mean: 4.6 (SD 5.8) Followup Mean: 2.7 (95% CI: 1.1 to 4.2)	Mean change from baseline: -2 (95% CI: -4.6 to 0.6), p=NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Pain catastrophizing, PCS	Full group	12 weeks	Baseline: 12 Followup: 12	Score Baseline Mean: 4.8 (SD 4.1) Followup Mean: 4 (95% CI: 1 to 7)	Mean change from baseline: -0.8 (95% CI: -3.3 to 1.6), p=NR	NR	No
Rizzoli, 2021[105]	1a	Full group	Full group	Headache Impact Test (HIT-6)	Full group	6 months	Baseline: 14 Followup: 14	Score Baseline Mean: 66.2 (SD 5.3) Followup Mean: 60 (SD 7.6)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Mobility, no problems	Full group	Before prehabilitation program	66	44 (NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Mobility, no problems	Full group	Post prehabilitation program	66	53 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Usual activities, no problems	Full group	Before prehabilitation program	66	52 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Usual activities, no problems	Full group	Post prehabilitation program	66	58 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Self care, no problems	Full group	Before prehabilitation program	66	60 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Self care, no problems	Full group	Post prehabilitation program	66	62 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Pain/Discomfort, no problems	Full group	Before prehabilitation program	66	31 (NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Pain/Discomfort, no problems	Full group	Post prehabilitation program	66	40 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Anxiety/Depression, no problems	Full group	Before prehabilitation program	66	35 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Anxiety/Depression, no problems	Full group	Post prehabilitation program	66	36 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Mobility, some problems	Full group	Before prehabilitation program	66	22 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Mobility, some problems	Full group	Post prehabilitation program	66	13 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Mobility, extreme problems	Full group	Before prehabilitation program	66	0 (NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Mobility, extreme problems	Full group	Post prehabilitation program	66	0 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Usual activities, some problems	Full group	Before prehabilitation program	66	13 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Usual activities, some problems	Full group	Post prehabilitation program	66	8 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Usual activities, extreme problems	Full group	Before prehabilitation program	66	1 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Usual activities, extreme problems	Full group	Post prehabilitation program	66	0 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Self care, some problems	Full group	Before prehabilitation program	66	5 (NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Self care, some problems	Full group	Post prehabilitation program	66	4 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Self care, extreme problems	Full group	Before prehabilitation program	66	1 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Self care, extreme problems	Full group	Post prehabilitation program	66	0 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Pain/Discomfort, some problems	Full group	Before prehabilitation program	66	33 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Pain/Discomfort, some problems	Full group	Post prehabilitation program	66	24 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Pain/Discomfort, extreme problems	Full group	Before prehabilitation program	66	2 (NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Pain/Discomfort, extreme problems	Full group	Post prehabilitation program	66	2 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Anxiety/Depression, some problems	Full group	Before prehabilitation program	66	29 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Anxiety/Depression, some problems	Full group	Post prehabilitation program	66	26 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 1	Before telehealth-delivered home-based prehab	Anxiety/Depression, extreme problems	Full group	Before prehabilitation program	66	2 (NR)	NR	NR	No
Wu, 2021[127]	2c	Arm 2	After telehealth-delivered home-based prehab	Anxiety/Depression, extreme problems	Full group	Post prehabilitation program	66	4 (NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Albornoz-Cabello, 2021[17]	5	Arm 1	Control (telematics)	Neuropathic pain in four questions (DN4)	Full group	4 weeks	Baseline: 27 Followup: 27	Score Baseline Mean: 3.8 (SD 1.9) Followup Mean: 4 (SD 1.9)	Mean change from baseline: 0.2 (95% CI: 0.1 to 0.4), p=NS	Ref	No
Albornoz-Cabello, 2021[17]	5	Arm 2	TPE (telematic + telephone advice)	Neuropathic pain in four questions (DN4)	Full group	4 weeks	Baseline: 27 Followup: 27	Score Baseline Mean: 3.8 (SD 1.3) Followup Mean: 1.9 (SD 1.1)	Mean change from baseline: 1.9 (95% CI: 1.3 to 2.3), p≤0.001	Ref: Arm1 (control) Mean change from baseline: 2.1 (95% CI: 1.1 to 2.9), p≤0.001	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; CI=confidence interval; IQR=interquartile range; N=sample size; NR=not reported; NS=non-significant; OR=odds ratio; p=p-value; PCS=Pain Catastrophizing Scale; RCRSP= Registered Collegiate Recreational Sports Professional; Ref=reference; SD=standard deviation; VAS=Visual Analogue Scale

Table D.6.5. Clinical outcome (condition specific) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Aiken, 2021[14]	2b	Arm 1	Individuals receiving medical abortion following in-person visit	Successful Medical Abortion	full group	59 days	22158	21769 (0.982)	NR	Ref	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.
Aiken, 2021[14]	2b	Arm 2	Individuals receiving medical abortion following telemedicine/hybrid visit	Successful Medical Abortion	full group	85 days	29984	29618 (0.988)	NR	Ref: Arm 1 Covariate adjusted test of difference or proportions: NR, p=1	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.
Arias, 2022[19]	2b	Arm 1	Pre-telehealth implementation	Any breastfeeding at postpartum visit	full group	NR	780	420 (75.3)	NR	Ref	No
Arias, 2022[19]	2b	Arm 2	Post-telehealth implementation	Any breastfeeding at postpartum visit	full group	NR	799	473 (72.3)	NR	Ref: Arm 1 Odds ratio: 0.09 (95% CI: 0.68 to 1.18), p=0.25	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Barequet, 2021[20]	2c	Full group	Full sample	Diagnostic accuracy and reliability for detecting keratoconus patients' progression - Specificity between office and remote	Full group	NR	Baseline: NR Followup: 204	Continuous data Baseline: NR Followup: Specificity: 95.8 (95% CI NR)	NR	NR	No
Barequet, 2021[20]	2c	Full group	Full sample	Diagnostic accuracy and reliability - Sensitivity between office and remote	Full group	NR	Baseline: NR Followup: 204	Continuous data Baseline: NR Followup: Sensitivty: 69.2 (95% CI NR)	NR	NR	No
Barequet, 2021[20]	2c	Full group	Full sample	Diagnostic accuracy and reliability - Positive predictive value between office and remote	Full group	NR	Baseline: NR Followup: 204	Continuous data Baseline: NR Followup: 52.9 (95% CI NR)	NR	NR	No
Barequet, 2021[20]	2c	Full group	Full sample	Diagnostic accuracy and reliability - Negative predictive value between office and remote	Full group	NR	Baseline: NR Followup: 204	Continuous data Baseline: NR Followup: 97.9 (95% CI NR)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Cvietusa, 2022[39]	2c	Arm 1	No asthma care	Total exacerbations	Full group	NR	Baseline: NR Followup: 2977	Continuous data Baseline: NR Followup: Mean: 0.013 (SE 0.003)	NR	Ref	No
Cvietusa, 2022[39]	2c	Arm 2	In-person only	Total exacerbations	Full group	NR	Baseline: NR Followup: 1792	Continuous data Baseline: NR Followup: Mean: 0.127 (SE 0.015)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	No
Cvietusa, 2022[39]	2c	Arm 3	Mixed (in-person and virtual)	Total exacerbations	Full group	NR	Baseline: NR Followup: 1084	Continuous data Baseline: NR Followup: Mean: 0.537 (SE 0.055)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	No
Cvietusa, 2022[39]	2c	Arm 4	Virtual care only	Total exacerbations	Full group	NR	Baseline: NR Followup: 1952	Continuous data Baseline: NR Followup: Mean: 0.161 (SE 0.018)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	No
Cvietusa, 2022[39]	2c	Arm 1	No asthma care	Exacerbations, Prednisone	Full group	NR	Baseline: NR Followup: 2977	Continuous data Baseline: NR Followup: Mean: 0.015 (SE 0.003)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Cvietusa, 2022[39]	2c	Arm 2	In-person only	Exacerbations, Prednisone	Full group	NR	Baseline: NR Followup: 1792	Continuous data Baseline: NR Followup: Mean: 0.088 (SE 0.011)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	No
Cvietusa, 2022[39]	2c	Arm 3	Mixed (in-person and virtual)	Exacerbations, Prednisone	Full group	NR	Baseline: NR Followup: 1084	Continuous data Baseline: NR Followup: Mean: 0.456 (SE 0.045)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	No
Cvietusa, 2022[39]	2c	Arm 4	Virtual care only	Exacerbations, Prednisone	Full group	NR	Baseline: NR Followup: 1952	Continuous data Baseline: NR Followup: Mean: 0.183 (SE 0.019)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	No
Cvietusa, 2022[39]	2c	Arm 1	No asthma care	Asthma medication ratio	Full group	NR	Baseline: NR Followup: 2977	Continuous data Baseline: NR Followup: Mean: 0.778 (SE 0.005)	NR	Ref	No
Cvietusa, 2022[39]	2c	Arm 2	In-person only	Asthma medication ratio	Full group	NR	Baseline: NR Followup: 1792	Continuous data Baseline: NR Followup: Mean: 0.762 (SE 0.006)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Cvietusa, 2022[39]	2c	Arm 3	Mixed (in-person and virtual)	Asthma medication ratio	Full group	NR	Baseline: NR Followup: 1084	Continuous data Baseline: NR Followup: Mean: 0.745 (SE 0.006)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	No
Cvietusa, 2022[39]	2c	Arm 4	Virtual care only	Asthma medication ratio	Full group	NR	Baseline: NR Followup: 1952	Continuous data Baseline: NR Followup: Mean: 0.743 (SE 0.005)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	No
Fredwall, 2021[49]	2c	Arm 1	Patients seen in-person at Epilepsy Clinic	In remission or had improvements, 1 month	full group	1 month	101	NR (0.7)	NR	NR	No
Fredwall, 2021[49]	2c	Arm 2	Patients seen by telemedicine at Epilepsy Clinic	In remission or had improvements, 1 month	full group	1 month	16	14 (0.88)	NR	NR	No
Fredwall, 2021[49]	2c	Arm 1	Patients seen in-person at Epilepsy Clinic	In remission or had improvements, 3 month	full group	3 months	101	NR (0.75)	NR	NR	No
Fredwall, 2021[49]	2c	Arm 2	Patients seen by telemedicine at Epilepsy Clinic	In remission or had improvements, 3 month	full group	3 months	16	14 (0.88)	NR	NR	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Disease in remission	Full group	NR	210	162 (77.1)	NR	Ref	NR

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Mair, 2021[80]	2c	Arm 2	Telerheum	Disease in remission	Full group	NR	340	291 (85.6)	NR	Ref: Arm1 Difference in proportion: 0.08 (95% CI: 0.02 to 0.15), p=Significant	NR
Minsky, 2021[90]	2c	Arm 1	Not using telemedicine	Likely to lose weight	full group	NR	228	NR	NR	Ref	Gender, age, baseline weight, treatment, exercise level, mood, dietary score
Minsky, 2021[90]	2c	Arm 2	Using telemedicine	Likely to lose weight	full group	NR	51	NR	NR	Ref: Arm1 Odds ratio: 2.79 (95% CI: 1.04 to 7.48), p=0.042	Gender, age, baseline weight, treatment, exercise level, mood, dietary score
Tchang, 2022[122]	2c	Arm 1	In-person	≥5% weight loss	Full group	6 months	69	32 (46.4)	NR	Ref	No
Tchang, 2022[122]	2c	Arm 2	Hybrid	≥5% weight loss	Full group	6 months	85	47 (55.3)	NR	Ref: Arm 1 p-value only: p=0.26	No
Tchang, 2022[122]	2c	Arm 3	Video	≥5% weight loss	Full group	6 months	91	54 (59.3)	NR	Ref: Arm 1 p-value only: p=0.26	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Tchang, 2022[122]	2c	Arm 1	In-person	≥10% weight loss	Full group	6 months	69	12 (17.4)	NR	Ref	No
Tchang, 2022[122]	2c	Arm 2	Hybrid	≥10% weight loss	Full group	6 months	85	14 (16.5)	NR	Ref: Arm 1 p-value only: p=0.61	No
Tchang, 2022[122]	2c	Arm 3	Video	≥10% weight loss	Full group	6 months	91	20 (22)	NR	Ref: Arm 1 p-value only: p=0.61	No
Tchang, 2022[122]	2c	Arm 1	In-person	Weight	Full group	6 months	Baseline: 69 Followup: 69	Continuous data Baseline: NR Followup: NR	Median change from baseline: -4.3 (IQR -8.5,-1.5)	Ref	No
Tchang, 2022[122]	2c	Arm 2	Hybrid	Weight	Full group	6 months	Baseline: 85 Followup: 85	Continuous data Baseline: NR Followup: NR	Median change from baseline: -5.6 (IQR -8.7,-2.2)	Ref: Arm 1 p-value only: p=0.41	No
Tchang, 2022[122]	2c	Arm 3	Video	Weight	Full group	6 months	Baseline: 91 Followup: 91	Continuous data Baseline: NR Followup: NR	Median change from baseline: -5.8 (IQR -9.7,-2.4)	Ref: Arm 1 p-value only: p=0.41	No
Tchang, 2022[122]	2c	Arm 1	In-person	BMI	Full group	6 months	Baseline: 69 Followup: 69	Continuous data Baseline: NR Followup: NR	Median change from baseline: -1.4 (IQR -3.2,-0.6)	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Tchang, 2022[122]	2c	Arm 2	Hybrid	BMI	Full group	6 months	Baseline: 85 Followup: 85	Continuous data Baseline: NR Followup: NR	Median change from baseline: -2 (IQR -3.3,-0.8)	Ref: Arm 1 p-value only: p=0.58	No
Tchang, 2022[122]	2c	Arm 3	Video	BMI	Full group	6 months	Baseline: 91 Followup: 91	Continuous data Baseline: NR Followup: NR	Median change from baseline: -2.1 (IQR -2.1,-3.6)	Ref: Arm 1 p-value only: p=0.58	No
Ye, 2022[128]	2c	Arm 1	In-person	Not Meeting the Controlling High Blood Pressure quality measure (all hypertension patients)	Full group	NR	20745	NR	NR	Ref	No
Ye, 2022[128]	2c	Arm 2	1 telemedicine visit	Not Meeting the Controlling High Blood Pressure quality measure (all hypertension patients)	Full group	NR	6878	NR	NR	Ref: Arm 1 Odds ratio: 2.06 (95% CI: 1.94 to 2.18), p=<0.001	No
Ye, 2022[128]	2c	Arm 3	2 or more telemedicine visits	Not Meeting the Controlling High Blood Pressure quality measure (all hypertension patients)	Full group	NR	5104	NR	NR	Ref: Arm 1 Odds ratio: 2.49 (95% CI: 2.31 to 2.68), p=<0.001	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Ye, 2022[128]	2c	Arm 1	In-person, with at least 1 BP measure	Not Meeting the Controlling High Blood Pressure quality measure (Patients with at least 1 recorded BP)	Full group	NR	20259	NR	NR	Ref	No
Ye, 2022[128]	2c	Arm 2	1 telemedicine visit, with at least 1 BP measure	Not Meeting the Controlling High Blood Pressure quality measure (Patients with at least 1 recorded BP)	Full group	NR	5015	NR	NR	Ref: Arm 1 Odds ratio: 0.89 (95% CI: 0.83 to 0.95), p=0.001	No
Ye, 2022[128]	2c	Arm 3	2 or more telemedicine visits, with at least 1 BP measure	Not Meeting the Controlling High Blood Pressure quality measure (Patients with at least 1 recorded BP)	Full group	NR	3825	NR	NR	Ref: Arm 1 Odds ratio: 0.91 (95% CI: 0.83 to 0.99), p=0.03	No
Boles, 2022[23]	3	Arm 1	In-person	Intraoperative blood loss (ml)	Full group	NR	Baseline: NR Followup: 66	Continuous data Baseline: NR Followup: Mean: 35.5 (SD 56.7)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Boles, 2022[23]	3	Arm 2	Telemedicine (not specified)	Intraoperative blood loss (ml)	Full group	NR	Baseline: NR Followup: 28	Continuous data Baseline: NR Followup: Mean: 19.4 (SD 26.4)	NR	Ref: Assuming Arm1 p-value only: p=0.06	No
Boles, 2022[23]	3	Arm 1	In-person	Surgical duration (min)	Full group	NR	Baseline: NR Followup: 66	Continuous data Baseline: NR Followup: Mean: 105.6 (SD 47.5)	NR	Ref	No
Boles, 2022[23]	3	Arm 2	Telemedicine (not specified)	Surgical duration (min)	Full group	NR	Baseline: NR Followup: 28	Continuous data Baseline: NR Followup: Mean: 104.1 (SD 38.7)	NR	Ref: Assuming Arm1 p-value only: p=0.68	No
Boles, 2022[23]	3	Arm 1	In-person	Length of stay (days)	Full group	NR	Baseline: NR Followup: 66	Continuous data Baseline: NR Followup: Mean: 1.2 (SD 1.9)	NR	Ref	No
Boles, 2022[23]	3	Arm 2	Telemedicine (not specified)	Length of stay (days)	Full group	NR	Baseline: NR Followup: 28	Continuous data Baseline: NR Followup: Mean: 1.3 (SD 2.1)	NR	Ref: Assuming Arm1 p-value only: p=0.93	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Levinson, 2021[72]	4	Arm 1	In-person	Body Mass Index	Full group	Mean stay: 11.32 weeks Discharge	Baseline: 60 Followup: 60	Continuous data Baseline: NR Followup: Mean: 24.78 (SD 7.63)	NR	Ref	No
Levinson, 2021[72]	4	Arm 2	Telehealth (Zoom)	Body Mass Index	Full group	Mean stay: 11.32 weeks Discharge	Baseline: 33 Followup: 33	Continuous data Baseline: NR Followup: Mean: 26.26 (SD 10.39)	NR	Ref: p-value only: p=NS	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; BP=blood pressure; CI=confidence interval; IQR=interquartile range; ml=milliliter; N=sample size; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; SD=standard deviation; SE=standard error

Table D.6.6. Clinical outcome (condition specific) results of non-comparison studies (Key Question 2)

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Malliaras, 2020[81]	1a	Arm 1	Advice only	Success on Global Rating of Change (GROC)	Full group	12 weeks	11	NR (39.7)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Success on Global Rating of Change (GROC)	Full group	12 weeks	12	NR (50.1)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Success on Global Rating of Change (GROC)	Full group	12 weeks	12	NR (75)	NR	NR	No
Reynolds-Wright, 2021[103]	2b	Full group	Full group	Complete abortion	full group	99 days	663	650 (98)	NR	NR	No

1a=general medical care, adults; 2b=specialized care, pregnany/prenatal/gynecological; N=sample size; NR=not reported

Table D.6.7. Clinical outcome (adverse events) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Average medication related problems per encounter	full group	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 1.65 (SD 1.56)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Average medication related problems per encounter	full group	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 1.06 (SD 1.21)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: Unnecessary drug therapy (per encounter)	full group	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0.07 (SD 0.27)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: Unnecessary drug therapy (per encounter)	full group	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.07 (SD 0.25)	NR	Ref: Arm 1 p-value only: p=0.307	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: Dose too low (per encounter)	full group	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0.29 (SD 0.52)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: Dose too low (per encounter)	full group	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.27 (SD 0.53)	NR	Ref: Arm 1 p-value only: p=0.596	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: adverse drug event (per encounter)	full group	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0.05 (SD 0.45)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: adverse drug event (per encounter)	full group	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.12 (SD 0.34)	NR	Ref: Arm 1 p-value only: p=0.496	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: Drug interaction (per encounter)	full group	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0 (SD 0)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: Drug interaction (per encounter)	full group	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.01 (SD 0.08)	NR	Ref: Arm 1 p-value only: p=1	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: Dose too high (per encounter)	full group	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0.09 (SD 0.29)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: Dose too high (per encounter)	full group	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.02 (SD 0.15)	NR	Ref: Arm 1 p-value only: p=0.721	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: Lab monitoring needed (per encounter)	full group	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0.6 (SD 1.12)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: Lab monitoring needed (per encounter)	full group	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.33 (SD 0.95)	NR	Ref: Arm 1 p-value only: p=0.123	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: Home monitoring needed (per encounter)	full group	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0.07 (SD 0.27)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: Home monitoring needed (per encounter)	full group	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.08 (SD 0.29)	NR	Ref: Arm 1 p-value only: p=0.64	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Age <65, Average medication related problems per encounter	Age	NR	Baseline: NR Followup: 198	Continuous data Baseline: NR Followup: Mean: 1.81 (SD 1.58)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Age <65, Average medication related problems per encounter	Age	NR	Baseline: NR Followup: 104	Continuous data Baseline: NR Followup: Mean: 0.97 (SD 1.18)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Age >=65, Average medication related problems per encounter	Age	NR	Baseline: NR Followup: 166	Continuous data Baseline: NR Followup: Mean: 1.46 (SD 1.52)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Age >=65, Average medication related problems per encounter	Age	NR	Baseline: NR Followup: 69	Continuous data Baseline: NR Followup: Mean: 1.22 (SD 1.24)	NR	Ref: Arm 1 p-value only: p=0.24	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Race White, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 56	Continuous data Baseline: NR Followup: Mean: 1.38 (SD 1.7)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Race White, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 12	Continuous data Baseline: NR Followup: Mean: 1.25 (SD 1.76)	NR	Ref: Arm 1 p-value only: p=0.82	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Race Black, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 62	Continuous data Baseline: NR Followup: Mean: 1.96 (SD 1.54)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Race Black, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 25	Continuous data Baseline: NR Followup: Mean: 0.72 (SD 0.89)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Race Hispanic, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 66	Continuous data Baseline: NR Followup: Mean: 1.69 (SD 1.61)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Race Hispanic, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 63	Continuous data Baseline: NR Followup: Mean: 1.11 (SD 1.15)	NR	Ref: Arm 1 p-value only: p=0.02	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Race Asian, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 166	Continuous data Baseline: NR Followup: Mean: 1.58 (SD 0.5)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Race Asian, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 67	Continuous data Baseline: NR Followup: Mean: 1.11 (SD 1.29)	NR	Ref: Arm 1 p-value only: p=0.03	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Race American Indian, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 5	Continuous data Baseline: NR Followup: Mean: 1.6 (SD 1.52)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Race American Indian, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 2	Continuous data Baseline: NR Followup: Mean: 0.5 (SD 0.71)	NR	Ref: Arm 1 p-value only: p=0.39	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Race Native Hawaiian, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 3	Continuous data Baseline: NR Followup: Mean: 2.67 (SD 2.07)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Race Native Hawaiian, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 3	Continuous data Baseline: NR Followup: Mean: 1.67 (SD 0.58)	NR	Ref: Arm 1 p-value only: p=0.47	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Race: Other, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 6	Continuous data Baseline: NR Followup: Mean: 2 (SD 1.55)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Race: Other, Average medication related problems per encounter	Race	NR	Baseline: NR Followup: 1	Continuous data Baseline: NR Followup: Mean: 1 (SD NA)	NR	Ref: Arm 1 p-value only: p=NA	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Gender Female, Average medication related problems per encounter	Gender	NR	Baseline: NR Followup: 179	Continuous data Baseline: NR Followup: Mean: 1.69 (SD 1.62)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Gender Female, Average medication related problems per encounter	Gender	NR	Baseline: NR Followup: 94	Continuous data Baseline: NR Followup: Mean: 0.98 (SD 1.05)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Gender Male, Average medication related problems per encounter	Gender	NR	Baseline: NR Followup: 184	Continuous data Baseline: NR Followup: Mean: 1.63 (SD 1.5)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Gender Male, Average medication related problems per encounter	Gender	NR	Baseline: NR Followup: 76	Continuous data Baseline: NR Followup: Mean: 1.13 (SD 1.27)	NR	Ref: Arm 1 p-value only: p=0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Gender Male to female transition, Average medication related problems per encounter	Gender	NR	Baseline: NR Followup: 1	Continuous data Baseline: NR Followup: Mean: 0 (SD 0)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Gender Male to female transition, Average medication related problems per encounter	Gender	NR	Baseline: NR Followup: 1	Continuous data Baseline: NR Followup: Mean: 0 (SD 0)	NR	Ref: Arm 1 p-value only: p=NA	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Gender: other, Average medication related problems per encounter	Gender	NR	Baseline: NR Followup: 0	Continuous data Baseline: NR Followup: Mean: NA (SD NA)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Gender: other, Average medication related problems per encounter	Gender	NR	Baseline: NR Followup: 2	Continuous data Baseline: NR Followup: Mean: 3.5 (SD 3.54)	NR	Ref: Arm 1 p-value only: p=NA	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: BP goals <140/90, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 268	Continuous data Baseline: NR Followup: Mean: 1.51 (SD 1.47)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: BP goals <140/90, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 115	Continuous data Baseline: NR Followup: Mean: 1.17 (SD 1.31)	NR	Ref: Arm 1 p-value only: p=0.03	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: BP goals >=140/90, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 91	Continuous data Baseline: NR Followup: Mean: 2.1 (SD 1.78)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: BP goals >=140/90, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 51	Continuous data Baseline: NR Followup: Mean: 0.86 (SD 0.94)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: BP goals <130/80, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 167	Continuous data Baseline: NR Followup: Mean: 1.6 (SD 1.47)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: BP goals <130/80, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 71	Continuous data Baseline: NR Followup: Mean: 1.15 (SD 1.35)	NR	Ref: Arm 1 p-value only: p=0.03	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: BP goals >=130/80, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 192	Continuous data Baseline: NR Followup: Mean: 1.71 (SD 1.65)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: BP goals >=130/80, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 95	Continuous data Baseline: NR Followup: Mean: 1.01 (SD 1.1)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: A1c goals <8%, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 202	Continuous data Baseline: NR Followup: Mean: 1.41 (SD 1.49)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: A1c goals <8%, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 62	Continuous data Baseline: NR Followup: Mean: 0.9 (SD 1.39)	NR	Ref: Arm 1 p-value only: p=0.02	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: A1c goals >=8%, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 139	Continuous data Baseline: NR Followup: Mean: 2.1 (SD 1.61)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: A1c goals >=8%, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 91	Continuous data Baseline: NR Followup: Mean: 1.29 (SD 1.11)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: A1c goals <7%, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 137	Continuous data Baseline: NR Followup: Mean: 1.18 (SD 1.34)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: A1c goals <7%, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 26	Continuous data Baseline: NR Followup: Mean: 0.62 (SD 1.24)	NR	Ref: Arm 1 p-value only: p=0.37	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: A1c goals >=7%, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 204	Continuous data Baseline: NR Followup: Mean: 2.03 (SD 1.62)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: A1c goals >=7%, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 127	Continuous data Baseline: NR Followup: Mean: 1.24 (SD 1.22)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: no diabetes, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 100	Continuous data Baseline: NR Followup: Mean: 1.07 (SD 1.24)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: no diabetes, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 21	Continuous data Baseline: NR Followup: Mean: 0.67 (SD 1.28)	NR	Ref: Arm 1 p-value only: p=0.92	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Uncomplicated diabetes, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 130	Continuous data Baseline: NR Followup: Mean: 1.65 (SD 1.6)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Uncomplicated diabetes, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 81	Continuous data Baseline: NR Followup: Mean: 1.14 (SD 1.33)	NR	Ref: Arm 1 p-value only: p=0.02	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: End-organ damage, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 134	Continuous data Baseline: NR Followup: Mean: 2.09 (SD 1.61)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: End-organ damage, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 71	Continuous data Baseline: NR Followup: Mean: 1.11 (SD 1.02)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: no liver disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 294	Continuous data Baseline: NR Followup: Mean: 1.7 (SD 1.58)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: no liver disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 138	Continuous data Baseline: NR Followup: Mean: 1.05 (SD 1.22)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: mild liver disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 64	Continuous data Baseline: NR Followup: Mean: 1.48 (SD 1.55)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: mild liver disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 33	Continuous data Baseline: NR Followup: Mean: 1.18 (SD 1.21)	NR	Ref: Arm 1 p-value only: p=0.33	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: moderate to severe liver disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 6	Continuous data Baseline: NR Followup: Mean: 1.67 (SD 0.75)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: moderate to severe liver disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 2	Continuous data Baseline: NR Followup: Mean: 0.5 (SD 0.71)	NR	Ref: Arm 1 p-value only: p=0.32	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: no solid tumor, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 1.65 (SD 1.56)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: no solid tumor, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 1.06 (SD 1.21)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: localized solid tumor, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 22	Continuous data Baseline: NR Followup: Mean: 1.59 (SD 1.76)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: localized solid tumor, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 20	Continuous data Baseline: NR Followup: Mean: 1.2 (SD 1.28)	NR	Ref: Arm 1 p-value only: p=0.42	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: metastatic solid tumor, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 1	Continuous data Baseline: NR Followup: Mean: 2 (SD NA)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: metastatic solid tumor, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 2	Continuous data Baseline: NR Followup: Mean: 0.5 (SD 0.71)	NR	Ref: Arm 1 p-value only: p=NA	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No CKD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 203	Continuous data Baseline: NR Followup: Mean: 1.49 (SD 1.5)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No CKD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 108	Continuous data Baseline: NR Followup: Mean: 1.09 (SD 1.33)	NR	Ref: Arm 1 p-value only: p=0.02	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Stage 1-3 CKD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 144	Continuous data Baseline: NR Followup: Mean: 1.8 (SD 1.63)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Stage 1-3 CKD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 53	Continuous data Baseline: NR Followup: Mean: 1.11 (SD 1.01)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Stage 4-5 CKD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 12	Continuous data Baseline: NR Followup: Mean: 2.92 (SD 1.38)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Stage 4-5 CKD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 8	Continuous data Baseline: NR Followup: Mean: 0.75 (SD 0.71)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Dialysis, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 5	Continuous data Baseline: NR Followup: Mean: 0.8 (SD 0.84)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Dialysis, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 4	Continuous data Baseline: NR Followup: Mean: 0.5 (SD 0.58)	NR	Ref: Arm 1 p-value only: p=0.56	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No acquired immunodeficiency syndrom, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 364	Continuous data Baseline: NR Followup: Mean: 1.7 (SD 1.56)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No acquired immunodeficiency syndrom, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 173	Continuous data Baseline: NR Followup: Mean: 1.07 (SD 1.2)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Acquired immunodeficiency syndrom, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 0	Continuous data Baseline: NR Followup: Mean: 0 (SD NA)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Acquired immunodeficiency syndrom, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 0	Continuous data Baseline: NR Followup: Mean: 0 (SD NA)	NR	Ref: Arm 1 p-value only: p=NA	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No congestive heart failure, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 335	Continuous data Baseline: NR Followup: Mean: 1.69 (SD 1.57)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No congestive heart failure, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 168	Continuous data Baseline: NR Followup: Mean: 1.08 (SD 1.22)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Congestive heart failure, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 29	Continuous data Baseline: NR Followup: Mean: 1.24 (SD 1.98)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Congestive heart failure, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 5	Continuous data Baseline: NR Followup: Mean: 0.8 (SD 0.73)	NR	Ref: Arm 1 p-value only: p=0.52	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No myocardial infarction, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 330	Continuous data Baseline: NR Followup: Mean: 1.61 (SD 1.51)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No myocardial infarction, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 164	Continuous data Baseline: NR Followup: Mean: 1.1 (SD 1.22)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Myocardial infarction, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 34	Continuous data Baseline: NR Followup: Mean: 2.09 (SD 1.98)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Myocardial infarction, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 9	Continuous data Baseline: NR Followup: Mean: 0.56 (SD 0.73)	NR	Ref: Arm 1 p-value only: p=0.03	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No COPD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 337	Continuous data Baseline: NR Followup: Mean: 1.68 (SD 1.53)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No COPD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 168	Continuous data Baseline: NR Followup: Mean: 1.07 (SD 1.2)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: COPD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 27	Continuous data Baseline: NR Followup: Mean: 1.33 (SD 1.98)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: COPD, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 5	Continuous data Baseline: NR Followup: Mean: 1.2 (SD 1.64)	NR	Ref: Arm 1 p-value only: p=0.89	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No peripheral vascular disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 342	Continuous data Baseline: NR Followup: Mean: 1.67 (SD 1.57)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No peripheral vascular disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 160	Continuous data Baseline: NR Followup: Mean: 1.09 (SD 1.16)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Peripheral vascular disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 22	Continuous data Baseline: NR Followup: Mean: 1.41 (SD 1.44)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Peripheral vascular disease, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 13	Continuous data Baseline: NR Followup: Mean: 1.77 (SD 1.69)	NR	Ref: Arm 1 p-value only: p=0.24	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No cerebrovascular accident/transient ischemic attack, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 328	Continuous data Baseline: NR Followup: Mean: 1.64 (SD 1.57)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No cerebrovascular accident/transient ischemic attack, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 163	Continuous data Baseline: NR Followup: Mean: 1.1 (SD 1.23)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Cerebrovascular accident/transient ischemic attack, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 36	Continuous data Baseline: NR Followup: Mean: 1.75 (SD 1.57)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Cerebrovascular accident/transient ischemic attack, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 10	Continuous data Baseline: NR Followup: Mean: 0.5 (SD 0.71)	NR	Ref: Arm 1 p-value only: p=0.02	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No dementia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 352	Continuous data Baseline: NR Followup: Mean: 1.66 (SD 1.57)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No dementia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 171	Continuous data Baseline: NR Followup: Mean: 1.08 (SD 1.21)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Dementia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 12	Continuous data Baseline: NR Followup: Mean: 1.33 (SD 1.5)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Dementia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 2	Continuous data Baseline: NR Followup: Mean: 0.5 (SD 0.71)	NR	Ref: Arm 1 p-value only: p=0.47	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No hemiplegia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 355	Continuous data Baseline: NR Followup: Mean: 1.64 (SD 1.55)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No hemiplegia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 172	Continuous data Baseline: NR Followup: Mean: 1.06 (SD 1.2)	NR	Ref: Arm 1 p-value only: p=<0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Hemiplegia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 9	Continuous data Baseline: NR Followup: Mean: 2.22 (SD 1.92)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Hemiplegia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 1	Continuous data Baseline: NR Followup: Mean: 3 (SD NA)	NR	Ref: Arm 1 p-value only: p=NA	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No connective tissue disorder, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 294	Continuous data Baseline: NR Followup: Mean: 1.7 (SD 1.55)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No connective tissue disorder, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 141	Continuous data Baseline: NR Followup: Mean: 1.08 (SD 1.27)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Connective tissue disorder, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 70	Continuous data Baseline: NR Followup: Mean: 1.45 (SD 1.61)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Connective tissue disorder, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 32	Continuous data Baseline: NR Followup: Mean: 1.03 (SD 0.93)	NR	Ref: Arm 1 p-value only: p=0.17	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No leukemia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 364	Continuous data Baseline: NR Followup: Mean: 1.7 (SD 1.56)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No leukemia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 173	Continuous data Baseline: NR Followup: Mean: 1.07 (SD 1.2)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Leukemia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 0	Continuous data Baseline: NR Followup: Mean: 0 (SD NA)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Leukemia, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 0	Continuous data Baseline: NR Followup: Mean: 0 (SD NA)	NR	Ref: Arm 1 p-value only: p=NA	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No malignant lymphoma, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 363	Continuous data Baseline: NR Followup: Mean: 1.64 (SD 1.55)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No malignant lymphoma, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 171	Continuous data Baseline: NR Followup: Mean: 1.08 (SD 1.21)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Malignant lymphoma, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 1	Continuous data Baseline: NR Followup: Mean: 6 (SD NA)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Malignant lymphoma, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 2	Continuous data Baseline: NR Followup: Mean: 0.5 (SD 0.5)	NR	Ref: Arm 1 p-value only: p=NA	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: No malignant lymphoma, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 362	Continuous data Baseline: NR Followup: Mean: 1.64 (SD 1.55)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: No malignant lymphoma, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 171	Continuous data Baseline: NR Followup: Mean: 1.08 (SD 1.21)	NR	Ref: Arm 1 p-value only: p=<0.01	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Comorbidities: Malignant lymphoma, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 2	Continuous data Baseline: NR Followup: Mean: 4.5 (SD 2.12)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Comorbidities: Malignant lymphoma, Average medication related problems per encounter	Comorbidities	NR	Baseline: NR Followup: 2	Continuous data Baseline: NR Followup: Mean: 0 (SD 0)	NR	Ref: Arm 1 p-value only: p=0.1	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Aiken, 2021[14]	2b	Arm 1	Individuals receiving medical abortion following in-person visit	Adverse Effect: Major Surgery	full group	59 days	22158	0 (0)	NR	Ref	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.
Aiken, 2021[14]	2b	Arm 2	Individuals receiving medical abortion following telemedicine/hybrid visit	Adverse Effect: Major Surgery	full group	85 days	29984	0 (0)	NR	Ref: Arm 1 Covariate adjusted test of difference or proportions: NR, p=NR	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Aiken, 2021[14]	2b	Arm 1	Individuals receiving medical abortion following in-person visit	Adverse Effect: Hemorrhage requiring transfusion	Full group	59 days	22158	8 (0.0004)	NR	Ref	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.
Aiken, 2021[14]	2b	Arm 2	Individuals receiving medical abortion following telemedicine/hybrid visit	Adverse Effect: Hemorrhage requiring transfusion	full group	85 days	29984	7 (0.0002)	NR	Ref: Arm 1 Covariate adjusted test of difference or proportions: NR, p=0.557	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Aiken, 2021[14]	2b	Arm 1	Individuals receiving medical abortion following in-person visit	Adverse Effect: Infection requiring hospital admission	full group	59 days	22158	0 (0)	NR	Ref	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.
Aiken, 2021[14]	2b	Arm 2	Individuals receiving medical abortion following telemedicine/hybrid visit	Adverse Effect: Infection requiring hospital admission	full group	85 days	29984	0 (0)	NR	Ref: Arm 1 Covariate adjusted test of difference or proportions: NR, p=NR	patient age, race/ethnicity, gestational age, parity and prior abortions using logistic regression and weighted risk differences.

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Arterial Blood Gas pH <7.0	full group	183 Days	6559	22 (0.004)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Arterial Blood Gas pH <7.0	full group	183 Days	6048	17 (0.003)	NR	Ref: Arm 1 Relative risk: 0.82 (95% CI: 0.44 to 1.55, p=0.64	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Arterial Blood Gas pH <7.0	0 audio prenatal visits	183 Days	1981	7 (0.0004)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Arterial Blood Gas pH <7.0	1 audio prenatal visits	183 Days	1612	4 (0.0003)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Arterial Blood Gas pH <7.0	2 audio prenatal visits	183 Days	1239	2 (0.0002)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Arterial Blood Gas pH <7.0	≥3 audio prenatal visits	183 Days	1216	4 (0.0004)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.56	No
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Hysterectomy	full group	183 Days	6559	26 (0.004)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Hysterectomy	full group	183 Days	6048	13 (0.002)	NR	Ref: Arm 1 Relative risk: 0.53 (95% CI: 0.27 to 1.04, p=0.07	BMI at delivery, race

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Hysterectomy	0 audio prenatal visits	183 Days	1981	2 (0.001)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Hysterectomy	1 audio prenatal visits	183 Days	1612	4 (0.002)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Hysterectomy	2 audio prenatal visits	183 Days	1239	3 (0.002)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Hysterectomy	≥3 audio prenatal visits	183 Days	1216	4 (0.003)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.37	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Major malformation	0 audio prenatal visits/All delivered infants	183 Days	2020	43 (0.021)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Major malformation	1 audio prenatal visits/All delivered infants	183 Days	1633	40 (0.024)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Major malformation	2 audio prenatal visits/All delivered infants	183 Days	1252	20 (0.016)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Major malformation	≥3 audio prenatal visits/All delivered infants	183 Days	1235	10 (0.01)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.09	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Need for Transfusion	full group	183 Days	6559	279 (0.043)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Need for Transfusion	full group	183 Days	6048	216 (0.036)	NR	Ref: Arm 1 Relative risk: 0.84 (95% CI: 0.7 to 0.99, p=0.049	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Need for Transfusion	0 audio prenatal visits	183 Days	1981	90 (0.045)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Need for Transfusion	1 audio prenatal visits	183 Days	1612	49 (0.03)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Need for Transfusion	2 audio prenatal visits	183 Days	1239	40 (0.032)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Need for Transfusion	≥3 audio prenatal visits	183 Days	1216	37 (0.03)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.005	No
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Placental Abruption	full group	183 Days	6559	56 (0.009)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Placental Abruption	full group	183 Days	6048	40 (0.007)	NR	Ref: Arm 1 Relative risk: 0.76 (95% CI: 0.51 to 1.14, p=0.21	BMI at delivery, race

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Placental Abruption	0 audio prenatal visits	183 Days	1981	19 (0.01)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Placental Abruption	1 audio prenatal visits	183 Days	1612	13 (0.0008)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Placental Abruption	2 audio prenatal visits	183 Days	1239	5 (0.0004)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Placental Abruption	≥3 audio prenatal visits	183 Days	1216	3 (0.0002)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.01	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Postpartum Hemorrhage	0 audio prenatal visits	183 Days	1981	187 (0.094)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Postpartum Hemorrhage	1 audio prenatal visits	183 Days	1612	150 (0.093)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Postpartum Hemorrhage	2 audio prenatal visits	183 Days	1239	115 (0.093)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Postpartum Hemorrhage	≥3 audio prenatal visits	183 Days	1216	118 (0.097)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.3	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preeclampsia with Severe Features	0 audio prenatal visits	183 Days	1981	235 (0.119)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preeclampsia with Severe Features	1 audio prenatal visits	183 Days	1612	174 (0.108)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preeclampsia with Severe Features	2 audio prenatal visits	183 Days	1239	120 (0.097)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preeclampsia with Severe Features	≥3 audio prenatal visits	183 Days	1216	120 (0.099)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.31	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Preterm Birth <34 weeks	full group	183 Days	6559	203 (0.031)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <34 weeks	full group	183 Days	6048	202 (0.033)	NR	Ref: Arm 1 Relative risk: 1.09 (95% CI: 0.9 to 1.31, p=0.44	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <34 weeks	0 audio prenatal visits	183 Days	1981	108 (0.055)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <34 weeks	1 audio prenatal visits	183 Days	1612	49 (0.03)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <34 weeks	2 audio prenatal visits	183 Days	1239	25 (0.02)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <34 weeks	≥3 audio prenatal visits	183 Days	1216	20 (0.016)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.003	No
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Preterm Birth <37 weeks	full group	183 Days	6559	672 (0.102)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <37 weeks	full group	183 Days	6048	593 (0.098)	NR	Ref: Arm 1 Relative risk: 0.96 (95% CI: 0.86 to 1.06, p=0.41	BMI at delivery, race

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <37 weeks	0 audio prenatal visits	183 Days	1981	259 (0.131)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <37 weeks	1 audio prenatal visits	183 Days	1612	147 (0.091)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <37 weeks	2 audio prenatal visits	183 Days	1239	88 (0.071)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preterm Birth <37 weeks	≥3 audio prenatal visits	183 Days	1216	0 (0.081)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p≤.001	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Shoulder Dystocia	full group	183 Days	6559	31 (0.005)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Shoulder Dystocia	full group	183 Days	6048	14 (0.002)	NR	Ref: Arm 1 Relative risk: 0.48 (95% CI: 0.48 to 0.91, p=0.02	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Shoulder Dystocia	0 audio prenatal visits	183 Days	1981	5 (0.003)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Shoulder Dystocia	1 audio prenatal visits	183 Days	1612	3 (0.002)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Shoulder Dystocia	2 audio prenatal visits	183 Days	1239	3 (0.002)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Shoulder Dystocia	≥3 audio prenatal visits	183 Days	1216	3 (0.002)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.06	No
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Still Birth	full group	183 Days	6559	40 (0.006)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Still Birth	full group	183 Days	6048	29 (0.005)	NR	Ref: Arm 1 Relative risk: 0.8 (95% CI: 0.5 to 1.29, p=0.32	BMI at delivery, race

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Still Birth	0 audio prenatal visits	183 Days	1981	17 (0.009)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Still Birth	1 audio prenatal visits	183 Days	1612	2 (0.001)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Still Birth	2 audio prenatal visits	183 Days	1239	5 (0.004)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Still Birth	≥3 audio prenatal visits	183 Days	1216	5 (0.004)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.08	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Stillbirth	0 audio prenatal visits/All delivered infants	183 Days	2020	17 (0.008)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Stillbirth	1 audio prenatal visits/All delivered infants	183 Days	1633	3 (0.002)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Stillbirth	2 audio prenatal visits/All delivered infants	183 Days	1252	5 (0.004)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Stillbirth	≥3 audio prenatal visits/All delivered infants	183 Days	1235	5 (0)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.11	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Umbilical Gas pH <7.0	0 audio prenatal visits/Live-born infants without major malformations	183 Days	1960	6 (0.003)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Umbilical Gas pH <7.0	1 audio prenatal visits/Live-born infants without major malformations	183 Days	1590	3 (0.002)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Umbilical Gas pH <7.0	2 audio prenatal visits/Live-born infants without major malformations	183 Days	1227	2 (0.002)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Umbilical Gas pH <7.0	≥3 audio prenatal visits/Live-born infants without major malformations	183 Days	1220	4 (0.004)	NR	Arm 2, Entire Subgroup	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Gestational Hypertension	full group	183 Days	6559	1320 (0.201)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Gestational Hypertension	full group	183 Days	6048	1147 (0.19)	NR	Ref: Arm 1 Relative risk: 0.93 (95% CI: 0.86 to 0.99, p=0.1	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Preeclampsia with Severe Features	full group	183 Days	6559	697 (0.106)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Preeclampsia with Severe Features	full group	183 Days	6048	649 (0.107)	NR	Ref: Arm 1 Relative risk: 0.99 (95% CI: 0.89 to 1.09, p=0.85	BMI at delivery, race

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Postpartum Hemorrhage	full group	183 Days	6559	580 (0.088)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Postpartum Hemorrhage	full group	183 Days	6048	570 (0.094)	NR	Ref: Arm 1 Relative risk: 1.04 (95% CI: 0.93 to 1.16, p=0.26	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 1	Pregnant individuals who received in-person pre-natal care	Composite Outcome (Still Birth, Full-term NICU Admission, Placental Abruption, Arterial Blood Gas pH <7.0	full group	183 Days	6559	195 (0.03)	NR	Ref	BMI at delivery, race
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Composite Outcome (Still Birth, Full-term NICU Admission, Placental Abruption, Arterial Blood Gas pH <7.0	full group	183 Days	6048	173 (0.029)	NR	Ref: Arm 1 Relative risk: 0.96 (95% CI: 0.78 to 1.17, p=0.71	BMI at delivery, race

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Composite Outcome (Still Birth, Full-term NICU Admission, Placental Abruption, Arterial Blood Gas pH <7.0	0 audio prenatal visits	183 Days	1981	66 (0.033)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Composite Outcome (Still Birth, Full-term NICU Admission, Placental Abruption, Arterial Blood Gas pH <7.0	1 audio prenatal visits	183 Days	1612	47 (0.029)	NR	Ref	No
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Composite Outcome (Still Birth, Full-term NICU Admission, Placental Abruption, Arterial Blood Gas pH <7.0	2 audio prenatal visits	183 Days	1239	35 (0.028)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Duryea, 2021[44]	2b	Arm 2	Pregnant individuals who received audio telehealth and in-person prenatal care	Composite Outcome (Still Birth, Full-term NICU Admission, Placental Abruption, Arterial Blood Gas pH <7.0	≥3 audio prenatal visits	183 Days	1216	25 (0.021)	NR	Ref: Arm 2, Entire Subgroup Mantel-Haenszel Trend: NR, p=0.15	No
Kerestes, 2021[65]	2b	Arm 1	In person	Complication: Additional Misoprostol	In person	246 days	94	1 (1.1)	NR	NR	No
Kerestes, 2021[65]	2b	Arm 2	Telemedicine + med pick up	Complication: Additional Misoprostol	Telemedicine + med pick up	247 days	124	1 (0.8)	NR	NR	No
Kerestes, 2021[65]	2b	Arm 2	Telemedicine + Mailed Medicine	Complication: Additional Misoprostol	Telemedicine + Mailed Medicine	248 days	69	2 (2.9)	NR	NR	No
Kerestes, 2021[65]	2b	Arm 1	In person	Complication: Blood Transfusion	In person	249 days	94	0 (0)	NR	NR	No
Kerestes, 2021[65]	2b	Arm 2	Telemedicine + med pick up	Complication: Blood Transfusion	Telemedicine + med pick up	250 days	124	2 (1.6)	NR	NR	No
Kerestes, 2021[65]	2b	Arm 2	Telemedicine + Mailed Medicine	Complication: Blood Transfusion	Telemedicine + Mailed Medicine	251 days	69	0 (0)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Pinsker, 2021[97]	2c	Arm 1	Individuls with diabetes receiving in-person insulin pump training	Adverse events	full group	NR	Baseline: NR Followup: 14284	Continuous Baseline: NR Followup: Mean: 0.04 (SD 0.24)	NR	Ref	Training method, age, previous therapy, trainer type, baseline A1c
Pinsker, 2021[97]	2c	Arm 2	Individuls with diabetes receiving virtual insulin pump training	Adverse events	full group	NR	Baseline: NR Followup: 8984	Continuous Baseline: NR Followup: Mean: 0.03 (SD 0.2)	NR	Ref: Arm 1 p=0.003	Training method, age, previous therapy, trainer type, baseline A1c
Boles, 2022[23]	3	Arm 1	In-person	Postopera tive complicati on, any	full group	NR	66	6 (9.1)	NR	Ref	No
Boles, 2022[23]	3	Arm 2	Telemedic ine (not specified)	Postopera tive complicati on, any	full group	NR	23	2 (7.1)	NR	Ref: Assuming Arm1 p-value only: p=1	No
Helmes, 2022[56]	3	Arm 1	Followup in-person	Taste of blood	full group	NR	35	NR (3.3)	NR	Ref	No
Helmes, 2022[56]	3	Arm 2	Followup by phone	Taste of blood	full group	NR	60	NR (0)	NR	Ref: Arm 1 p-value only: p=0.317	No
Helmes, 2022[56]	3	Arm 1	Followup in-person	Swelling of surgical area	full group	NR	35	NR (6.7)	NR	Ref	No
Helmes, 2022[56]	3	Arm 2	Followup by phone	Swelling of surgical area	full group	NR	60	NR (3.3)	NR	Ref: Arm 1 p-value only: p=0.557	No
Helmes, 2022[56]	3	Arm 1	Followup in-person	Fever	full group	NR	35	NR (0)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Helmes, 2022[56]	3	Arm 2	Followup by phone	Fever	full group	NR	60	NR (0)	NR	Ref: Arm 1 p-value only: p=1	No
Helmes, 2022[56]	3	Arm 1	Followup in-person	Chills with sweat	full group	NR	35	NR (0)	NR	Ref	No
Helmes, 2022[56]	3	Arm 2	Followup by phone	Chills with sweat	full group	NR	60	NR (0)	NR	Ref: Arm 1 p-value only: p=1	No
Helmes, 2022[56]	3	Arm 1	Followup in-person	Dysphagia or difficulty breathing	full group	NR	35	NR (0)	NR	Ref	No
Helmes, 2022[56]	3	Arm 2	Followup by phone	Dysphagia or difficulty breathing	full group	NR	60	NR (0)	NR	Ref: Arm 1 p-value only: p=1	No
Irarrazav al, 2021[60]	3	Arm 1	In-person	Postopera tive morbidity	full group	NR	113	9 (7.9)	NR	Ref	No
Irarrazav al, 2021[60]	3	Arm 2	Telemedic ine	Postopera tive morbidity	full group	NR	106	6 (5.7)	NR	Ref: Assuming Arm1 p-value only: p=0.5	No
Irarrazav al, 2021[60]	3	Arm 1	In-person	Minor complicati ons	full group	NR	113	9 (8)	NR	Ref	No
Irarrazav al, 2021[60]	3	Arm 2	Telemedic ine	Minor complicati ons	full group	NR	106	7 (6)	NR	Ref: Assuming Arm1 p-value only: p=0.79	No
Irarrazav al, 2021[60]	3	Arm 1	In-person	Major complicati ons	full group	NR	113	1 (0.9)	NR	Ref	No
Irarrazav al, 2021[60]	3	Arm 2	Telemedic ine	Major complicati ons	full group	NR	106	0 (0)	NR	Ref: Assuming Arm1 p-value only: p=>0.99	No
Irarrazav al, 2021[60]	3	Arm 1	In-person	Perioperat ive COVID-19 infection	full group	NR	113	6 (5.3)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Irarrazaval, 2021[60]	3	Arm 2	Telemedicine	Perioperative COVID-19 infection	full group	NR	106	9 (8.5)	NR	Ref: Assuming Arm1 p-value only: p=0.35	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Anastomic leak	full group	90 days	437	8 (1.8)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Anastomic leak	full group	90 days	98	1 (1)	NR	Ref: Arm 1 p-value only: p=0.57	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Acute kidney injury	full group	90 days	437	7 (1.6)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Acute kidney injury	full group	90 days	98	1 (1)	NR	Ref: Arm 1 p-value only: p=0.67	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Venous thrombosis	full group	90 days	437	6 (1.4)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Venous thrombosis	full group	90 days	98	0 (0)	NR	Ref: Arm 1 p-value only: p=0.24	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Pancreatic leak	full group	90 days	437	5 (1.1)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Pancreatic leak	full group	90 days	98	0 (0)	NR	Ref: Arm 1 p-value only: p=0.29	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Wound infecion	full group	90 days	437	5 (1.1)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Wound infecion	full group	90 days	98	2 (2)	NR	Ref: Arm 1 p-value only: p=0.48	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Other infection	full group	90 days	437	4 (0.9)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Other infection	full group	90 days	98	2 (2)	NR	Ref: Arm 1 p-value only: p=0.34	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Cardiopulmonary	full group	90 days	437	3 (0.7)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Cardiopulmonary	full group	90 days	98	0 (0)	NR	Ref: Arm 1 p-value only: p=0.41	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Bleeding	full group	90 days	437	3 (0.7)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Bleeding	full group	90 days	98	0 (0)	NR	Ref: Arm 1 p-value only: p=0.41	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Bowel obstruction	full group	90 days	437	3 (0.7)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Bowel obstruction	full group	90 days	98	1 (1)	NR	Ref: Arm 1 p-value only: p=0.73	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n(%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Stroke	full group	90 days	437	1 (0.2)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Stroke	full group	90 days	98	0 (0)	NR	Ref: Arm 1 p-value only: p=0.64	No
Uppal, 2022[123]	3	Arm 1	In-person	Reason for 90-day readmission: Other	full group	90 days	437	9 (2.1)	NR	Ref	No
Uppal, 2022[123]	3	Arm 2	Telehealth	Reason for 90-day readmission: Other	full group	90 days	98	1 (1)	NR	Ref: Arm 1 p-value only: p=0.15	No
Fortier, 2022[47]	4	Arm 1	In-person (usual care)	Adverse events	full group	24 weeks	29	0 (0)	NR	NR	No
Fortier, 2022[47]	4	Arm 2	Telehealth (virtual care)	Adverse events	full group	24 weeks	45	0 (0)	NR	NR	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; BMI=body mass index; CI=confidence interval; COPD=Chronic obstructive pulmonary disease; N=sample size; NA=not available; NR=not reported; OR=odds ratio; p=p-value; Ref=reference; SD=standard deviation

Table D.6.8. Clinical outcome (adverse events) results of non-comparison studies (Key Question 2)

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Malliaras, 2020[81]	1a	Arm 1	Advice only	Adverse events	Full group	12 weeks	12	6 (50)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Adverse events	Full group	12 weeks	12	4 (33)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Adverse events	Full group	12 weeks	12	6 (50)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 1	Advice only	Mild adverse events	Full group	12 weeks	12	7 (70)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Mild adverse events	Full group	12 weeks	12	4 (57)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Mild adverse events	Full group	12 weeks	12	6 (75)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 1	Advice only	Moderate adverse events	Full group	12 weeks	12	3 (30)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Moderate adverse events	Full group	12 weeks	12	3 (43)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Moderate adverse events	Full group	12 weeks	12	1 (12)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 1	Advice only	Serious adverse events	Full group	12 weeks	12	0 (0)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Serious adverse events	Full group	12 weeks	12	0 (0)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Serious adverse events	Full group	12 weeks	12	1 (12)	NR	NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Postorino, 2020[98]	2c	Full group	Full group	Minor adverse events	Full group	NR	3828	6 (18)	NR	NR	No
Postorino, 2020[98]	2c	Full group	Full group	Major adverse events	Full group	NR	3828	5 (13)	NR	NR	No
Postorino, 2020[98]	2c	Full group	Full group	Minor adverse events	Full group	NR	3828	5 (13)	NR	NR	No
Russo, 2021[108]	2c	Full group	Full group	Need for "Medical Interventio n"	full group	NR	150	69 (46)	NR	NR	No
Akerly, 2021[16]	2c	Full group	Full group	Reported Side Effects Requiring Nursing Interventio n	full group	6 week	7	6 (86)	NR	NR	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; N=sample size; NR=not reported

Table D.7.1. Process outcome (missed visits) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm om-parison	Adjusted
Arias, 2022[19]	2b	Arm 1	Pre-telehealth implementation	Postpartum visit attendance rate	full group	NR	780	565 (72.4)	NR	Ref	Race, prenatal care provider, parity, gestational age at delivery and insurance status
Arias, 2022[19]	2b	Arm 2	Post-telehealth implementation	Postpartum visit attendance rate	full group	NR	799	662 (82.9)	NR	Ref: Arm 1 Odds ratio: 1.9 (95% CI: 1.47 to 2.46), p=<0.001	Race, prenatal care provider, parity, gestational age at delivery and insurance status
Arias, 2022[19]	2b	Arm 1	Pre-telehealth implementation, hypertensive disorder of pregnancy	Cardiology follow-up visit attendance rate	full group	NR	56	29 (51.8)	NR	Ref	Prenatal care provider only
Arias, 2022[19]	2b	Arm 2	Post-telehealth implementation, hypertensive disorder of pregnancy	Cardiology follow-up visit attendance rate	full group	NR	59	36 (61)	NR	Ref: Arm 1 Odds ratio: 1.8 (95% CI: 0.79 to 4.11), p=0.32	Prenatal care provider only

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm om-parison	Adjusted
Boshara, 2022[26]	2c	Arm 1	In-person	Appointment adherence	full group	NR	332 visits	(70.8)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Appointment adherence	full group	NR	246 visits	(79.2)	NR	Ref: Arm 1 W: p=<0.001	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Age: 18-24, Appointment adherence	Age	NR	10	(61.5)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Age: 18-24, Appointment adherence	Age	NR	10	(80)	NR	Ref: Arm 1 W: p=0.414	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Age: 25-34, Appointment adherence	Age	NR	98	(64.7)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Age: 25-34, Appointment adherence	Age	NR	98	(73.3)	NR	Ref: Arm 1 W: p=0.046	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Age: 35-44, Appointment adherence	Age	NR	82	(72.5)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Age: 35-44, Appointment adherence	Age	NR	82	(80.2)	NR	Ref: Arm 1 W: p=0.058	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Age: 45-54, Appointment adherence	Age	NR	69	(73.8)	NR	Ref	Paired data

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm om-parison	Adjusted
Boshara, 2022[26]	2c	Arm 2	Telehealth	Age: 45-54, Appointment adherence	Age	NR	69	(83.6)	NR	Ref: Arm 1 W: p=0.01	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Age: 55-64, Appointment adherence	Age	NR	59	(76.4)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Age: 55-64, Appointment adherence	Age	NR	59	(76.8)	NR	Ref: Arm 1 W: p=0.459	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Age: 65+, Appointment adherence	Age	NR	29	(69.1)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Age: 65+, Appointment adherence	Age	NR	29	(88.9)	NR	Ref: Arm 1 W: p=0.027	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Race: Black, Appointment adherence	Race	NR	Total N:251	(68.9)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Race: Black, Appointment adherence	Race	NR	251	(78.3)	NR	Ref: Arm 1 W: p=0.001	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Race: White, Appointment adherence	Race	NR	20	(68.2)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Race: White, Appointment adherence	Race	NR	20	(71.8)	NR	Ref: Arm 1 W: p=0.803	Paired data

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm om-parison	Adjusted
Boshara, 2022[26]	2c	Arm 1	In-person	Race/ethnicity: Hispanic Appointment adherence	Race	NR	69	(75.9)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Race/ethnicity: Hispanic Appointment adherence	Race	NR	69	(82.5)	NR	Ref: Arm 1 W: p=0.015	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Race: Asian, Appointment adherence	Race	NR	7	(83.3)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Race: Asian, Appointment adherence	Race	NR	7	(100)	NR	Ref: Arm 1 W: p=0.317	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Gender: Female, Appointment adherence	Gender	NR	130	(70.1)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Gender: Female, Appointment adherence	Gender	NR	130	(83.4)	NR	Ref: Arm 1 W: p=<0.001	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Gender: Male, Appointment adherence	Gender	NR	217	(71.3)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Gender: Male, Appointment adherence	Gender	NR	217	(76.3)	NR	Ref: Arm 1 W: p=0.029	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	MSM, Appointment adherence	Comorbidity	NR	92	(72.5)	NR	Ref	Paired data

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm om-parison	Adjusted
Boshara, 2022[26]	2c	Arm 2	Telehealth	MSM, Appointment adherence	Comorbidity	NR	92	(86.2)	NR	Ref: Arm 1 W: p=0.0001	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	No MSM, Appointment adherence	Comorbidity	NR	137	(66.4)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	No MSM, Appointment adherence	Comorbidity	NR	137	(74.8)	NR	Ref: Arm 1 W: p=0.041	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	IDU, Appointment adherence	Comorbidity	NR	92	(61.2)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	IDU, Appointment adherence	Comorbidity	NR	92	(66.7)	NR	Ref: Arm 1 W: p=0.399	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	No IDU, Appointment adherence	Comorbidity	NR	137	(70.7)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	No IDU, Appointment adherence	Comorbidity	NR	137	(79.7)	NR	Ref: Arm 1 W: p=<0.001	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Drug use, Appointment adherence	Comorbidity	NR	48	(52.9)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Drug use, Appointment adherence	Comorbidity	NR	48	(78.6)	NR	Ref: Arm 1 W: p=0.017	Paired data

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm om-parison	Adjusted
Boshara, 2022[26]	2c	Arm 1	In-person	No drug use, Appointment adherence	Comorbidity	NR	299	(72.6)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	No drug use, Appointment adherence	Comorbidity	NR	299	(79.3)	NR	Ref: Arm 1 W: p=<0.001	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Alcohol use, Appointment adherence	Comorbidity	NR	32	(63.1)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Alcohol use, Appointment adherence	Comorbidity	NR	32	(75)	NR	Ref: Arm 1 W: p=0.214	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	No alcohol use, Appointment adherence	Comorbidity	NR	315	(71.5)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	No alcohol use, Appointment adherence	Comorbidity	NR	315	(79.6)	NR	Ref: Arm 1 W: p=<0.001	Paired data
Boshara, 2022[26]	2c	Arm 1	In-person	Housing status stable, Appointment adherence	Comorbidity	NR	36	(59.2)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Housing status stable, Appointment adherence	Comorbidity	NR	36	(81.7)	NR	Ref: Arm 1 W: p=0.006	Paired data

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm om-parison	Adjusted
Boshara, 2022[26]	2c	Arm 1	In-person	Housing status unstable, Appointment adherence	Comorbidity	NR	215	(73.1)	NR	Ref	Paired data
Boshara, 2022[26]	2c	Arm 2	Telehealth	Housing status unstable, Appointment adherence	Comorbidity	NR	215	(86)	NR	Ref: Arm 1 W: p=<0.001	Paired data
Klain, 2021[68]	2c	Arm 3	2019 visit (corresponding period to followup visit during COVID-19)	Outpatient F/U evaluations	full group	2019	525	Events: NR	NR	Ref	No
Klain, 2021[68]	2c	Arm 4	2020 telemedicine followup visit during COVID-19	Outpatient F/U evaluations	full group	During COVID-19	445	Events: NR	NR	Ref: Evaluations in corresponding 2019 period Difference in number of evaluations: -0.15 (15% missed outpatient visit in 2020 comparing 2019), p=NR	No
Watson, 2021[125]	2c	Arm 1	Pre-telephone clinic (face to face)	Proportion of patients who cancelled colonoscopies	full group	NR	814	13 (1.5)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm om-parison	Adjusted
Watson, 2021[125]	2c	Arm 2	Post-introduction (telephone)	Proportion of patients who cancelled colonoscopies	full group	NR	910	22 (2.5)	NR	Ref: Arm 1 p-value only: p=0.14	No
Zhu, 2021[133]	2c	Arm 1	2019 cohort (face to face)	Non-attendance of appointment	full group	NR	1443	157 (10.9)	NR	Ref	No
Zhu, 2021[133]	2c	Arm 2	2020 cohort (telehealth)	Non-attendance of appointment	full group	NR	1597	104 (6.5)	NR	Ref: Arm1 Odds ratio: 0.57 (95% CI: 0.44 to 0.739), p≤0.001	No
Ye, 2022[129]	3	Arm 1	In-person	Missed visit	full group	NR	3810	1953 (51.3)	NR	Ref	No
Ye, 2022[129]	3	Arm 2	Telehealth	Missed visit	full group	NR	4387	1080 (24.7)	NR	Ref: Arm 1 Odds ratio: 0.311 (95% CI: 0.284 to 0.342), p=<0.001	No
Ye, 2022[129]	3	Arm 1	In-person	Missed visit, low Area Deprivation Index	full group	NR	1384	658 (47.5)	NR	Ref	No
Ye, 2022[129]	3	Arm 2	Telehealth	Missed visit, low Area Deprivation Index	full group	NR	1590	378 (23.8)	NR	Ref: Arm 1 p-value only: p=<0.001	No
Ye, 2022[129]	3	Arm 1	In-person	Missed visit, medium Area Deprivation Index	full group	NR	2041	1066 (52.2)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm om-parison	Adjusted
Ye, 2022[129]	3	Arm 2	Telehealth	Missed visit, medium Area Deprivation Index	full group	NR	2420	601 (24.8)	NR	Ref: Arm 1 p-value only: p=<0.001	No
Ye, 2022[129]	3	Arm 1	In-person	Missed visit, high Area Deprivation Index	full group	NR	385	229 (59.5)	NR	Ref	No
Ye, 2022[129]	3	Arm 2	Telehealth	Missed visit, high Area Deprivation Index	full group	NR	377	104 (27.6)	NR	Ref: Arm 1 p-value only: p=<0.001	No
Zayde, 2021[130]	4	Full group	Full sample	No-show rates (before vs after)	full group	20 Weeks	Baseline: 12 Followup: 12	Continuous data Baseline: Mean: 0.23 (SD 0.23) Followup: Mean: 0.32 (SD 0.25)	NR	NR	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; CI=confidence interval; ED=emergency department; ENT=Ear, nose and throat; F/U=followup; N=sample size; NR=not reported; OR=odds ratio; p=p-value; Ref=reference

Table D.7.2. Process outcome (missed visits) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partici-pants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Sawka, 2021[110]	2c	Arm 1	Choice of Active Surveillance for Thyroid Cancer	Missed Clinical Appointment	Active Surveillance Group (during COVID)	232 days	133	11 (8.3)	NR	NR	No
Sawka, 2021[110]	2c	Arm 1	Choice of Active Surveillance for Thyroid Cancer	Missed Ultrasound Appointment	Active Surveillance Group (during COVID)	232 days	133	11 (8.3)	NR	NR	No
Sawka, 2021[110]	2c	Arm 1	Choice of Active Surveillance for Thyroid Cancer	Missed Blood Test	Active Surveillance Group (during COVID)	232 days	133	22 (16.5)	NR	NR	No
Sawka, 2021[110]	2c	Arm 1	Choice of Active Surveillance for Thyroid Cancer	Delayed Appointment	Active Surveillance Group (during COVID)	232 days	133	31 (22.3)	NR	NR	No

2c=specialized care, other; N=sample size; NR=not reported

Table D.7.3. Process outcome (case resolution/duplication) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Tarn, 2021[120]	1c	Arm 1	Patients receiving in-person outpatient care at primary care clinic	Telephone calls	full group	NR	Baseline: 52 Followup: NR	Continuous Baseline: Mean: 3.56 (SD 2.46) Followup: NR	NR	Ref: Arm 2, Arm 3 Chi-Squared: NR, p=0.002	No
Tarn, 2021[120]	1c	Arm 2	Patients receiving telephone outpatient care at primary care clinic	Telephone calls	full group	NR	Baseline: 55 Followup: NR	Continuous Baseline: Mean: 5.29 (SD 2.6) Followup: NR	NR	NR	No
Tarn, 2021[120]	1c	Arm 3	Patients receiving telehealth(video) outpatient care at primary care clinic	Telephone calls	full group	NR	Baseline: 89 Followup: NR	Continuous Baseline: Mean: 4.39 (SD 2.5) Followup: NR	NR	NR	No
Tarn, 2021[120]	1c	Arm 1	Patients receiving in-person outpatient care at primary care clinic	Email Messages	full group	NR	Baseline: 52 Followup: NR	Continuous Baseline: Mean: 1.4 (SD 0.96) Followup: NR	NR	Ref: Arm 2, Arm 3 Chi-Squared: NR, p=0.02	No
Tarn, 2021[120]	1c	Arm 2	Patients receiving telephone outpatient care at primary care clinic	Email Messages	full group	NR	Baseline: 55 Followup: NR	Continuous Baseline: Mean: 1.58 (SD 1.29) Followup: NR	NR	NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Tarn, 2021[120]	1c	Arm 3	Patients receiving telehealth(video) outpatient care at primary care clinic	Email Messages	full group	NR	Baseline: 89 Followup: NR	Continuous Baseline: Mean: 1.97 (SD 1.3) Followup: NR	NR	NR	No
Tarn, 2021[120]	1c	Arm 1	Patients receiving in-person outpatient care at primary care clinic	Telemedic ine visit	full group	NR	Baseline: 52 Followup: NR	Continuous Baseline: Mean: 1.1 (SD 0.3) Followup: NR	NR	Ref: Arm 2, Arm 3 Chi-Squared: NR, p≤.001	No
Tarn, 2021[120]	1c	Arm 2	Patients receiving telephone outpatient care at primary care clinic	Telemedic ine visit	full group	NR	Baseline: 55 Followup: NR	Continuous Baseline: Mean: 1.16 (SD 0.46) Followup: NR	NR	NR	No
Tarn, 2021[120]	1c	Arm 3	Patients receiving telehealth(video) outpatient care at primary care clinic	Telemedic ine visit	full group	NR	Baseline: 89 Followup: NR	Continuous Baseline: Mean: 2.3 (SD 0.7) Followup: NR	NR	NR	No
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Return to Health Care within 72 hours	full group	72 hours	132	7 (5.3)	NR	NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Return to Health Care within 72 hours	full group	72 hours	153	6 (3.9)	NR	NR	No
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Return to Health Care within 72 hours, COVID-19 related	full group	72 hours	132	5 (3.8)	NR	NR	No
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Return to Health Care within 72 hours, COVID-19 related	full group	72 hours	153	4 (2.6)	NR	NR	No
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Return to Health Care within 72 hours, Non-COVID-19 related	full group	72 hours	132	1 (8)	NR	NR	No
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Return to Health Care within 72 hours, Non-COVID-19 related	full group	72 hours	153	2 (1.3)	NR	NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Return to Health Care, Overall	full group	NR (assumed 25 days)	132	19 (14.4)	NR	NR	No
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Return to Health Care, Overall	full group	NR (assumed 25 days)	153	10 (6.5)	NR	NR	No
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Return to Health Care , Overall, COVID-19 related	full group	NR (assumed 25 days)	132	12 (9)	NR	NR	No
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Return to Health Care, Overall, COVID-19 related	full group	NR (assumed 25 days)	153	7 (4.6)	NR	NR	No
Carlberg, 2020[30]	2a	Arm 1	Patients receiving telehealth and in-person evaluation in the ED	Return to Health Care, Overall, Non-COVID-19 related	full group	NR (assumed 25 days)	132	4 (3)	NR	NR	No
Carlberg, 2020[30]	2a	Arm 2	Patients receiving telehealth only evaluation in the ED	Return to Health Care, Overall, Non-COVID-19 related	full group	NR (assumed 25 days)	153	2 (1.3)	NR	NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Kerestes, 2021[65]	2b	Arm 1	Patients who received abortion services in-person	Abortion Completion without surgery	Full group	243 days	94	88 (0.936)	NR	NR	No
Kerestes, 2021[65]	2b	Arm 2	Patients who received abortion services via telehealth	Abortion Completion without surgery	Full group	244 days	124	120 (0.968)	NR	NR	No
Kerestes, 2021[65]	2b	Arm 2	Patients who received abortion services via telehealth	Abortion Completion without surgery	Full group	245 days	69	67 (0.971)	NR	NR	No
Fredwall, 2021[49]	2c	Arm 1	Patients seen in-person at Epilepsy Clinic	Linked with Counseling, 1 month	full group	1 month	101	NR (75)	NR	NR	No
Fredwall, 2021[49]	2c	Arm 2	Patients seen by telemedicine at Epilepsy Clinic	Linked with Counseling, 1 month	full group	1 month	16	8 (35)	NR	NR	No
Fredwall, 2021[49]	2c	Arm 1	Patients seen in-person at Epilepsy Clinic	Linked with Counseling, 3 month	full group	3 months	101	NR (76)	NR	NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Fredwall, 2021[49]	2c	Arm 2	Patients seen by telemedicine at Epilepsy Clinic	Linked with Counseling, 3 month	full group	3 months	16	10 (63)	NR	NR	No
Kolb, 2021[69]	2c	Arm 1	Patients receiving in-person outpatient care at ENT clinic (Recurrent Acute Otitis Media Cohort)	Routine Follow-up Recommended	Recurrent Acute Otitis Media	42 days	50	16 (32)	NR	Ref	No
Kolb, 2021[69]	2c	Arm 2	Patients receiving telehealth outpatient care at ENT clinic, (Reccurent Acute Otitis Media Cohort)	Routine Follow-up Recommended	Recurrent Acute Otitis Media	42 days	50	10 (20)	NR	Ref: Arm 1 Chi-Squared Test: NR, p=0.254	No
Zhu, 2021[133]	2c	Arm 1	2019 cohort (face to face)	Follow-up Phone Call Required	Full group	NR	1286	29 (2.3)	NR	Ref	NR

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Zhu, 2021[133]	2c	Arm 2	2020 cohort (telehealth)	Follow-up Phone Call Required	Full group	NR	1493	48 (3.2)	NR	Ref: Arm 1 Odds ratio: 1.44 (95% CI: 0.901 to 2.293), p=0.127	No
Li, 2021[74]	2c	Arm 1	Patients triaged in-person for ophthalmologic issue	Need in-person ophthalmologic review	full group	NR	451	400 (88.7)	NR	REF	No
Li, 2021[74]	2c	Arm 2	Patients receiving virtual triage for ophthalmologic issue	Need in-person ophthalmologic review	full group	NR	403	220 (54.6)	NR	Ref: Arm 1 Chi-Squared: 128.2, p≤0.001	No
Li, 2021[74]	2c	Arm 1	Patients triaged in-person for ophthalmologic issue	Return to the Emergency Room within 1 month	full group	30 days	51	8 (15.7)	NR	REF	No
Li, 2021[74]	2c	Arm 2	Patients receiving virtual triage for ophthalmologic issue	Return to the Emergency Room within 1 month	full group	30 days	183	65 (35.5)	NR	Ref: Arm 1 Chi-Squared: 7.31, p=0.007	No
Rowe, 2021[107]	2c	Arm 1	Telephone Cardiology Outpatient Visits	Follow-up appointment within study period	Full group	148 Days	1118	196 (16.5)	NR	REF	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Rowe, 2021[107]	2c	Arm 2	Video Cardiology Outpatient Visits	Follow-up appointment within study period	Full group	148 Days	327	79 (24.2)	NR	Ref: Arm 1 p=0.015	Age, Gender, English as First Language, Rural Status, initial appointment status, cardiologist seen
Rowe, 2021[107]	2c	Arm 1	Telephone Cardiology Outpatient Visits	Alternative appointment type at next appointment	full group	148 Days	NR	39 (19.9)	NR	REF	No
Rowe, 2021[107]	2c	Arm 2	Video Cardiology Outpatient Visits	Alternative appointment type at next appointment	full group	148 Days	NR	45 (57)	NR	Ref: Arm 1 Measure of association not mentioned (used, assumed relative risk): p≤.0001	Age, Gender, English as First Language, Rural Status, initial appointment status, cardiologist seen
Rowe, 2021[107]	2c	Arm 1	Telephone Cardiology Outpatient Visits	Alternative Telemedicine Next Appointment	full group	148 Days	NR	13 (33.3)	NR	REF	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Rowe, 2021[107]	2c	Arm 2	Video Cardiology Outpatient Visits	Alternative Telemedicine Next Appointment	full group	148 Days	NR	38 (84.4)	NR	Ref: Arm 1 Measure of association not mentioned (used, assumed relative risk): p≤.0001	Age, Gender, English as First Language, Rural Status, initial appointment status, cardiologist seen
Hatef, 2022[4]	1c	Arm 1	First encounter in-person	Acute ambulatory care, any followup encounter	full group	14 days	493716	NR	NR	Ref	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.
Hatef, 2022[4]	1c	Arm 2	First encounter telemedicine	Acute ambulatory care, any followup encounter	full group	14 days	113857	NR	NR	Ref: Arm 1 Odds ratio: 1.44 (95% CI: 1.42 to 1.46), p=NR	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Hatef, 2022[4]	1c	Arm 1	First encounter in-person	Chronic ambulatory care, any followup encounter	full group	14 days	410743	NR	NR	Ref	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.
Hatef, 2022[4]	1c	Arm 2	First encounter telemedicine	Chronic ambulatory care, any followup encounter	full group	14 days	94481	NR	NR	Ref: Arm 1 Odds ratio: 0.94 (95% CI: 0.92 to 0.95), p=NR	Adjusted for the type of acute and chronic ambulatory care sensitive conditions treated during the episode.
Offiah, 2022[91]	2c	Arm 1	Traditional clinic	Return clinic	full group	NR	1220	980 (80.3)	NR	Ref	No
Offiah, 2022[91]	2c	Arm 2	Virtual clinic	Return clinic	full group	NR	496	353 (71.2)	NR	Ref: Assuming Arm1 p-value only: p=0.0003	No
Offiah, 2022[91]	2c	Arm 1	Traditional clinic	Discharged	full group	NR	1220	239 (19.6)	NR	Ref	No
Offiah, 2022[91]	2c	Arm 2	Virtual clinic	Discharged	full group	NR	496	143 (28.8)	NR	Ref: Assuming Arm1 p-value only: p=NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Lindhagen, 2022[76]	2c	Arm 1	Process outcomes	Number of unplanned telephone contacts with doctor per patient	full group	NR	Baseline: NR Followup: 814	Continuous data Baseline: NR Followup: Mean: 0.88 (SD 1.89)	NR	Ref	No
Lindhagen, 2022[76]	2c	Arm 2	Process outcomes	Number of unplanned telephone contacts with doctor per patient	full group	NR	Baseline: NR Followup: 910	Continuous data Baseline: NR Followup: Mean: 0.9 (SD 1.9)	NR	Ref: Arm 1 p-value only: p=0.379	No
Lindhagen, 2022[76]	2c	Arm 1	Process outcomes	Number of planned telephone followups with doctor per patient	full group	NR	Baseline: NR Followup: 814	Continuous data Baseline: NR Followup: Mean: 0.01 (SD 0.12)	NR	Ref	No
Lindhagen, 2022[76]	2c	Arm 2	Process outcomes	Number of planned telephone followups with doctor per patient	full group	NR	Baseline: NR Followup: 910	Continuous data Baseline: NR Followup: Mean: 0.47 (SD 0.55)	NR	Ref: Arm 1 p-value only: p=<0.001	No
Lindhagen, 2022[76]	2c	Arm 1	Process outcomes	Number of planned physical followups with doctor per patient	full group	NR	Baseline: NR Followup: 814	Continuous data Baseline: NR Followup: Mean: 0.45 (SD 0.57)	NR	Ref	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Lindhagen, 2022[76]	2c	Arm 2	Process outcomes	Number of planned physical followups with doctor per patient	full group	NR	Baseline: NR Followup: 910	Continuous data Baseline: NR Followup: Mean: 0.13 (SD 0.35)	NR	Ref: Arm 1 p-value only: p=<0.001	No
Irarrazaval, 2021[60]	3	Arm 1	In-person	Required a second in-person visit	full group	30 days	113	4 (3.5)	NR	NR	No
Irarrazaval, 2021[60]	3	Arm 2	Telemedicine	Required a second in-person visit	full group	30 days	106	3 (2.8)	NR	NR	No
Irarrazaval, 2021[60]	3	Arm 1	In-person	Required a second telemedicine visit	full group	30 days	113	7 (6.2)	NR	NR	No
Irarrazaval, 2021[60]	3	Arm 2	Telemedicine	Required a second telemedicine visit	full group	30 days	106	16 (14.9)	NR	NR	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; CI=confidence interval; ED=emergency department; ENT=Ear, nose and throat; F/U=followup; N=sample size; NR=not reported; OR=odds ratio; p=p-value; Ref=reference

Table D.7.4. Process outcome (case resolution/duplication) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Loftus, 2022[78]	2c	Arm 1	Contemporary cohort (type of visit unclear)	Added appointments/imaging/procedures	full group	NR	Baseline: NR Followup: 95	Continuous data Baseline: NR Followup: Mean: 12.4 (SD 8.7)	NR	Ref	No
Loftus, 2022[78]	2c	Arm 2	C3 pilot (includes telehealth component)	Added appointments/imaging/procedures	full group	NR	Baseline: NR Followup: 34	Continuous data Baseline: NR Followup: Mean: 13.9 (SD 7.8)	NR	Ref: Arm 1 p-value only: p=0.18	No
Loftus, 2022[78]	2c	Arm 1	Contemporary cohort (type of visit unclear)	Added or cancelled appointments/imaging/procedures	full group	NR	Baseline: NR Followup: 95	Continuous data Baseline: NR Followup: Mean: 18 (SD 12)	NR	Ref	No
Loftus, 2022[78]	2c	Arm 2	C3 pilot (includes telehealth component)	Added or cancelled appointments/imaging/procedures	full group	NR	Baseline: NR Followup: 34	Continuous data Baseline: NR Followup: Mean: 19.9 (SD 11.9)	NR	Ref: Arm 1 p-value only: p=0.33	No
Alvarez, 2020[18]	1a	Full group	Full group	Telephone consultation, resolved	Specialised primary care	NR	1509 consultations	Events: 842 (56)	NR	NR	No
Alvarez, 2020[18]	1a	Full group	Full group	Telephone consultation, unresolved	Specialised primary care	NR	1509 consultations	Events: 667 (44)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Alvarez, 2020[18]	1a	Full group	Full group	Telephone consultation, resolved	Outpatient hospital consultations	NR	1063 consultations	Events: 808 (76)	NR	NR	No
Alvarez, 2020[18]	1a	Full group	Full group	Telephone consultation, unresolved	Outpatient hospital consultations	NR	1063 consultations	Events: 255 (24)	NR	NR	No
Alvarez, 2020[18]	1a	Full group	Full group	Telephone consultation, resolved	Referrals	NR	2459 consultations	Events: 1012 (41)	NR	NR	No
Alvarez, 2020[18]	1a	Full group	Full group	Telephone consultation, unresolved	Referrals	NR	2459 consultations	Events: 1447 (59)	NR	NR	No
Alvarez, 2020[18]	1a	Full group	Full group	Telephone consultation, effective or discharges	Specialised primary care and outpatient hospital consultations	NR	2572 consultations	Events: 1650 (64)	NR	NR	No
Alvarez, 2020[18]	1a	Full group	Full group	Telephone consultation, required onsite visits or no telephone contact was made	Specialised primary care and outpatient hospital consultations	NR	2572 consultations	Events: 922 (36)	NR	NR	No
Alvarez, 2020[18]	1a	Full group	Full group	Telephone consultation, effective	Full group	NR	5031 consultations	Events: NR (53)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Mehtani, 2021[88]	1a	Full group	Full group	Buprenorphine use at discharge from I&Q	Full group	16 days	12	7 (58)	NR	NR	No
Mehtani, 2021[88]	1a	Full group	Full group	Followed up after discharge from I&Q	full group	16 days	12	4 (33)	NR	NR	No
Schweiberger, 2020[112]	1b	Arm 1	Outpatient practices with low telemedicine use	Telephone manaement without a visit per 1000 patients per week	full group	31 days	NR	Events: 17 (NR)	NR	Ref: Arm 2, Arm 3 Kruskal-Wallis Test: NR, p=0.8	No
Schweiberger, 2021[112]	1b	Arm 2	Outpatient practices with intermediate telemedicine use	Telephone manaement without a visit per 1000 patients per week	full group	32 days	NR	Events: 14 (NR)	NR	NR	No
Schweiberger, 2022[112]	1b	Arm 3	Outpatient practices with high telemedicine use	Telephone manaement without a visit per 1000 patients per week	full group	33 days	NR	Events: 15 (NR)	NR	NR	No
Ferry, 2021[46]	2a	Full group	Full	Hospital assessment after virtual ward admission	Full group	NR	223	18 (8.1)	NR	NR	No
Shabto, 2020[115]	2a	Full group	Full	Required in-person respiratory clinic assessment	full group	NR	49	4 (8.2)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Kolb, 2021[69]	2c	Arm 1	Patients receiving in-person outpatient care at ENT clinic (Recurrent Acute Otitis Media Cohort)	Successful Visit	Recurrent Acute Otitis Media	42 days	50	NR	NR	Ref	No
Kolb, 2021[69]	2c	Arm 2	Patients receiving telehealth outpatient care at ENT clinic, (Reccurent Acute Otitis Media Cohort)	Successful Visit	Recurrent Acute Otitis Media	42 days	50	42 (84)	NR	Ref: Arm 1 Chi-Squared Test: NR, p=NR	No
Kolb, 2021[69]	2c	Arm 1	Patients receiving in-person outpatient care at ENT clinic, (Sleep-Disorderd Breathing Cohort)	Successful Visit	Sleep-disordered breathing	42 days	64	NR	NR	Ref	No
Kolb, 2021[69]	2c	Arm 2	Patients receiving telehealth outpatient care at ENT clinic, (Sleep-Disorderd Breathing Cohort)	Successful Visit	Sleep-disordered breathing	42 days	64	61 (95.3)	NR	Ref: Arm 1 Fisher's Exact Test: NR, p=NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Kolb, 2021[69]	2c	Arm 1	Patients receiving in-person outpatient care at ENT clinic (Recurrent Acute Otitis Media Cohort)	Office Examination Recommended	Recurrent Acute Otitis Media	42 days	50	NR	NR	Ref	No
Kolb, 2021[69]	2c	Arm 2	Patients receiving telehealth outpatient care at ENT clinic, (Reccurent Acute Otitis Media Cohort)	Office Examination Recommended	Recurrent Acute Otitis Media	42 days	50	2 (4)	NR	Ref: Arm 1 Chi-Squared Test: NR, p=NR	No
Kolb, 2021[69]	2c	Arm 1	Patients receiving in-person outpatient care at ENT clinic, (Sleep-Disorderd Breathing Cohort)	Office Examination Recommended	Sleep-disordered breathing	42 days	64	NR	NR	Ref	No
Kolb, 2021[69]	2c	Arm 2	Patients receiving telehealth outpatient care at ENT clinic, (Sleep-Disorderd Breathing Cohort)	Office Examination Recommended	Sleep-disordered breathing	42 days	64	3 (4.7)	NR	Ref: Arm 1 Fisher's Exact Test: NR, p=NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Zhang, 2021[131]	2c	Full group	Full	Planned subsequet in-person encounter	Full group	6 weeks	298	8 (3)	NR	NR	No
Darr, 2020[41]	2c	Full group	Full group	Further investigations required after appointment	full group	NR	200	22 (11)	NR	NR	No
Chang, 2021[32]	2c	Arm 1	Patients seen by telemedicine at dermatology clinic for nail issues (New Visit)	In-person follow-up requested	Full group	NR	46	25 (54)	NR	NR	No
Chang, 2021[32]	2c	Arm 2	Patients seen by telemedicine at dermatology clinic for nail issues (Follow-up visit)	In-person follow-up requested	Full group	NR	54	2 (4)	NR	NR	No
De Marchi, 2021[43]	2c	Full group	Full group	Required urgent pneumological evaluation	full group	NR	19	2 (3.5)	NR	NR	NR
Sharma, 2020[116]	2c	Full group	Full group	Telephone consultation was effective, % of those phoned	Telephone consultation was effective	NR	215	91 (81)	NR	NR	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Com-parison	Adjusted
Sharma, 2020[116]	2c	Full group	Full group	Appropriate referrals in diagnostic category	Telephone consultation undertaken	NR	215	113 (53)	NR	NR	No
Sharma, 2020[116]	2c	Full group	Full group	Appropriate referrals in diagnostic category	Patients requiring further ENT clinic appointment	NR	215	148 (69)	NR	NR	No
Sharma, 2020[116]	2c	Full group	Full group	Appropriate referrals in diagnostic category	Listed for surgery	NR	215	23 (11)	NR	NR	No
Sharma, 2020[116]	2c	Full group	Full group	Appropriate referrals in diagnostic category	No follow up	NR	215	44 (21)	NR	NR	No
Chesnel, 2021[33]	2c	Full group	Full group	Inefficient teleconsultation	Full group	NR	328	15 (4.2)	NR	NR	No
Chesnel, 2021[33]	2c	Full group	Full group	Difficult teleconsultation (numerical scale ≥ 5)	Full group	NR	328	3 (0.9)	NR	NR	No
Chesnel, 2021[33]	2c	Full group	Full group	Teleconsultation replacing physical visit	Full group	NR	328	324 (90.5)	NR	NR	No
Longobardi, 2021[79]	3	Full group	Full group	Outpatient follow-up needed	full group	34 days	37	14 (0.3783)	NR	NR	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; ENT= ear, nose, and throat; N=sample size; NR=not reported; p=p-value; Ref=reference; SD=standard deviation

Table D.7.5. Process outcome (change in therapy/medication) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: Needs additional drug therapy (per encounter)	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0.37 (SD 0.7)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: Needs additional drug therapy (per encounter)	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.12 (SD 0.4)	NR	Ref: Arm 1 p-value only: p=0.527	No
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: Different drug needed (per encounter)	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0.09 (SD 0.31)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: Different drug needed (per encounter)	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.06 (SD 0.23)	NR	Ref: Arm 1 p-value only: p=0.423	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Wabe, 2022[124]	1a	Arm 1	Face to face	Consultations with atleast one medication prescribed	NR	8303233	3264748 (39.3)	NR	Ref	Age, sex, socioeconomic status, patient status, remoteness, primary health network, and the state of the practice
Wabe, 2022[124]	1a	Arm 2	Telehealth	Consultations with atleast one medication prescribed	NR	5304983	1751878 (33)	NR	Ref: Arm 1 Odds ratio: 1.38 (95% CI: 1.379 to 1.381), p=NR	Age, sex, socioeconomic status, patient status, remoteness, primary health network, and the state of the practice
Wabe, 2022[124]	1a	Arm 1	Face to face	Consultations with first-time medication prescribed	NR	8303233	1520401 (18.3)	NR	Ref	Age, sex, socioeconomic status, patient status, remoteness, primary health network, and the state of the practice

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Wabe, 2022[124]	1a	Arm 2	Telehealth	Consultations with first-time medication prescribed	NR	5304983	537144 (10.1)	NR	Ref: Arm 1 Odds ratio: 2.03 (95% CI: 2.02 to 2.031), p=NR	Age, sex, socioeconomic status, patient status, remoteness, primary health network, and the state of the practice
Cobo-Calbo, 2022[34]	2c	Arm 1	Face to face (2018)	Mean monthly treatment prescriptions	NR	Baseline: NR Followup: 276 prescriptions	Continuous data Baseline: NR Followup: Mean: 23 (SD 8)	NR	Ref	No
Cobo-Calbo, 2022[34]	2c	Arm 2	Face to face (2019)	Mean monthly treatment prescriptions	NR	Baseline: NR Followup: 360 prescriptions	Continuous data Baseline: NR Followup: Mean: 30 (SD 7)	NR	Ref	No
Cobo-Calbo, 2022[34]	2c	Arm 1	Telehealth (2020)	Mean monthly treatment prescriptions	NR	Baseline: NR Followup: 289 prescriptions	Continuous data Baseline: NR Followup: Mean: 24.1 (SD 7)	NR	Ref: Arm 1 and Arm 2 p-value only: Compared to Arm1: p=0.727 Compared to Arm2: p=0.049	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Cobo-Calbo, 2022[34]	2c	Arm 2	Telehealth extension period (Jan-May 2021)	Mean monthly treatment prescriptions	NR	Baseline: NR Followup: NR	Continuous data Baseline: NR Followup: Mean: 23.2 (SD 5.5)	NR	Ref: Arm 2 and Arm 3 p-value only: Compared to Arm1: p=0.072 Compared to Arm2: p=0.805	No
Lindhagen, 2022[76]	2c	Arm 1	Pre-pandemic (in-person)	Increased medication	NR	868	NR (21.3)	NR	Ref	No
Lindhagen, 2022[76]	2c	Arm 2	Pandemic (telemedicine)	Increased medication	NR	891	NR (22.2)	NR	Ref: Arm 1 p-value only: p=0.641	No
Lindhagen, 2022[76]	2c	Arm 1	Pre-pandemic (in-person)	Decreased medication	NR	868	NR (6.1)	NR	Ref	No
Lindhagen, 2022[76]	2c	Arm 2	Pandemic (telemedicine)	Decreased medication	NR	891	NR (5.9)	NR	Ref: Arm 1 p-value only: p=0.914	No
Lindhagen, 2022[76]	2c	Arm 1	Pre-pandemic (in-person)	No change in medication	NR	868	NR (76.1)	NR	Ref	No
Lindhagen, 2022[76]	2c	Arm 2	Pandemic (telemedicine)	No change in medication	NR	891	NR (75.3)	NR	Ref: Arm 1 p-value only: p=0.713	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	No change in disease-modifying antirheumatic drugs	NR	210	152 (72.4)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Mair, 2021[80]	2c	Arm 2	Telerheum	No change in disease-modifying antirheumatic drugs	NR	340	285 (73.9)	NR	Ref: Arm1 Difference in proportion: 0.11 (95% CI: 0.04 to 0.19), p=Significant	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Start new disease-modifying antirheumatic drugs	NR	210	22 (10.5)	NR	Ref	No
Mair, 2021[80]	2c	Arm 2	Telerheum	Start new disease-modifying antirheumatic drugs	NR	340	20 (5.9)	NR	Ref: Arm1 Difference in proportion: -0.05 (95% CI: -0.1 to 0), p=NS	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Stop disease-modifying antirheumatic drugs	NR	210	3 (1.4)	NR	Ref	No
Mair, 2021[80]	2c	Arm 2	Telerheum	Stop disease-modifying antirheumatic drugs	NR	340	8 (2.4)	NR	Ref: Arm1 Difference in proportion: 0.01 (95% CI: -0.02 to 0.03), p=NS	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Increased dose of disease-modifying antirheumatic drugs	NR	210	12 (5.7)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Mair, 2021[80]	2c	Arm 2	Telerheum	Increased dose of disease-modifying antirheumatic drugs	NR	340	11 (3.2)	NR	Ref: Arm1 Difference in proportion: -0.02 (95% CI: -0.07 to 0.01), p=NS	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Decreased dose of disease-modifying antirheumatic drugs	NR	210	15 (7.1)	NR	Ref	No
Mair, 2021[80]	2c	Arm 2	Telerheum	Decreased dose of disease-modifying antirheumatic drugs	NR	340	14 (4.1)	NR	Ref: Arm1 Difference in proportion: -0.03 (95% CI: -0.08 to 0.01), p=NS	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Changed route of disease-modifying antirheumatic drugs administration	NR	210	2 (1)	NR	Ref	No
Mair, 2021[80]	2c	Arm 2	Telerheum	Changed route of disease-modifying antirheumatic drugs administration	NR	340	1 (0.3)	NR	Ref: Arm1 Difference in proportion: -0.01 (95% CI: -0.03 to 0.01), p=NS	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Further disease-modifying antirheumatic drugs infusion	NR	210	4 (1.9)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Mair, 2021[80]	2c	Arm 2	Telerheum	Further disease-modifying antirheumatic drugs infusion	NR	340	1 (0.3)	NR	Ref: Arm1 Difference in proportion: -0.02 (95% CI: -0.05 to 0), p=NS	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Other medication change	NR	210	33 (15.7)	NR	Ref	No
Mair, 2021[80]	2c	Arm 2		Other medication change	NR	340	40 (11.8)	NR	Ref: Arm1 Difference in proportion: -0.04 (95% CI: -0.1 to 0.02), p=NS	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Non-pharmacological management	NR	210	35 (16.7)	NR	Ref	No
Mair, 2021[80]	2c	Arm 2	Telerheum	Non-pharmacological management	NR	340	35 (10.3)	NR	Ref: Arm1 Difference in proportion: -0.06 (95% CI: -0.13 to -0.01), p=Significant	No
Mair, 2021[80]	2c	Arm 1	Pre-COVID (2019)	Any medication change	NR	210	79 (37.6)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Mair, 2021[80]	2c	Arm 2	Telerheum	Any medication change	NR	340	84 (24.7)	NR	Ref: Arm1 Difference in proportion: -0.13 (95% CI: -0.21 to -0.05), p=Significant	No
Offiah, 2022[91]	2c	Arm 1	Traditional clinic	Patients ≥ 1 management change	NR	1220	470 (38.5)	NR	Ref	No
Offiah, 2022[91]	2c	Arm 2	Virtual clinic	Patients ≥ 1 management change	NR	496	99 (19.9)	NR	Ref: Assuming Arm1 p-value only: p=<0.00001	No
Offiah, 2022[91]	2c	Arm 1	Traditional clinic	Medication changes	NR	1220	390 (31.9)	NR	Ref	No
Offiah, 2022[91]	2c	Arm 2	Virtual clinic	Medication changes	NR	496	80 (16.1)	NR	Ref: Assuming Arm1 p-value only: p=<0.00001	No
Sharma, 2020[117]	2c	Arm 1	IBD Services before COVID (2019)	Medication dose escalation	32 days	50	8 (16)	NR	REF	No
Sharma, 2020[117]	2c	Arm 2	IBD Services after COVID (2020)	Medication dose escalation	32 days	45	8 (18)	NR	Ref: Arm 1 Fisher's exact test: NR, p=>.99	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Sharma, 2020[117]	2c	Arm 1	IBD Services before COVID (2019)	Start immunomodulator	32 days	50	3 (6)	NR	REF	No
Sharma, 2020[117]	2c	Arm 2	IBD Services after COVID (2020)	Start immunomodulator	32 days	45	1 (2)	NR	Ref: Arm 1 Fisher's exact test: NR, p=0.61	No
Sharma, 2020[117]	2c	Arm 2	IBD Services after COVID (2020)	Start Biologic agent	32 days	50	19 (38)		REF	No
Sharma, 2020[117]	2c	Arm 2	IBD Services after COVID (2020)	Start Biologic agent	32 days	45	29 (64)		p=0.01	No
Sharma, 2020[117]	2c	Arm 2	IBD Services after COVID (2020)	Switch Biologic agent	32 days	50	20 (40)		REF	No
Sharma, 2020[117]	2c	Arm 2	IBD Services after COVID (2020)	Switch Biologic agent	32 days	45	7 (16)		p=0.01	No
Zhu, 2021[133]	2c	Arm 1	2019 cohort (face to face)	Changes in analgesia	NR	1286	96 (7.5)	NR	Ref	No
Zhu, 2021[133]	2c	Arm 2	2020 cohort (telehealth)	Changes in analgesia	NR	1493	79 (5.3)	NR	Ref: Arm 1 Odds ratio: 0.69 (95% CI: 0.509 to 0.942), p=0.019	No
Zhu, 2021[133]	2c	Arm 1	2019 cohort (face to face)	Clinicians chage immunosuppressive therapy	NR	1286	352 (27.4)	NR	Ref	No

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Zhu, 2021[133]	2c	Arm 2	2020 cohort (telehealth)	Clinicians chage immunosuppressive therapy	NR	1493	338 (22.6)	NR	Ref: Arm1 Odds ratio: 0.78 (95% CI: 0.654 to 0.923), p=0.004	No

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; CI=confidence interval; IBD=irritable bowel disease; N=sample size; NR=not reported; NS=non-significant; OR=odds ratio; p=p-valu; Ref=reference; SD=standard deviation

Table D.7.6. Process outcome (change in therapy/medication) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
De Marchi, 2021[43]	2c	Full group	Change in the patient's medication regimen for neurological management	Full group	NR	19	11 (57.89)	NR	NR	No
Russo, 2021[108]	2c	Full group	Medical intervention - Anticoagulant Treatment	Receiving medical intervention	NR	69	17 (0.25)	NR	NR	No
Russo, 2021[108]	2c	Full group	Medical intervention - Antihypertensive Treatment	Receiving medical intervention	NR	69	9 (0.13)	NR	NR	No
Russo, 2021[108]	2c	Full group	Medical intervention - Lipid Lowering Treatment	Receiving medical intervention	NR	69	43 (0.62)	NR	NR	No
Sevilis, 2022[114]	2c	Arm 1	ED thrombolytics	full group	24 hours	15226	1071 (7.9)	NR	Ref	No
Sevilis, 2022[114]	2c	Arm 2	ED thrombolytics	full group	24 hours	11105	813 (8.2)	NR	Ref: Assuming Arm1 p-value only: p=0.443	No

2c=specialized care, other; ED=emergency department; N=sample size; NR=not reported; Ref=reference

Table D.7.7. Process outcome (therapy/medication adherence) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
McNamara, 2021[87]	1a	Arm 1	Face to face	Medication related problem: non-adherence (per encounter)	full group	NR	Baseline: NR Followup: 341	Continuous data Baseline: NR Followup: Mean: 0.01 (SD 0.14)	NR	Ref	No
McNamara, 2021[87]	1a	Arm 2	Telehealth	Medication related problem: non-adherence (per encounter)	full group	NR	Baseline: NR Followup: 151	Continuous data Baseline: NR Followup: Mean: 0.01 (SD 0.08)	NR	Ref: Arm 1 p-value only: p=1	No
Zimmerman, 2021[134]	1a	Arm 1	In-person	Completed treatment	full group	NR	207	NR (62.3)	NR	Ref	No
Zimmerman, 2021[134]	1a	Arm 2	Telehealth	Completed treatment	full group	NR	207	NR (72.9)	NR	Ref: Arm 1 p≤0.05	No
Baughman, 2021[21]	2c	Arm 1	Office	Adherent to treatment, all specialties with Type 2 diabetes	full group	6 months	29029	19775 (68.1)	NR	Ref	No
Baughman, 2021[21]	2c	Arm 2	Telemedicine (not specified)	Adherent to treatment, all specialties with Type 2 diabetes	full group	6 months	4822	2904 (60.2)	NR	Ref: Arm 1 Difference %: 7.9, p=<0.001	No
Baughman, 2021[21]	2c	Arm 3	Telemedicine+Office	Adherent to treatment, all specialties with Type 2 diabetes	full group	6 months	33851	22679 (67)	NR	NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Baughman, 2021[21]	2c	Arm 1	Office	Adherent to treatment, all specialties without Type 2 diabetes	full group	6 months	25843	13278 (51.4)	NR	Ref	No
Baughman, 2021[21]	2c	Arm 2	Telemedicine (not specified)	Adherent to treatment, all specialties without Type 2 diabetes	full group	6 months	4028	2056 (51)	NR	Ref: Arm 1 Difference %: 0.4, p=0.64	No
Baughman, 2021[21]	2c	Arm 3	Telemedicine+Office	Adherent to treatment, all specialties without Type 2 diabetes	full group	6 months	29871	15334 (51.3)	NR	NR	No
Baughman, 2021[21]	2c	Arm 1	Office	Adherent to treatment, all specialties (total N)	full group	6 months	54872	33053 (60.2)	NR	Ref	No
Baughman, 2021[21]	2c	Arm 2	Telemedicine (not specified)	Adherent to treatment, all specialties (total N)	full group	6 months	8850	4960 (56)	NR	Ref: Arm 1 Difference %: 4.2, p=<0.001	No
Baughman, 2021[21]	2c	Arm 3	Telemedicine+Office	Adherent to treatment, all specialties (total N)	full group	6 months	63722	38013 (59.7)	NR	NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Baughman, 2021[21]	2c	Arm 1	Office	Family medicine, all specialties with Type 2 diabetes	full group	6 months	19675	12954 (65.8)	NR	Ref	No
Baughman, 2021[21]	2c	Arm 2	Telemedicine (not specified)	Family medicine, all specialties with Type 2 diabetes	full group	6 months	2760	1675 (60.7)	NR	Ref: Arm 1 Difference %: 5.1, p=<0.001	No
Baughman, 2021[21]	2c	Arm 3	Telemedicine+Office	Family medicine, all specialties with Type 2 diabetes	full group	6 months	22435	14629 (65.2)	NR	NR	No
Baughman, 2021[21]	2c	Arm 1	Office	Family medicine, all specialties without Type 2 diabetes	full group	6 months	17332	8828 (50.9)	NR	Ref	No
Baughman, 2021[21]	2c	Arm 2	Telemedicine (not specified)	Family medicine, all specialties without Type 2 diabetes	full group	6 months	2141	1087 (50.8)	NR	Ref: Arm 1 Difference %: 0.1, p=0.93	No
Baughman, 2021[21]	2c	Arm 3	Telemedicine+Office	Family medicine, all specialties without Type 2 diabetes	full group	6 months	19473	9915 (50.9)	NR	NR	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Baughman, 2021[21]	2c	Arm 1	Office	Family medicine, all specialties (total N)	full group	6 months	37007	21782 (58.9)	NR	Ref	No
Baughman, 2021[21]	2c	Arm 2	Telemedicine (not specified)	Family medicine, all specialties (total N)	full group	6 months	4901	2762 (56.4)	NR	Ref: Arm 1 Difference %: 2.5, p=0.01	No
Baughman, 2021[21]	2c	Arm 3	Telemedicine+Office	Family medicine, all specialties (total N)	full group	6 months	41908	24544 (58.6)	NR	NR	No
Baughman, 2021[21]	2c	Arm 1	Office	Other specialties, all specialties with Type 2 diabetes	full group	6 months	9534	6821 (72.9)	NR	Ref	No
Baughman, 2021[21]	2c	Arm 2	Telemedicine (not specified)	Other specialties, all specialties with Type 2 diabetes	full group	6 months	2062	1229 (59.6)	NR	Ref: Arm 1 Difference %: 13.3, p=<0.001	No
Baughman, 2021[21]	2c	Arm 3	Telemedicine+Office	Other specialties, all specialties with Type 2 diabetes	full group	6 months	11416	8050 (70.5)	NR	NR	No
Baughman, 2021[21]	2c	Arm 1	Office	Other specialties, all specialties without Type 2 diabetes	full group	6 months	8511	4450 (52.3)	NR	Ref	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Baughman, 2021[21]	2c	Arm 2	Telemedicine (not specified)	Other specialties, all specialties without Type 2 diabetes	full group	6 months	1887	969 (51.4)	NR	Ref: Arm 1 Difference %: 1.8, p=0.16	No
Baughman, 2021[21]	2c	Arm 3	Telemedicine+Office	Other specialties, all specialties without Type 2 diabetes	full group	6 months	10398	5419 (52.1)	NR	NR	No
Baughman, 2021[21]	2c	Arm 1	Office	Other specialties, all specialties (total N)	full group	6 months	17865	11271 (63.1)	NR	Ref	No
Baughman, 2021[21]	2c	Arm 2	Telemedicine (not specified)	Other specialties, all specialties (total N)	full group	6 months	3949	2198 (55.7)	NR	Ref: Arm 1 Difference %: 7.4, p=<0.001	No
Baughman, 2021[21]	2c	Arm 3	Telemedicine+Office	Other specialties, all specialties (total N)	full group	6 months	21814	13469 (61.7)	NR	NR	No
Cvietusa, 2022[39]	2c	Arm 1	No asthma care	Proportion of days covered	full group	NR	Baseline: NR Followup: 2977	Continuous data Baseline: NR Followup: Mean: 0.489 (SE 0.007)	NR	Ref	Age, sex, race, baseline value of outcome

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Cvietusa, 2022[39]	2c	Arm 2	In-person only	Proportion of days covered	full group	NR	Baseline: NR Followup: 1792	Continuous data Baseline: NR Followup: Mean: 0.446 (SE 0.008)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	Age, sex, race, baseline value of outcome
Cvietusa, 2022[39]	2c	Arm 3	Mixed (in-person and virtual)	Proportion of days covered	full group	NR	Baseline: NR Followup: 1084	Continuous data Baseline: NR Followup: Mean: 0.497 (SE 0.01)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	Age, sex, race, baseline value of outcome
Cvietusa, 2022[39]	2c	Arm 4	Virtual care only	Proportion of days covered	full group	NR	Baseline: NR Followup: 1952	Continuous data Baseline: NR Followup: Mean: 0.476 (SE 0.008)	NR	Ref: Assuming Arm1 p-value only: p=<0.001	Age, sex, race, baseline value of outcome
Garmendia, 2021[51]	2c	Arm 1	Individuals with Sleep Apnea attending outpatient clinic, pre-covid/in-person	CPAP Compliance	full group	193	NR	NR	NR	Ref	No
Garmendia, 2021[51]	2c	Arm 2	Individuals with Sleep Apnea attending outpatient clinic, post-covid, telehealth	CPAP Compliance	full group	77	NR	NR	NR	Ref: Arm 1 Chi-squared: NR, p=0.099	No
Garmendia, 2021[51]	2c	Arm 1	Individuals with Sleep Apnea attending outpatient clinic, pre-covid/in-person	CPAP Compliance	Matching Cohort	NR	NR	NR	NR	Ref	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Garmendia, 2021[51]	2c	Arm 2	Individuals with Sleep Apnea attending outpatient clinic, post-covid, telehealth	CPAP Compliance	Matching Cohort	NR	NR	NR	NR	Ref: Arm 1 Chi-squared: NR, p=0.071	No
Garmendia, 2021[51]	2c	Arm 1	Individuals with Sleep Apnea attending outpatient clinic, pre-covid/in-person	CPAP Compliance	full group	193	NR	NR	NR	Ref	Yes
Garmendia, 2021[51]	2c	Arm 2	Individuals with Sleep Apnea attending outpatient clinic, post-covid, telehealth	CPAP Compliance	full group	77	NR	NR	NR	Ref: Arm 1 Linear Regression: NR, p=0.106	Yes
Garmendia, 2021[51]	2c	Arm 1	Individuals with Sleep Apnea attending outpatient clinic, pre-covid/in-person	CPAP Compliance	Matching Cohort	NR	NR	NR	NR	Ref	Yes
Garmendia, 2021[51]	2c	Arm 2	Individuals with Sleep Apnea attending outpatient clinic, post-covid, telehealth	CPAP Compliance	Matching Cohort	NR	NR	NR	NR	Ref: Arm 1 Linear Regression: NR, p=0.201	Yes
McCoy, 2022[85]	2c	Arm 1	In-person before telemedicine	Surgery performed	full group	NR	113	41 (36.3)	NR	NR	No
McCoy, 2022[85]	2c	Arm 2	Telemedicine	Surgery performed	full group	NR	59	24 (40.7)	NR	NR	No
McCoy, 2022[85]	2c	Arm 3	In-person during telemedicine	Surgery performed	full group	NR	4	2 (50)	NR	NR	No
Cunningham, 2022[38]	4	Arm 1	Pre-pandemic (in-person)	90- day treatment retention	full group	90 days	72	24 (33.3)	NR	NR	No
Cunningham, 2022[38]	4	Arm 2	Pandemic (telemedicine)	90- day treatment retention	full group	90 days	35	17 (48.6)	NR	NR	No
Fortier, 2022[47]	4	Arm 1	In-person (usual care)	Dropout	full group	24 weeks	29	7 (24)	NR	Ref	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Sub-group	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjusted
Fortier, 2022[47]	4	Arm 2	Telehealth (virtual care)	Dropout	full group	24 weeks	45	8 (18)	NR	Ref: Arm 1 Chi squared: p=0.506	No
Fortier, 2022[47]	4	Arm 1	In-person (usual care)	Treatment completers	full group	24 weeks	29	22 (76)	NR	Ref	No
Fortier, 2022[47]	4	Arm 2	Telehealth (virtual care)	Treatment completers	full group	24 weeks	45	37 (82)	NR	Ref: Arm 1 Chi squared: p=0.506	No
Fortier, 2022[47]	4	Arm 1	In-person (usual care)	Attendance	full group	24 weeks	29	NR (75)	NR	Ref	No
Fortier, 2022[47]	4	Arm 2	Telehealth (virtual care)	Attendance	full group	24 weeks	45	NR (88)	NR	Ref: Arm 1 Z-score: p=0.007	No
Ripp, 2022[104]	4	Arm 1	In-person (2019)	Completed follow up visits	full group	NR	1077	NR	NR	Ref	Age, sex, race, ethnicity, insurance type, and week of visit
Ripp, 2022[104]	4	Arm 2	Telehealth (2020)	Completed follow up visits	full group	NR	354	NR	NR	Ref: Arm 1 Odds ratio: 1.57 (95% CI: 1.23 to 2), p=<0.001	Age, sex, race, ethnicity, insurance type, and week of visit

1a=general medical care, adults; 1b=general medical care, children; 1c=general medical care, all ages; 2a=specialized care, COVID-19; 2b=specialized care, pregnany/prenatal/gynecological; 2c=specialized care, other; 3=surgical care; 4=general behavioural; 5=physical rehabilitation; N=sample size; NR=not reported; p=p-value; Ref=reference; CPAP= continuous positive airway pressure; SD=standard deviation

Table D.7.8. Process outcome (therapy/medication) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Malliaras, 2020[81]	1a	Arm 1	Advice only	Exercise adherence	Full group	12 weeks	12	NR	NR	NR	No
Malliaras, 2020[81]	1a	Arm 2	Recommended care	Exercise adherence	Full group	12 weeks	12	11 (92)	NR	NR	No
Malliaras, 2020[81]	1a	Arm 3	Recommended and telerehabilitation	Exercise adherence	Full group	12 weeks	12	8 (67)	NR	NR	No

1a=general medical care, adults; N=sample size; NR=not reported

Table D.7.9. Process outcome (up to date labs and paraclinical assessment) results of studies comparing in-person versus telehealth interventions (Key Question 2)

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partic-ipants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjust-ed
Arias, 2022[19]	2b	Arm 1	Pre-telehealth implementation, diabetic patients	Completion of postpartum glucose tolerance test	full group	NR	45	12 (26.7)	NR	Ref	Race, insurance status, and length of hospital stay
Arias, 2022[19]	2b	Arm 2	Post-telehealth implementation, diabetic patients	Completion of postpartum glucose tolerance test	full group	NR	59	15 (25.4)	NR	Ref: Arm 1 Odds ratio: 0.99 (95% CI: 0.37 to 2.68), p=0.89	Race, insurance status, and length of hospital stay
Cobo-Calbo, 2022[34]	2c	Arm 1	Face to face (2018)	Mean monthly visits	full group	NR	Baseline: NR Followup: 2207 scans	Continuous data Baseline: NR Followup: Mean: 183.9 (SD 29.1)	NR	Ref	No
Cobo-Calbo, 2022[34]	2c	Arm 2	Face to face (2019)	Mean monthly visits	full group	NR	Baseline: NR Followup: 2356 scans	Continuous data Baseline: NR Followup: Mean: 196 (SD 17.5)	NR	Ref	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partic-ipants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjust-ed
Cobo-Calbo, 2022[34]	2c	Arm 3	Telehealth (2020)	Mean monthly visits	full group	NR	Baseline: NR Followup: 2202 scans	Continuous data Baseline: NR Followup: Mean: 183.5 (SD 68.9)	NR	Ref: Arm 1 and Arm 2 p-value only: p=Compared to Arm1: p=0.984 Compared to Arm2: p=0.538	No
Lindhagen, 2022[76]	2c	Arm 1	Pre-telephone clinic (face to face)	Ulcerative colitis, Proportion of patients with surveillance colonoscopy	full group	NR	814	76 (15)	NR	Ref	No
Lindhagen, 2022[76]	2c	Arm 2	Post-introduction (telephone)	Ulcerative colitis, Proportion of patients with surveillance colonoscopy	full group	NR	910	49 (9.4)	NR	Ref: Arm 1 p-value only: p=0.007	No
Lindhagen, 2022[76]	2c	Arm 1	Pre-telephone clinic (face to face)	Crohn's disease, Proportion of patients with surveillance colonoscopy	full group	NR	814	17 (5.1)	NR	Ref	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partic-ipants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjust-ed
Lindhagen, 2022[76]	2c	Arm 2	Post-introduction (telephone)	Crohn's disease, Proportion of patients with surveillance colonoscopy	full group	NR	910	11 (3.3)	NR	Ref: Arm 1 p-value only: p=0.224	No
Lindhagen, 2022[76]	2c	Arm 1	Pre-telephone clinic (face to face)	Ulcerative colitis, Proportion of patients with activity control colonoscopy	full group	NR	814	55 (10.8)	NR	Ref	No
Lindhagen, 2022[76]	2c	Arm 2	Post-introduction (telephone)	Ulcerative colitis, Proportion of patients with activity control colonoscopy	full group	NR	910	64 (12.3)	NR	Ref: Arm 1 p-value only: p=0.514	No
Lindhagen, 2022[76]	2c	Arm 1	Pre-telephone clinic (face to face)	Crohn's disease, Proportion of patients with activity control colonoscopy	full group	NR	814	43 (13)	NR	Ref	No
Lindhagen, 2022[76]	2c	Arm 2	Post-introduction (telephone)	Crohn's disease, Proportion of patients with activity control colonoscopy	full group	NR	910	40 (11.8)	NR	Ref: Arm 1 p-value only: p=0.65	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partic-ipants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjust-ed
Liu, 2021[77]	2c	Arm 1	Pre-COVID clinic patients at various outpatient facilities	Pathology Test/Consultation Ordered	full group	5 days	692	492 (71.1)	NR	REF	No
Liu, 2021[77]	2c	Arm 2	Post-COVID clinic patients at various outpatient facilities	Pathology Test/Consultation Ordered	full group	5 days	683	582 (85.2)	NR	Ref: Arm 1 Assumed t-test: NR, p≤0.001	No
Liu, 2021[77]	2c	Arm 1	Pre-COVID clinic patients at various outpatient facilities	Pathology Test/Consultation Completed	full group	5 days	492	426 (86.6)	NR	REF	No
Liu, 2021[77]	2c	Arm 2	Post-COVID clinic patients at various outpatient facilities	Pathology Test/Consultation Completed	full group	5 days	582	443 (76.1)	NR	Ref: Arm 1 Assumed t-test: NR, p≤0.001	No
Liu, 2021[77]	2c	Arm 1	Pre-COVID clinic patients at various outpatient facilities	Radiology Test/Consultation Ordered	full group	5 days	692	295 (42.6)	NR	REF	No
Liu, 2021[77]	2c	Arm 2	Post-COVID clinic patients at various outpatient facilities	Radiology Test/Consultation Ordered	full group	5 days	682	345 (50.6)	NR	Ref: Arm 1 Assumed t-test: NR, p=0.003	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partic-ipants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjust-ed
Liu, 2021[77]	2c	Arm 1	Pre-COVID clinic patients at various outpatient facilities	Radiology Test/Consultation Completed	full group	5 days	295	247 (83.7)	NR	REF	No
Liu, 2021[77]	2c	Arm 2	Post-COVID clinic patients at various outpatient facilities	Radiology Test/Consultation Completed	full group	5 days	345	229 (66.4)	NR	Ref: Arm 1 Assumed t-test: NR, p≤0.001	No
Ostberg, 2022[94]	2c	Arm 1	In-person	Order class: All	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 9 (IQR 6, 12)	NR	Ref	Age, gender, billing level, insurance status, and length of stay
Ostberg, 2022[94]	2c	Arm 2	Telehealth (Zoom)	Order class: All	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 10 (IQR 7, 14)	NR	Ref: Arm 1 Rate Ratio: 1.19 (95% CI: 1.11 to 1.28, p=<0.001	Age, gender, billing level, insurance status, and length of stay
Ostberg, 2022[94]	2c	Arm 1	In-person	Order class: Imaging	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 1 (IQR 0, 1)	NR	Ref	Age, gender, billing level, insurance status, and length of stay

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partic-ipants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjust-ed
Ostberg, 2022[94]	2c	Arm 2	Telehealth (Zoom)	Order class: Imaging	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 1 (IQR 1, 1)	NR	Ref: Arm 1 Rate Ratio: 1.16 (95% CI: 1.04 to 1.3, p=0.006	Age, gender, billing level, insurance status, and length of stay
Ostberg, 2022[94]	2c	Arm 1	In-person	Order class: Labs	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 6 (IQR 4, 8)	NR	Ref	Age, gender, billing level, insurance status, and length of stay
Ostberg, 2022[94]	2c	Arm 2	Telehealth (Zoom)	Order class: Labs	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 6 (IQR 5, 8)	NR	Ref: Arm 1 Rate Ratio: 1.08 (95% CI: 1.01 to 1.16, p=0.02	Age, gender, billing level, insurance status, and length of stay
Ostberg, 2022[94]	2c	Arm 1	In-person	Order class: Medications	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 0 (IQR 0, 1)	NR	Ref	Age, gender, billing level, insurance status, and length of stay

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partic-ipants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjust-ed
Ostberg, 2022[94]	2c	Arm 2	Telehealth (Zoom)	Order class: Medications	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 0 (IQR 0, 1)	NR	Ref: Arm 1 Rate Ratio: 0.89 (95% CI: 0.72 to 1.1, p=0.279	Age, gender, billing level, insurance status, and length of stay
Ostberg, 2022[94]	2c	Arm 1	In-person	Order class: Nursing orders	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 0 (IQR 0, 1)	NR	Ref	Age, gender, billing level, insurance status, and length of stay
Ostberg, 2022[94]	2c	Arm 2	Telehealth (Zoom)	Order class: Nursing orders	full group	NR	Baseline: NR Followup: 455	Continuous data Baseline: NR Followup: Median: 1 (IQR 1, 4)	NR	Ref: Arm 1 Rate Ratio: 1.87 (95% CI: 1.56 to 2.23, p=<0.001	Age, gender, billing level, insurance status, and length of stay
Parise, 2021[95]	2c	Arm 1	Not included in telemedicine study	Continuous glucose monitoring	full group	NR	43	7 (16)	NR	Ref	No
Parise, 2021[95]	2c	Arm 2	Included in telemedicine study	Continuous glucose monitoring	full group	NR	166	155 (93.4)	NR	p≤0.001	No
Reddy, 2021[101]	2c	Arm 1	Before virtual care (in-person)	Laboratory testing	full group	4 weeks before transition	763	265 (34.7)	NR	Ref	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partic-ipants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjust-ed
Reddy, 2021[101]	2c	Arm 2	Transition to virtual care	Laboratory testing	full group	1 week during transition	168	58 (34.5)	NR	Ref: Arm 1 p-value only: p=<0.0001	No
Reddy, 2021[101]	2c	Arm 3	After transition to virtual care	Laboratory testing	full group	4 weeks after transition	813	105 (12.9)	NR	Ref: Arm 1 p-value only: p=<0.0001	No
Reddy, 2021[101]	2c	Arm 1	Before virtual care (in-person)	Diagnostic imaging	full group	4 weeks before transition	763	112 (14.7)	NR	Ref	No
Reddy, 2021[101]	2c	Arm 2	Transition to virtual care	Diagnostic imaging	full group	1 week during transition	168	17 (10.1)	NR	Ref: Arm 1 p-value only: p=<0.0001	No
Reddy, 2021[101]	2c	Arm 3	After transition to virtual care	Diagnostic imaging	full group	4 weeks after transition	813	40 (4.9)	NR	Ref: Arm 1 p-value only: p=<0.0001	No
Reddy, 2021[101]	2c	Arm 1	Before virtual care (in-person)	Procedures (biopsy, paracentesis, acupuncture, endoscopy, catheter exchanges, etc.)	full group	4 weeks before transition	763	16 (2.1)	NR	Ref	No

Author, Year	Cate-gory	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Partic-ipants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Com-parison	Adjust-ed
Reddy, 2021[101]	2c	Arm 2	Transition to virtual care	Procedures (biopsy, paracentesis, acupuncture, endoscopy, catheter exchanges, etc.)	full group	1 week during transition	168	1 (0.6)	NR	Ref: Arm 1 p-value only: p=0.0223	No
Reddy, 2021[101]	2c	Arm 3	After transition to virtual care	Procedures (biopsy, paracentesis, acupuncture, endoscopy, catheter exchanges, etc.)	full group	4 weeks after transition	813	5 (0.6)	NR	Ref: Arm 1 p-value only: p=0.0223	No

2b=specialized care, pregnany/prenatal/gynecological ; 2c=specialized care, other; N=sample size; NR=not reported; p=p-value; Ref=reference; IQR=interquartile range; CI=confidence interval

Table D.7.10. Process outcome (up to date labs and paraclinical assessment) results of non-comparison studies (Key Question 2)

Author, Year	Category	Arm	Arm Definition	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Com-parison	Between Arm Comparison	Adjusted
Akama-Garren, 2021[15]	2a	Arm 1	Patients triaged by Medical students at a respiratory clinic - Cleared	COVID-19 Test (post-RIC)	full group	214 Days	693	231 (33)	NR	Ref: Arm 2, Arm 3, Arm 4 Chi-Squared: NR, p=0.00625	No
Akama-Garren, 2021[15]	2a	Arm 2	Patients triaged by Medical students at a respiratory clinic - Referred to Clinic (RIC)	COVID-19 Test (post-RIC)	full group	214 Days	107	52 (49)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 3	Patients triaged by Medical students at a respiratory clinic - Advised to isolate	COVID-19 Test (post-RIC)	full group	214 Days	478	163 (34)	NR	NR	No
Akama-Garren, 2021[15]	2a	Arm 4	Patients triaged by Medical students at a respiratory clinic - Referred to ED	COVID-19 Test (post-RIC)	full group	214 Days	8	5 (62)	NR	NR	No

2a=specialized care, COVID-19; N=sample size; NR=not reported; p=p-value; Ref=reference

Table D.8.1. Other outcome (categorical) results of studies investigating benefits and harms of telehealth during COVID-19 (Key Question 2)

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Aazh, 2021[12]	Full group	Declining video appointments based on PTA for better ear	No hearing loss	NR	NR	NR	NR	Ref	age and gender
Aazh, 2021[12]	Full group	Declining video appointments based on PTA for better ear	Mild hearing loss	NR	NR	NR	NR	Ref: No hearing loss Relative risk: 3.5 (95% CI: 1.06 to 11.4), p=0.04	age and gender
Aazh, 2021[12]	Full group	Declining video appointments based on PTA for better ear	Moderate hearing loss	NR	NR	NR	NR	No hearing loss	age and gender
Aazh, 2021[12]	Full group	Declining video appointments based on VAS scores for tinnitus annoyance	High tinnitus annoyance	NR	NR	NR	NR	Ref: NR Relative risk: 1.4 (95% CI: 1.05 to 1.8), p=0.019	age and gender
Aiken, 2021[14]	Arm 1	Ectopic Managed Post-Treatment	full group	59 days	22197	2 (0.0001)	NR	Ref	No
Aiken, 2021[14]	Arm 2	Ectopic Managed Post-Treatment	full group	85 days	30021	10 (0.0003)	NR	Ref: Arm 1 Chi Squared: NR, p=0.123	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Aiken, 2021[14]	Arm 1	Ectopic Managed Pre-Treatment	full group	59 days	22197	37 (0.0017)	NR	Ref	No
Aiken, 2021[14]	Arm 2	Ectopic Managed Pre-Treatment	full group	85 days	30021	39 (0.0013)	NR	Ref: Arm 1 Chi Squared: NR, p=0.796	No
Aiken, 2021[14]	Arm 1	Gestational Age Later than expected	full group	59 days	22197	0 (0)	NR	Ref	No
Aiken, 2021[14]	Arm 1	Gestational Age Later than expected	full group	85 days	30021	11 (0.0004)	NR	Ref: Arm 1 Chi Squared: NR, p=NR	No
Aiken, 2021[14]	Arm 1	Unsuccessful Medical Abortion	full group	59 days	22158	389 (0.018)	NR	Ref	No
Aiken, 2021[14]	Arm 2	Unsuccessful Medical Abortion	full group	85 days	29984	366 (0.012)	NR	Ref: Arm 1 Chi Squared: NR, p=0.268	No
Aiken, 2021[14]	Arm 1	Unsuccessful: Opted to continue or known	full group	59 days	22158	3 (0.0001)	NR	Ref	No
Aiken, 2021[14]	Arm 2	Unsuccessful: Opted to continue or known	full group	85 days	29984	8 (0.0003)	NR	Ref: Arm 1 Chi Squared: NR, p=NR	No
Aiken, 2021[14]	Arm 1	Unsuccessful: Retained products treated with surgical management	full group	59 days	22158	225 (0.01)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Aiken, 2021[14]	Arm 2	Unsuccessful: Retained products treated with surgical management	full group	85 days	29984	208 (0.007)	NR	Ref: Arm 1 Chi Squared: NR, p=NR	No
Aiken, 2021[14]	Arm 1	Unsuccessful: Treated with surgical management	full group	59 days	22158	161 (0.007)	NR	Ref	No
Aiken, 2021[14]	Arm 2	Unsuccessful: Treated with surgical management	full group	85 days	29984	150 (0.005)	NR	Ref: Arm 1 Chi Squared: NR, p=NR	No
Akama-Garren, 2021[15]	Arm 1	Outpatient Encounter	full group	214 Days	693	412 (59)	NR	NR	No
Akama-Garren, 2021[15]	Arm 2	Outpatient Encounter	full group	214 Days	107	63 (59)	NR	NR	No
Akama-Garren, 2021[15]	Arm 3	Outpatient Encounter	full group	214 Days	478	364 (76)	NR	NR	No
Akama-Garren, 2021[15]	Arm 4	Outpatient Encounter	full group	214 Days	8	4 (5)	NR	NR	No
Akama-Garren, 2021[15]	Arm 1	Total Encounters (post-RIC)	full group	214 Days	693	8 (NR)	NR	Ref: Arm 2, Arm 3, Arm 4 One-Way Analysis of Variance: NR, p=0.141	No
Akama-Garren, 2021[15]	Arm 2	Total Encounters (post-RIC)	full group	214 Days	107	8 (NR)	NR	NR	No
Akama-Garren, 2021[15]	Arm 3	Total Encounters (post-RIC)	full group	214 Days	478	8 (NR)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Akama-Garren, 2021[15]	Arm 4	Total Encounters (post-RIC)	full group	214 Days	8	12 (NR)	NR	NR	No
Akerly, 2021[16]	Full group	Reported barriers to adherance	full group	6 week	7	4 (NR)	NR	NR	No
Bogin, 2022[22]	Arm 1	Video visit length >=30min	Residents without readmission	NR	646	233 (52.4)	NR	Ref	No
Bogin, 2022[22]	Arm 2	Video visit length >=30min	Residents with readmission	NR	76	26 (54)	NR	Ref: Arm 1 p-value only: NR, p=0.81	No
Chesnel, 2021[33]	Full group	Need to take a day-off	face to face consultation	NR	328	80 (24.4)	NR	NR	0
Chesnel, 2021[33]	Full group	Need to take a day-off	telephone consultation	NR	328	23 (7)	NR	NR	0
Compton, 2020[35]	Full group	Prescribed antibiotics and steroid taper	seen by multidisciplinary telehealth team	38 days	38	2 (NR)	NR	NR	NR
Corden, 2020[36]	Full group	Direct surgery referral	Individuals with lesions and prior imaging	14 days	118	66 (NR)	NR	NR	No
Corden, 2020[36]	Full group	Discharged	Individuals with lesions and no prior imaging	14 days	22	4 (NR)	NR	NR	No
Corden, 2020[36]	Full group	Discharged	Individuals with dermatoses and prior imaging	14 days	64	23 (0.359)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Corden, 2020[36]	Full group	Discharged	Individuals with dermatoses and no prior imaging	14 days	165	47 (0.285)	NR	NR	No
Corden, 2020[36]	Full group	Discharged after advice/treatment	Individuals with lesions and prior imaging	14 days	118	88 (0.34)	NR	NR	No
Corden, 2020[36]	Full group	Follow-up after advice/treatment	Individuals with lesions and prior imaging	14 days	118	129 (0.788)	NR	NR	No
Corden, 2020[36]	Full group	Follow-up requested ("Clinical Review")	Individuals with lesions and no prior imaging	14 days	22	18 (NR)	NR	NR	No
Corden, 2020[36]	Full group	Follow-up requested ("Clinical Review")	Individuals with dermatoses and prior imaging	14 days	64	34 (0.531)	NR	NR	No
Corden, 2020[36]	Full group	Follow-up requested ("Clinical Review")	Individuals with dermatoses and no prior imaging	14 days	165	96 (0.582)	NR	NR	No
Corden, 2020[36]	Full group	Surgery Referral - Mohs	Individuals with lesions and prior imaging	14 days	118	10 (NR)	NR	NR	No
Corden, 2020[36]	Full group	Surgery Referral - Expedited	Individuals with lesions and prior imaging	14 days	118	4 (NR)	NR	NR	No
Corden, 2020[36]	Full group	Surgery Referral - Routine	Individuals with lesions and prior imaging	14 days	118	52 (NR)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Crawford, 2021[37]	Full group	Surgery indication following in-person eval	full group	152 days	303	292 (0.96)	% change from baseline	NR	No
Darr, 2020[41]	Full group	Appointment was converted to face to face clinic	0	NR	200	20 (10)	NR	NR	No
Darr, 2020[41]	Full group	Discharged to primary care	0	NR	200	58 (29)	NR	NR	No
Darr, 2020[41]	Full group	Patients referred to different specialty within the same trust	0	NR	200	1 (0.5)	NR	NR	No
Darr, 2020[41]	Full group	Patients were listed for surgery	0	NR	200	18 (9)	NR	NR	No
Das, 2021[42]	Arm 1	Initiating contraception in the inpatient setting	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 1	Initiating contraception in the inpatient setting	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.99 (95% CI: 1.1 to 3.58), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Initiating contraception in the inpatient setting	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.26 (95% CI: 0.64 to 2.49), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Initiating contraception in the inpatient setting	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.45 (95% CI: 0.75 to 2.81), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Initiating contraception in the inpatient setting	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 2.74 (95% CI: 1.59 to 4.71), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Initiating contraception in the outpatient setting	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Initiating contraception in the outpatient setting	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.073 (95% CI: 0.03 to 0.18), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Initiating contraception in the outpatient setting	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.95 (95% CI: 0.69 to 1.31), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Initiating contraception in the outpatient setting	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.14 (95% CI: 0.83 to 1.58), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Initiating contraception in the outpatient setting	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.24 (95% CI: 0.15 to 0.38), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 1	Using any form of postpartum contraception	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using any form of postpartum contraception	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.41 (95% CI: 0.28 to 0.61), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using any form of postpartum contraception	PPV in-person	NR	NR	NR	NR	Arm 1	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using any form of postpartum contraception	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.18 (95% CI: 0.87 to 1.61), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using any form of postpartum contraception	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.54 (95% CI: 0.39 to 0.74), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using any form of postpartum contraception	Did not attend PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using any form of postpartum contraception	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.881 (95% CI: 0.349 to 2.225), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using any form of postpartum contraception	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.119 (95% CI: 0.786 to 1.593), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using contraception, initiated Inpatient	Did not attend PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using contraception, initiated Inpatient	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.241 (95% CI: 0.15 to 0.387), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using contraception, initiated Inpatient	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.86 (95% CI: 0.514 to 1.437), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using contraception, initiated Outpatient	Did not attend PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using contraception, initiated Outpatient	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.88 (95% CI: 1.11 to 3.212), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using contraception, initiated Outpatient	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.68 (95% CI: 1.223 to 2.076), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using Female Sterilization	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 1	Using Female Sterilization	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.13 (95% CI: 0.47 to 2.73), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using Female Sterilization	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.69 (95% CI: 0.26 to 1.82), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using Female Sterilization	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.63 (95% CI: 0.22 to 1.78), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using Female Sterilization	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.42 (95% CI: 0.15 to 1.21), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using female sterilization	Did not attend PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using female sterilization	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.806 (95% CI: 0.239 to 2.717), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using female sterilization	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 2.006 (95% CI: 0.524 to 7.686), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using LARC	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using LARC	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.3 (95% CI: 0.16 to 0.56), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using LARC	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.63 (95% CI: 0.42 to 0.94), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.13 (95% CI: 0.78 to 1.63), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.54 (95% CI: 0.35 to 0.82), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using LARC	Did not attend PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.177 (95% CI: 0.651 to 2.26), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.684 (95% CI: 0.434 to 1.076), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 1	Using LARC vs SARC	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using LARC vs SARC	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.46 (95% CI: 0.21 to 1), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC vs SARC	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.47 (95% CI: 0.27 to 0.81), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using LARC vs SARC	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1 (95% CI: 0.58 to 1.56), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC vs SARC	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 2.6 (95% CI: 1.14 to 5.93), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC vs SARC	Did not attend PPV	NR	NR	NR	NR	Ref Odds ratio: Ref (95% CI: Ref to Ref), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using LARC vs SARC	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.288 (95% CI: 0.527 to 3.15), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC vs SARC	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 3.831 (95% CI: 1.623 to 9.043), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using LARC, initiated at outpatient visit	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 1	Using LARC, initiated at outpatient visit	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.05 (95% CI: 0.01 to 0.22), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC, initiated at outpatient visit	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.96 (95% CI: 0.66 to 1.42), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC, initiated at outpatient visit	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.54 (95% CI: 0.35 to 0.83), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using LARC, initiated at outpatient visit	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.29 (95% CI: 0.17 to 0.5), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC, initiated at outpatient visit	Did not attend PPV	NR	NR	NR	NR	Ref Odds ratio: Ref (95% CI: Ref to Ref), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC, initiated at outpatient visit	PPV via telemedicine	NR	NR	NR	NR	Arm 1	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using LARC, initiated at outpatient visit	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.913 (95% CI: 0.829 to 4.419), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using LARC, initiated at the hospital	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using LARC, initiated at the hospital	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 6.84 (95% CI: 1.61 to 25.91), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using LARC, initiated at the hospital	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 3.96 (95% CI: 0.93 to 16.7), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC, initiated at the hospital	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 6.4 (95% CI: 1.66 to 24.91), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC, initiated at the hospital	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 8.67 (95% CI: 2.42 to 31.05), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using LARC, initiated at the hospital	Did not attend PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC, initiated at the hospital	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.443 (95% CI: 0.249 to 0.787), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using LARC, initiated at the hospital	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.697 (95% CI: 578 to 2.082), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 1	Using SARC	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using SARC	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.59 (95% CI: 0.35 to 0.99), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.76 (95% CI: 1.2 to 2.6), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using SARC	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.28 (95% CI: 0.84 to 1.95), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.76 (95% CI: 0.49 to 1.19), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC	Did not attend PPV	NR	NR	NR	NR	Ref Odds ratio: Ref (95% CI: Ref to Ref), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using SARC	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.765 (95% CI: 0.904 to 3.445), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.243 (95% CI: 1.031 to 1.924), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using SARC, initiated at outpatient visit	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 1	Using SARC, initiated at outpatient visit	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.3 (95% CI: 0.67 to 2.54), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC, initiated at outpatient visit	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.89 (95% CI: 0.41 to 1.95), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC, initiated at outpatient visit	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.8 (95% CI: 0.35 to 1.81), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using SARC, initiated at outpatient visit	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.79 (95% CI: 0.97 to 3.3), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC, initiated at outpatient visit	Did not attend PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC, initiated at outpatient visit	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.476 (95% CI: 0.305 to 0.745), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using SARC, initiated at outpatient visit	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.542 (95% CI: 0.272 to 1.083), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using SARC, initiated at the hospital	Attended PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 1	Using SARC, initiated at the hospital	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.14 (95% CI: 0.04 to 0.46), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using SARC, initiated at the hospital	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 2.07 (95% CI: 1.34 to 3.19), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC, initiated at the hospital	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.51 (95% CI: 0.99 to 2.43), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC, initiated at the hospital	Did not attend PPV	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.24 (95% CI: 0.1 to 0.54), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Das, 2021[42]	Arm 2	Using SARC, initiated at the hospital	Did not attend PPV	NR	NR	NR	NR	Ref	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC, initiated at the hospital	PPV via telemedicine	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.13 (95% CI: 1.058 to 1.294), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
Das, 2021[42]	Arm 2	Using SARC, initiated at the hospital	PPV in-person	NR	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.661 (95% CI: 1.322 to 1.356), p=NR	age category, low-income, ZIP, Medicaid status, marital status, ethnicity, race, multiple gestation, hypertension in pregnancy, other risk factors in pregnancy
De Marchi, 2021[43]	Full group	Scheduled outpatient multidisciplinary visit	0	NR	19	12 (NR)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
De Marchi, 2021[43]	Full group	Unable to continue due to problems with Internet connection (houses were in mountain / remote areas),	Full group	NR	19	3 (15.79)	NR	NR	No
Etherton, 2021[45]	Arm 1	Mean Number of Teleconsults	Telestroke Consult	6 months	NR	Events: 33.7 (NR)	NR	Ref	No
Etherton, 2021[45]	Arm 2	Mean Number of Teleconsults	Telestroke Consult	6 months	NR	Events: 29.8 (NR)	NR	Ref: Arm 1 % change from baseline: -0.0132, p=0.11	No
Etherton, 2021[45]	Arm 1	Number of cases with Stroke diagnosis (per week)	Telestroke Consult	6 months	NR	Events: NR (23.9)	NR	Ref	No
Etherton, 2021[45]	Arm 2	Number of cases with Stroke diagnosis (per week)	Telestroke Consult	6 months	NR	Events: NR (21.2)	NR	Arm 1	No
Etherton, 2021[45]	Arm 1	Number of cases with TIA diagnosis (per week)	Telestroke Consult	6 months	NR	Events: NR (3.5)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Etherton, 2021[45]	Arm 2	Number of cases with TIA diagnosis (per week)	Telestroke Consult	6 months	NR	Events: NR (1.8)	NR	Arm 1	No
Ferry, 2021[46]	Full group	Discharged without complications	Full group	NR	223	205 (91.9)	NR	NR	NR
Fredwall, 2021[49]	Arm 2	Acceptance of Diagnosis	full group	1 month	16	12 (0.75)	NR	NR	No
Fredwall, 2021[49]	Arm 1	Acceptance of Diagnosis, 1 month	full group	1 month	101	NR (0.5)	NR	NR	No
Fredwall, 2021[49]	Arm 1	Acceptance of Diagnosis, 3 month	full group	3 months	101	NR (0.73)	NR	NR	No
Fredwall, 2021[49]	Arm 2	Acceptance of Diagnosis, 3 month	full group	3 months	16	11 (0.69)	NR	NR	No
Gaetani, 2021[50]	Arm 1	Epistaxis Severity Score (ESS) >22	full group	244 days	45	32 (NR)	NR	NR	No
Gaetani, 2021[50]	Arm 1	IV Iron Supplementation	full group	244 Days	45	11 (0.244)	NR	REF	No
Gaetani, 2021[50]	Arm 2	IV Iron Supplementation	full group	244 Days	45	6 (0.133)	NR	Ref: Arm 1 % change from baseline: -0.111, p=not significant	No
Gaetani, 2021[50]	Arm 1	Oral Iron Supplementation	full group	244 Days	45	4 (0.088)	NR	REF	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Gaetani, 2021[50]	Arm 2	Oral Iron Supplementation	full group	244 Days	45	18 (0.4)	NR	Ref: Arm 1 % change from baseline: 0.312, p≤0.02	No
Gaetani, 2021[50]	Arm 1	Patients with EQ-VAS Improved	full group	NR	NR	NR	Total Improved from Baseline	NR	No
Gaetani, 2021[50]	Arm 1	Patients with EQ-VAS Stable	full group	NR	NR	NR	Total Stable from Baseline	NR	No
Gaetani, 2021[50]	Arm 1	Patients with EQ-VAS worsened	full group	NR	NR	NR	Total Worsened from Baseline	NR	No
Gaetani, 2021[50]	Arm 1	Require Iron Supplementation (Total)	full group	244 Days	45	15 (0.333)	NR	REF	No
Gaetani, 2021[50]	Arm 2	Require Iron Supplementation (Total)	full group	244 Days	45	24 (0.533)	NR	Ref: Arm 1 % change from baseline: 0.2, p=not significant	No
Grandizio, 2022[52]	Arm 1	Elbow flexion test	In-person evaluation	NR	32	4 (13)	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Elbow flexion test	Telemedicine evaluation	NR	32	5 (16)	NR	Ref: Arm 1 Agreement %: 97, p=Kappa: 0.94	No
Grandizio, 2022[52]	Arm 1	Median nerve compression test	In-person evaluation	NR	32	31 (97)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Grandizio, 2022[52]	Arm 2	Median nerve compression test	Telemedicine evaluation	NR	32	31 (97)	NR	Ref: Arm 1 Agreement %: 94, p=Kappa: 0.88	No
Grandizio, 2022[52]	Arm 1	Median nerve numbness	In-person evaluation	NR	32	30 (94)	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Median nerve numbness	Telemedicine evaluation	NR	32	30 (94)	NR	Ref: Arm 1 Agreement %: 100, p=Kappa: 1	No
Grandizio, 2022[52]	Arm 1	Median nerve sensory changes	In-person evaluation	NR	32	16 (50)	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Median nerve sensory changes	Telemedicine evaluation	NR	32	22 (69)	NR	Ref: Arm 1 Agreement %: 63, p=Kappa: 0.26	No
Grandizio, 2022[52]	Arm 1	Nocturnal numbness	In-person evaluation	NR	32	31 (97)	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Nocturnal numbness	Telemedicine evaluation	NR	32	31 (97)	NR	Ref: Arm 1 Agreement %: 100, p=Kappa: 1	No
Grandizio, 2022[52]	Arm 1	Positive Phalen's test	In-person evaluation	NR	32	31 (97)	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Positive Phalen's test	Telemedicine evaluation	NR	32	32 (100)	NR	Ref: Arm 1 Agreement %: 97, p=Kappa: 0.94	No
Grandizio, 2022[52]	Arm 1	Positive Tinel sign	In-person evaluation	NR	32	17 (53)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Grandizio, 2022[52]	Arm 2	Positive Tinel sign	Telemedicine evaluation	NR	32	16 (50)	NR	Ref: Arm 1 Agreement %: 78, p=Kappa: 0.56	No
Grandizio, 2022[52]	Arm 1	Thenar atrophy or weakness	In-person evaluation	NR	32	3 (9)	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Thenar atrophy or weakness	Telemedicine evaluation	NR	32	3 (9)	NR	Ref: Arm 1 Agreement %: 94, p=Kappa: 0.88	No
Grandizio, 2022[52]	Arm 1	Tinel sign	In-person evaluation	NR	32	5 (16)	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Tinel sign	Telemedicine evaluation	NR	32	6 (19)	NR	Ref: Arm 1 Agreement %: 84, p=Kappa: 0.68	No
Gross, 2020[53]	Arm 1	Nature of FTW Restrictions	full group	82 days	NR	NR	NR	REF	No
Gross, 2020[53]	Arm 2	Nature of FTW Restrictions	full group	58 days	NR	NR	NR	Ref: Arm 1 % change from baseline: NR, p≤0.001	No
Gross, 2020[53]	Arm 1	Nature of FTW Restrictions - Permanent	full group	82 days	2935	69 (0.062)	NR	NR	No
Gross, 2020[53]	Arm 2	Nature of FTW Restrictions - Permanent	full group	58 days	1205	92 (0.133)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Gross, 2020[53]	Arm 1	Nature of FTW Restrictions - Temporary	full group	82 days	2935	1042 (0.938)	NR	NR	No
Gross, 2020[53]	Arm 2	Nature of FTW Restrictions - Temporary	full group	58 days	1205	2598 (0.867)	NR	NR	No
Gross, 2020[53]	Arm 1	Nature of RTW Modifications	full group	82 days	NR	NR	NR	REF	No
Gross, 2020[53]	Arm 1	Nature of RTW Modifications - Modified work duties	full group	82 days	2935	954 (0.605)	NR	NR	No
Gross, 2020[53]	Arm 2	Nature of RTW Modifications - Modified work duties	full group	58 days	1205	305 (0.696)	NR	NR	No
Gross, 2020[53]	Arm 1	Nature of RTW Modifications - Modified work duties and hours	full group	82 days	2935	572 (0.363)	NR	NR	No
Gross, 2020[53]	Arm 2	Nature of RTW Modifications - Modified work duties and hours	full group	58 days	1205	121 (0.276)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Gross, 2020[53]	Arm 1	Nature of RTW Modifications - Modified work hours	full group	82 days	2935	50 (0.032)	NR	NR	No
Gross, 2020[53]	Arm 2	Nature of RTW Modifications - Modified work hours	full group	58 days	1205	12 (0.027)	NR	NR	No
Gross, 2020[53]	Arm 2	Nature of RTW Restrictions	full group	58 days	NR	NR	NR	Ref: Arm 1 % change from baseline: NR, p=0.002	No
Gross, 2020[53]	Arm 1	Nature of RTW Restrictions - Permanent	full group	82 days	2935	17 (0.011)	NR	NR	No
Gross, 2020[53]	Arm 2	Nature of RTW Restrictions - Permanent	full group	58 days	1205	33 (0.075)	NR	NR	No
Gross, 2020[53]	Arm 1	Nature of RTW Restrictions - Temporary	full group	82 days	2935	1559 (0.989)	NR	NR	No
Gross, 2020[53]	Arm 2	Nature of RTW Restrictions - Temporary	full group	58 days	1205	405 (0.925)	NR	NR	No
Gross, 2020[53]	Arm 1	Other Recommendation	full group	82 days	NR	NR	NR	REF	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Gross, 2020[53]	Arm 2	Other Recommendation	full group	58 days	NR	NR	NR	Ref: Arm 1 % change from baseline: NR, p≤0.001	No
Gross, 2020[53]	Arm 1	Other Recommendation - Community Provider	full group	82 days	2935	696 (0.237)	NR	NR	No
Gross, 2020[53]	Arm 2	Other Recommendation - Community Provider	full group	58 days	1205	339 (0.281)	NR	NR	No
Gross, 2020[53]	Arm 1	Other Recommendation - Further Medical	full group	82 days	2935	139 (0.047)	NR	NR	No
Gross, 2020[53]	Arm 2	Other Recommendation - Further Medical	full group	58 days	1205	47 (0.039)	NR	NR	No
Gross, 2020[53]	Arm 1	Other Recommendation - No Interventions Needed	full group	82 days	2935	178 (0.061)	NR	NR	No
Gross, 2020[53]	Arm 2	Other Recommendation - No Interventions Needed	full group	58 days	1205	112 (0.093)	NR	NR	No
Gross, 2020[53]	Arm 1	Other Recommendation - Other	full group	82 days	2935	188 (0.064)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Gross, 2020[53]	Arm 2	Other Recommendation - Other	full group	58 days	1205	63 (0.052)	NR	NR	No
Gross, 2020[53]	Arm 1	Other Recommendation - Rehabilitation Program	full group	82 days	2935	1734 (0.591)	NR	NR	No
Gross, 2020[53]	Arm 2	Other Recommendation - Rehabilitation Program	full group	58 days	1205	644 (0.534)	NR	NR	No
Gross, 2020[53]	Arm 1	Work-Assessment Outcome Recommendation	full group	82 days	NR	NR	NR	REF	No
Gross, 2020[53]	Arm 2	Work-Assessment Outcome Recommendation	full group	58 days	NR	NR	NR	Ref: Arm 1 % change from baseline: NR, p≤0.001	No
Gross, 2020[53]	Arm 1	Work-Assessment Outcome Recommendation - FTW modified Level	full group	82 days	2935	1111 (0.379)	NR	NR	No
Gross, 2020[53]	Arm 2	Work-Assessment Outcome Recommendation - FTW modified Level	full group	58 days	1205	690 (0.573)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Gross, 2020[53]	Arm 1	Work-Assessment Outcome Recommendation - FTW pre-Accident Level	full group	82 days	2935	19 (0.006)	NR	NR	No
Gross, 2020[53]	Arm 2	Work-Assessment Outcome Recommendation - FTW pre-Accident Level	full group	58 days	1205	12 (0.01)	NR	NR	No
Gross, 2020[53]	Arm 1	Work-Assessment Outcome Recommendation - No RTW	full group	82 days	2935	30 (0.01)	NR	NR	No
Gross, 2020[53]	Arm 2	Work-Assessment Outcome Recommendation - No RTW	full group	58 days	1205	24 (0.02)	NR	NR	No
Gross, 2020[53]	Arm 1	Work-Assessment Outcome Recommendation - RTW modified level	full group	82 days	2935	1576 (0.537)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Gross, 2020[53]	Arm 2	Work-Assessment Outcome Recommendation - RTW modified level	full group	58 days	1205	438 (0.363)	NR	NR	No
Gross, 2020[53]	Arm 1	Work-Assessment Outcome Recommendation - RTW pre-Accident Level	full group	82 days	2935	199 (0.068)	NR	NR	No
Gross, 2020[53]	Arm 2	Work-Assessment Outcome Recommendation - RTW pre-Accident Level	full group	58 days	1205	41 (0.034)	NR	NR	No
Hameed, 2021[54]	Arm 1	Clinically Meaningful Change in Sit-to-stand score	full group	2 weeks	6	NR (0.17)	NR	Ref: Entire Group Chi-Squared Linear-by-linear association for multiple group comparion: NR, p=0.056	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Hameed, 2021[54]	Arm 2	Clinically Meaningful Change in Sit-to-stand score	full group	2 weeks	31	NR (0.65)	NR	Ref: Arm 1 Chi-Squared Linear-by-linear association for multiple group comparion: NR, p=0.03	No
Hameed, 2021[54]	Arm 3	Clinically Meaningful Change in Sit-to-stand score	full group	2 weeks	8	NR (0.88)	NR	Ref: Arm 1 Chi-Squared Linear-by-linear association for multiple group comparion: NR, p≤.01	No
Hameed, 2021[54]	Arm 4	Clinically Meaningful Change in Sit-to-stand score	full group	2 weeks	8	NR (0.5)	NR	NR	No
Hameed, 2021[54]	Arm 1	Clinically Meaningful Change in Step Test Score	full group	2 weeks	6	NR (0.5)	NR	Ref: Entire Group Chi-Squared Linear-by-linear association for multiple group comparion: NR, p=0.12	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Hameed, 2021[54]	Arm 2	Clinically Meaningful Change in Step Test Score	full group	2 weeks	31	NR (0.74)	NR	Ref: Arm 1 Chi-Squared Linear-by-linear association for multiple group comparion: NR, p=0.25	No
Hameed, 2021[54]	Arm 3	Clinically Meaningful Change in Step Test Score	full group	2 weeks	8	NR (0.5)	NR	NR	No
Hameed, 2021[54]	Arm 4	Clinically Meaningful Change in Step Test Score	full group	2 weeks	8	NR (0.5)	NR	NR	No
Hughes, 2021[58]	Arm 1	Number of Visits in timeframe	full group	59 days	NR	Events: 436 (NR)	NR	Ref	No
Hughes, 2021[58]	Arm 2	Number of Visits in timeframe	full group	30 days	NR	Events: 254 (NR)	NR	Ref	No
Hughes, 2021[58]	Arm 3	Number of Visits in timeframe	full group	60 days	NR	Events: 581 (NR)	NR	Ref: Arm 1, Arm 2 Chi-Squared: NR, p≤.001	No
Hughes, 2021[58]	Arm 1	Type of Visit: Lab visit	full group	59 days	NR	Events: 6.9 (4.4)	NR	Ref	No
Hughes, 2021[58]	Arm 2	Type of Visit: Lab visit	full group	30 days	NR	Events: 11.9 (NR)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Hughes, 2021[58]	Arm 3	Type of Visit: Lab visit	full group	60 days	NR	Events: 15 (8.8)	NR	Ref: Arm 1, Arm 2 Chi-Squared: NR, p≤.001	No
Hughes, 2021[58]	Arm 1	Type of Visit: Office	full group	59 days	NR	Events: 14.5 (19.3)	NR	Ref	No
Hughes, 2021[58]	Arm 2	Type of Visit: Office	full group	30 days	NR	Events: 15.4 (29.9)	NR	Ref	No
Hughes, 2021[58]	Arm 3	Type of Visit: Office	full group	60 days	NR	Events: 10.7 (8.1)	NR	Ref: Arm 1, Arm 2 Chi-Squared: NR, p=0.5288	No
Hughes, 2021[58]	Arm 1	Type of Visit: Telehealth	full group	59 days	NR	Events: NR	NR	Ref	No
Hughes, 2021[58]	Arm 2	Type of Visit: Telehealth	full group	30 days	NR	Events: 13.6 (24.2)	NR	Ref	No
Hughes, 2021[58]	Arm 3	Type of Visit: Telehealth	full group	60 days	NR	Events: 16.4 (30.2)	NR	Ref: Arm 1, Arm 2 Chi-Squared: NR, p≤.001	No
Kim, 2021[67]	Full group	72 hour PED visit resulting in hospitlization	full group	91 days	406	2 (0.00005)	NR	NR	No
Kim, 2021[67]	Full group	Antibiotic Prescription	full group	91 days	406	29 (0.071)	NR	NR	No
Kim, 2021[67]	Full group	Conservative Management	full group	91 days	406	292 (0.72)	NR	NR	No
Kim, 2021[67]	Full group	Medicaition Prescription	full group	91 days	406	72 (0.18)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Klain, 2021[68]	Arm 3	Number of first accesses for newly diagnosed DTC cases	0	2019	NR	Events: 75 (NR)	NR	Ref	NR
Klain, 2021[68]	Arm 4	Number of first accesses for newly diagnosed DTC cases	0	During COVID-19	NR	Events: 54 (NR)	NR	Ref: Evaluations in corresponding 2019 period Difference in number of evaluations: -0.28, p=NR	NR
Kolb, 2021[69]	Arm 1	Audiogram Ordered After Appointment	Recurrent Acute Otitis Media	42 days	50	5 (0.1)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Audiogram Ordered After Appointment	Recurrent Acute Otitis Media	42 days	50	5 (0.1)	NR	Ref: Arm 1 Chi-Squared Test: NR, p=1	No
Kolb, 2021[69]	Arm 1	Deferred BMTT	Recurrent Acute Otitis Media	42 days	50	4 (NR)	NR	NR	No
Kolb, 2021[69]	Arm 2	Deferred BMTT	Recurrent Acute Otitis Media	42 days	50	8 (16)	NR	NR	No
Kolb, 2021[69]	Arm 1	Detailed Ear Exam	Recurrent Acute Otitis Media	42 days	50	48 (0.96)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Detailed Ear Exam	Recurrent Acute Otitis Media	42 days	50	0 (0)	NR	Ref: Arm 1 Chi-Squared Test: NR, p≤0.001	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Kolb, 2021[69]	Arm 1	Detailed Nasal Exam	Recurrent Acute Otitis Media	42 days	50	48 (0.96)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Detailed Nasal Exam	Recurrent Acute Otitis Media	42 days	50	0 (0)	NR	Ref: Arm 1 Chi-Squared Test: NR, p≤0.001	No
Kolb, 2021[69]	Arm 1	Detailed Nasal Exam	Sleep-disordered breathing	42 days	64	64 (1)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Detailed Nasal Exam	Sleep-disordered breathing	42 days	64	9 (0.141)	NR	Ref: Arm 1 Fisher's Exact Test: NR, p≤0.001	No
Kolb, 2021[69]	Arm 1	Detailed Oral/Oropharyngeal Exam	Recurrent Acute Otitis Media	42 days	50	49 (0.98)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Detailed Oral/Oropharyngeal Exam	Recurrent Acute Otitis Media	42 days	50	0 (0)	NR	Ref: Arm 1 Chi-Squared Test: NR, p≤0.001	No
Kolb, 2021[69]	Arm 1	Detailed Oral/Oropharyngeal Exam	Sleep-disordered breathing	42 days	64	64 (1)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Detailed Oral/Oropharyngeal Exam	Sleep-disordered breathing	42 days	64	42 (0.656)	NR	Ref: Arm 1 Fisher's Exact Test: NR, p≤0.001	No
Kolb, 2021[69]	Arm 1	Offered BMTT	Recurrent Acute Otitis Media	42 days	50	33 (66)	NR	NR	No
Kolb, 2021[69]	Arm 2	Offered BMTT	Recurrent Acute Otitis Media	42 days	50	36 (72)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Kolb, 2021[69]	Arm 1	Polysomnography Ordered After Appointment	Sleep-disordered breathing	42 days	64	11 (17.2)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Polysomnography Ordered After Appointment	Sleep-disordered breathing	42 days	64	5 (7.8)	NR	Ref: Arm 1 Fisher's Exact Test: NR, p=0.181	No
Kolb, 2021[69]	Arm 1	Routine Follow-up Recommended	Sleep-disordered breathing	42 days	64	19 (29.7)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Routine Follow-up Recommended	Sleep-disordered breathing	42 days	64	12 (18.8)	NR	Ref: Arm 1 Fisher's Exact Test: NR, p=0.149	No
Kolb, 2021[69]	Arm 1	Sugery Offered; Family Agrees	Recurrent Acute Otitis Media	42 days	50	33 (66)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Sugery Offered; Family Agrees	Recurrent Acute Otitis Media	42 days	50	36 (72)	NR	Ref: Arm 1 Chi-Squared Test: NR, p=0.831	No
Kolb, 2021[69]	Arm 1	Sugery Offered; Family Agrees	Sleep-disordered breathing	42 days	64	40 (62.5)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Sugery Offered; Family Agrees	Sleep-disordered breathing	42 days	64	40 (62.5)	NR	Ref: Arm 1 Fisher's Exact Test: NR, p=1	No
Kolb, 2021[69]	Arm 1	Surgery Offered; Family Considering	Recurrent Acute Otitis Media	42 days	50	1 (2)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Kolb, 2021[69]	Arm 2	Surgery Offered; Family Considering	Recurrent Acute Otitis Media	42 days	50	1 (2)	NR	Ref: Arm 1 Chi-Squared Test: NR, p=1	No
Kolb, 2021[69]	Arm 1	Surgery Offered; Family Considering	Sleep-disordered breathing	42 days	64	1 (1.6)	NR	Ref	No
Kolb, 2021[69]	Arm 2	Surgery Offered; Family Considering	Sleep-disordered breathing	42 days	64	3 (4.7)	NR	Ref: Arm 1 Fisher's Exact Test: NR, p=0.31	No
Kolb, 2021[69]	Arm 1	Underwent BMTT	Recurrent Acute Otitis Media	42 days	50	29 (58)	NR	NR	No
Kolb, 2021[69]	Arm 2	Underwent BMTT	Recurrent Acute Otitis Media	42 days	50	28 (56)	NR	NR	No
Li, 2021[73]	Arm 1	Correct prescription (based on CENTOR/FeverPain scores)	Full group	NR	67	Events: 51 (NR)	NR	NR	No
Li, 2021[73]	Arm 2	Correct prescription (based on CENTOR/FeverPain scores)	Full group	NR	27	Events: 16 (NR)	NR	NR	No
Li, 2021[73]	Arm 1	Incorrect prescription (based on CENTOR/FeverPain scores)	Full group	NR	67	Events: 16 (NR)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Li, 2021[73]	Arm 2	Incorrect prescription (based on CENTOR/FeverPain scores)	Full group	NR	27	Events: 8 (NR)	NR	NR	No
Li, 2021[73]	Arm 1	Parameters recorded	Full group	NR	39	NR (64.1)	NR	NR	No
Li, 2021[73]	Arm 2	Parameters recorded	Full group	NR	151	NR (50)	NR	NR	No
Li, 2021[73]	Arm 2	Scoring usage rate	full group	NR	151	NR (0)	NR	Ref: NR p=0.0415	No
Li, 2021[73]	Arm 1	Scoring usage rate	full group	NR	39	NR (10)	NR	NR	No
Li, 2021[73]	Arm 1	Use of antibiotics	full group	NR	39	NR (92.3)	NR	Ref	No
Li, 2021[73]	Arm 2	Use of antibiotics	full group	NR	151	NR (88.5)	NR	Ref: NR p=>0.05	No
Lightsey, 2021[75]	Full group	Change in Pre-operative plan after in-person	full group	152 days	33	31 (0.94)	% change from baseline	NR	No
Lightsey, 2021[75]	Full group	Virtual Physical Exam Completed	full group	152 days	33	10 (0.303)	NR	NR	No
Liu, 2021[77]	Arm 1	Clinic Attendance	full group	5 days	940	772 (82.1)	NR	REF	No
Liu, 2021[77]	Arm 2	Clinic Attendance	full group	5 days	942	790 (83.9)	NR	Ref: Arm 1 Assumed t-test: NR, p=0.32	No
Mair, 2021[80]	Arm 1	Active disease	Full group	NR	210	44 (21)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Mair, 2021[80]	Arm 2	Active disease	Full group	NR	340	43 (12.7)	NR	Ref: Arm1 Difference in proportion: -0.08 (95% CI: -0.15 to -0.02), p=Significant	No
Mair, 2021[80]	Arm 1	Any intervention	Full group	NR	210	102 (48.6)	NR	Ref	No
Mair, 2021[80]	Arm 2	Any intervention	Full group	NR	340	109 (32.1)	NR	Ref: Arm1 Difference in proportion: -0.17 (95% CI: -0.25 to -0.08), p=Significant	No
Mair, 2021[80]	Arm 1	Disease indeterminate	Full group	NR	210	4 (1.9)	NR	Ref	No
Mair, 2021[80]	Arm 2	Disease indeterminate	Full group	NR	340	6 (1.8)	NR	Ref: Arm1 Difference in proportion: 0 (95% CI: -0.03 to 0.02), p=NS	No
Martinez-Garcia, 2020[84]	Full group	Discharged from telehealth monitoring	full group	30 days	304	224 (0.7368)	NR	NR	No
Martinez-Garcia, 2020[84]	Full group	Voluntary Discharge	full group	30 days	304	1 (0.0032)	NR	NR	No
McCoy, 2022[85]	Arm 1	Follow up apointment	In-person before telemedicine	NR	113	61 (54)	NR	NR	No
McCoy, 2022[85]	Arm 2	Follow up apointment	Telemedicine	NR	59	28 (47.5)	NR	NR	No
McCoy, 2022[85]	Arm 3	Follow up apointment	In-person during telemedicine	NR	4	1 (25)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
McCoy, 2022[85]	Arm 1	New problem	In-person before telemedicine	NR	113	55 (48.7)	NR	NR	No
McCoy, 2022[85]	Arm 2	New problem	Telemedicine	NR	59	37 (62.7)	NR	NR	No
McCoy, 2022[85]	Arm 3	New problem	In-person during telemedicine	NR	4	3 (75)	NR	NR	No
McCoy, 2022[85]	Arm 1	Surgery recommended	In-person before telemedicine	NR	113	46 (40.7)	NR	NR	No
McCoy, 2022[85]	Arm 2	Surgery recommended	Telemedicine	NR	59	24 (40.7)	NR	NR	No
McCoy, 2022[85]	Arm 3	Surgery recommended	In-person during telemedicine	NR	4	2 (50)	NR	NR	No
Mehtani, 2021[88]	Full group	Diagnosed with Opioid Use Disorder	full group	16 days	59	12 (NR)	NR	NR	No
Miller, 2021[89]	Arm 1	Number of Antibiotic Prescription	full group	91 days	3654	NR	NR	REF	No
Miller, 2021[89]	Arm 2	Number of Antibiotic Prescription	full group	91 days	2075	NR	NR	Ref: Arm 1 Odds ratio: 0.78 (NR: 0.69 to 0.89), p≤0.001	No
Miller, 2021[89]	Arm 1	Number of Antibiotic Prescription	Seen by Otolaryngologist	91 days	332	NR	NR	REF	No
Miller, 2021[89]	Arm 2	Number of Antibiotic Prescription	Seen by Otolaryngologist	91 days	190	NR	NR	Ref: Arm 1 Assumed OR: p=0.781	No
Minsky, 2021[90]	Arm 1	Improvement in dietary habit score	Not using telemedicine	NR	228	76 (33.33)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Minsky, 2021[90]	Arm 2	Improvement in dietary habit score	Using telemedicine	NR	51	20 (39.22)	NR	NR	No
Minsky, 2021[90]	Arm 1	Mean weight change	Not using telemedicine	NR	NR	NR	Mean change from baseline: 0.18 (SD 4.6)	Ref	No
Minsky, 2021[90]	Arm 2	Mean weight change	Using telemedicine	NR	NR	NR	Mean change from baseline: -1.3 (SD 5.2)	Ref: Arm1 p=0.07	No
Minsky, 2021[90]	Arm 1	More exercise	Not using telemedicine	NR	228	29 (12.719298245614)	NR	Ref	No
Minsky, 2021[90]	Arm 2	More exercise	Using telemedicine	NR	51	13 (25.4901960784314)	NR	Ref: Arm1 Odds ratio: 2.4 (95% CI: 1.12 to 5), p=0.02	No
Minsky, 2021[90]	Arm 1	No change in dietary habit score	Not using telemedicine	NR	228	54 (23.68)	NR	NR	No
Minsky, 2021[90]	Arm 2	No change in dietary habit score	Using telemedicine	NR	51	14 (27.45)	NR	NR	No
Minsky, 2021[90]	Arm 1	Same or less exercise	Not using telemedicine	NR	228	179 (78.5)	NR	Ref	No
Minsky, 2021[90]	Arm 2	Same or less exercise	Using telemedicine	NR	51	34 (66.67)	NR	Ref: Arm1 NR, p=0.02	No
Offiah, 2022[91]	Arm 1	Medical specialty referral	Traditional clinic	NR	1220	45 (3.7)	NR	Ref	No
Offiah, 2022[91]	Arm 2	Medical specialty referral	Virtual clinic	NR	496	5 (1)	NR	Ref: Assuming Arm1 p-value only: NR, p=0.0028	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Offiah, 2022[91]	Arm 1	Referral for coronary artery bypass grafting	Traditional clinic	NR	1220	1 (0.1)	NR	NR	No
Offiah, 2022[91]	Arm 2	Referral for coronary artery bypass grafting	Virtual clinic	NR	496	1 (0.2)	NR	NR	No
Offiah, 2022[91]	Arm 1	Referral for device	Traditional clinic	NR	1220	8 (0.7)	NR	NR	No
Offiah, 2022[91]	Arm 2	Referral for device	Virtual clinic	NR	496	2 (0.4)	NR	NR	No
Offiah, 2022[91]	Arm 1	Referral for valve surgery	Traditional clinic	NR	1220	5 (0.4)	NR	NR	No
Offiah, 2022[91]	Arm 2	Referral for valve surgery	Virtual clinic	NR	496	1 (0.2)	NR	NR	No
Offiah, 2022[91]	Arm 1	Specialist nurse clinic referral	Traditional clinic	NR	1220	32 (2.6)	NR	Ref	No
Offiah, 2022[91]	Arm 2	Specialist nurse clinic referral	Virtual clinic	NR	496	5 (1)	NR	Ref: Assuming Arm1 p-value only: NR, p=0.037	No
Onishi, 2021[93]	Full group	HgbA1c <7.0% at post-period	full group	NR	NR	NR	NR	Ref NR Odds ratio: 1.53 (95% CI: 1.12 to 2.08, p=0.007	Sex, Type of Diabetes, Pre-HgbA1c, Pre-BMI, Change in BMI, Age
Onishi, 2021[93]	Full group	HgbA1c <7.0% at post-period	full group	NR	NR	NR	NR	Ref NR Odds ratio: 1.56 (95% CI: 1.15 to 2.11, p=0.004	Sex, Type of Diabetes, Pre-HgbA1c, Pre-BMI, Change in BMI, Age

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Phillips, 2021[96]	Arm 1	Any Healthcare visit	full group	14 Days	741	Events: 222 (30)	NR	Ref	No
Phillips, 2021[96]	Arm 2	Any Healthcare visit	full group	14 Days	564	Events: 187 (33.2)	NR	Ref: Arm 1 Chi Squared: NR, p=NR	No
Phillips, 2021[96]	Arm 1	Multiple related visits	full group	14 Days	741	Events: 32 (4.3)	NR	Ref	No
Phillips, 2021[96]	Arm 2	Multiple related visits	full group	14 Days	564	Events: 28 (5)	NR	Ref: Arm 1 Chi Squared: NR, p=0.581	No
Phillips, 2021[96]	Arm 2	Multiple related visits	Initial Visit Type	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.11 (95% CI: 0.66 to 1.88), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Multiple related visits	Age	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.01 (95% CI: 0.99 to 1.03), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Multiple related visits	Gender	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.64 (95% CI: 0.35 to 1.16), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Multiple related visits	Comorbidities	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1 (95% CI: 0.83 to 1.22), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 1	No healthcare visits	full group	14 Days	741	Events: 519 (70)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Phillips, 2021[96]	Arm 2	No healthcare visits	full group	14 Days	564	Events: 337 (66.8)	NR	Ref: Arm 1 Chi Squared: NR, p=0.218	No
Phillips, 2021[96]	Arm 1	Office Visit	full group	14 Days	741	Events: 66 (8.9)	NR	Ref	No
Phillips, 2021[96]	Arm 2	Office Visit	full group	14 Days	564	Events: 69 (12.2)	NR	Ref: Arm 1 Chi Squared: NR, p=0.033	No
Phillips, 2021[96]	Arm 2	Office Visit	Initial Visit Type	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.46 (95% CI: 1.02 to 2.1), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Office Visit	Age	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.99 (95% CI: 0.98 to 1.01), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Office Visit	Gender	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.71 (95% CI: 0.48 to 1.06), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Office Visit	Comorbidities	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.16 (95% CI: 1 to 1.33), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 1	Related healthcare visit	full group	14 Days	741	Events: 161 (21.7)	NR	Ref	No
Phillips, 2021[96]	Arm 2	Related healthcare visit	full group	14 Days	564	Events: 146 (25.9)	NR	Ref: Arm 1 Chi Squared: NR, p=0.079	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Phillips, 2021[96]	Arm 2	Related healthcare visit	Initial Visit Type	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.12 (95% CI: 0.94 to 1.58), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Related healthcare visit	Age	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1 (95% CI: 0.99 to 1.01), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Related healthcare visit	Gender	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.8 (95% CI: 0.6 to 1.05), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Related healthcare visit	Comorbidities	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.13 (95% CI: 1.02 to 1.25), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 1	Telehealth Visit	full group	14 Days	741	Events: 72 (9.7)	NR	Ref	No
Phillips, 2021[96]	Arm 2	Telehealth Visit	full group	14 Days	564	Events: 62 (11)	NR	Ref: Arm 1 Chi Squared: NR, p=0.452	No
Phillips, 2021[96]	Arm 2	Telehealth Visit	Initial Visit Type	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.11 (95% CI: 0.78 to 1.59), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Telehealth Visit	Age	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.01 (95% CI: 0.99 to 1.02), p=NR	initial type of visit, age, gender and the number of comorbidities

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Phillips, 2021[96]	Arm 2	Telehealth Visit	Gender	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 0.83 (95% CI: 0.57 to 1.23), p=NR	initial type of visit, age, gender and the number of comorbidities
Phillips, 2021[96]	Arm 2	Telehealth Visit	Comorbidities	14 Days	NR	NR	NR	Ref: Arm 1 Odds ratio: 1.06 (95% CI: 0.93 to 1.22), p=NR	initial type of visit, age, gender and the number of comorbidities
Ragheb, 2021[100]	Arm 1	Meets 8/9 standard of care items	In-person	NR	171	153 (89.5)	NR	Ref	No
Ragheb, 2021[100]	Arm 2	Meets 8/9 standard of care items	Telehealth	NR	51	48 (94.1)	NR	Ref: Arm 1 p-value only: NR, p=0.42	No
Ragheb, 2021[100]	Arm 1	Meets all standard of care items	In-person	NR	171	134 (78.4)	NR	Ref	No
Ragheb, 2021[100]	Arm 2	Meets all standard of care items	Telehealth	NR	51	26 (51)	NR	Ref: Arm 1 p-value only: NR, p=0.0003	No
Reynolds-Wright, 2021[103]	Full group	Ongoing pregnancy	full group	99 days	663	5 (0.8)	NR	NR	No
Rohan, 2021[106]	Arm 1	Added to Waitlist	full group	7 months	1639	308 (NR)	NR	NR	No
Rohan, 2021[106]	Arm 2	Added to Waitlist	full group	7 months	1148	282 (NR)	NR	NR	No
Rohan, 2021[106]	Arm 1	Evaluated for Transplant	full group	7 months	1639	880 (NR)	NR	NR	No
Rohan, 2021[106]	Arm 2	Evaluated for Transplant	full group	7 months	1148	930 (NR)	NR	NR	No
Rohan, 2021[106]	Arm 1	Referrals to Transplant	full group	7 months	NR	1639 (NR)	NR	NR	No
Rohan, 2021[106]	Arm 2	Referrals to Transplant	full group	7 months	NR	1148 (NR)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Rohan, 2021[106]	Arm 1	Removed from Evaluation	full group	7 months	1639	795 (NR)	NR	NR	No
Rohan, 2021[106]	Arm 2	Removed from Evaluation	full group	7 months	1148	247 (NR)	NR	NR	No
Rohan, 2021[106]	Arm 1	Transplantation Completed	full group	7 months	NR	177 (NR)	NR	NR	No
Rohan, 2021[106]	Arm 2	Transplantation Completed	full group	7 months	NR	176 (NR)	NR	NR	No
Rowe, 2021[107]	Arm 1	Face-to-Face Next Appointment	full group	148 Days	1118	26 (0.667)	NR	REF	No
Rowe, 2021[107]	Arm 2	Face-to-Face Next Appointment	full group	148 Days	327	7 (0.156)	NR	Arm 1	Age, Gender, English as First Language, Rural Status, initial appointment status, cardiologist seen
Sawka, 2021[110]	Full group	Choice of Active Surveillance for Thryoid Cancer vs Surgery	Pre-Covid enrollement in study	NR	157	117 (0.745)	NR	NR	No
Sawka, 2021[110]	Full group	Choice of Active Surveillance for Thryoid Cancer vs Surgery	Post-Covid enrollement in study	232 Days	25	24 (0.96)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Schafer, 2022[111]	Arm 1	Middle ear effusion	In-person	NR	246	172 (69.92)	NR	Ref	No
Schafer, 2022[111]	Arm 2	Middle ear effusion	Telemedicine (not specified)	NR	63	20 (31.75)	NR	Ref: Assuming Arm1 p-value only: NR, p=<0.0001	No
Schafer, 2022[111]	Arm 1	Recommended for surgery	In-person	NR	384	265 (69.01)	NR	Ref	Ethnicity, 3+ ear infections in past 6 months, history of IM antibiotics, speech difficulty, hearing difficulty
Schafer, 2022[111]	Arm 2	Recommended for surgery	Telemedicine (not specified)	NR	140	72 (51.43)	NR	Ref: Arm 1 Odds ratio: 0.443 (95% CI: 0.29 to 0.68), p=0.0002	Ethnicity, 3+ ear infections in past 6 months, history of IM antibiotics, speech difficulty, hearing difficulty
Schafer, 2022[111]	Arm 1	Underwent surgery	In-person	NR	265	246 (92.83)	NR	Ref	No
Schafer, 2022[111]	Arm 2	Underwent surgery	Telemedicine (not specified)	NR	72	63 (87.5)	NR	Ref: Assuming Arm1 p-value only: NR, p=0.106	No
Schweiberger, 2020[112]	Arm 1	All primary care encounters per 1000 patients per week	full group	16 days	NR	Events: 22 (NR)	NR	Ref: Arm 2, Arm 3 Kruskal-Wallis Test: NR, p=0.006	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Schweiberger, 2020[112]	Arm 1	In-person Visits per 1000 patients per week	full group	13 days	NR	Events: 16 (NR)	NR	Ref: Arm 2, Arm 3 Kruskal-Wallis Test: NR, p=0.005	No
Schweiberger, 2020[112]	Arm 1	Total encounters outside of primary care per 1000 patients per week	full group	25 days	NR	Events: 2 (NR)	NR	Ref: Arm 2, Arm 3 Kruskal-Wallis Test: NR, p=0.008	No
Schweiberger, 2020[112]	Arm 1	Total encounters per 1000 patients per week	full group	28 days	NR	Events: 25 (NR)	NR	Ref: Arm 2, Arm 3 Kruskal-Wallis Test: NR, p=0.003	No
Schweiberger, 2021[112]	Arm 2	All primary care encounters per 1000 patients per week	full group	17 days	NR	Events: 23 (NR)	NR	NR	No
Schweiberger, 2021[112]	Arm 2	In-person Visits per 1000 patients per week	full group	14 days	NR	Events: 11 (NR)	NR	NR	No
Schweiberger, 2021[112]	Arm 2	Total encounters outside of primary care per 1000 patients per week	full group	26 days	NR	Events: 3 (NR)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Schweiberger, 2021[112]	Arm 2	Total encounters per 1000 patients per week	full group	29 days	NR	Events: 25 (NR)	NR	NR	No
Schweiberger, 2022[112]	Arm 3	All primary care encounters per 1000 patients per week	full group	18 days	NR	Events: 28 (NR)	NR	NR	No
Schweiberger, 2022[112]	Arm 3	In-person Visits per 1000 patients per week	full group	15 days	NR	Events: 10 (NR)	NR	NR	No
Schweiberger, 2022[112]	Arm 3	Total encounters outside of primary care per 1000 patients per week	full group	27 days	NR	Events: 3 (NR)	NR	NR	No
Schweiberger, 2022[112]	Arm 3	Total encounters per 1000 patients per week	full group	30 days	NR	Events: 30 (NR)	NR	NR	No
Sharma, 2020[117]	Arm 1	Colonoscopy	"Service Evaluation" - Radiology	NR	NR	Events: 66 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	Colonoscopy	"Service Evaluation" - Radiology	NR	NR	Events: 11 (NR)	NR	Ref: Arm 1 % change from baseline: -0.83, p=NR	No
Sharma, 2020[117]	Arm 1	Helpline Contacts (Total)	"Service Evaluation" - Helpline	NR	NR	Events: 1521 (NR)	NR	REF	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Sharma, 2020[117]	Arm 2	Helpline Contacts (Total)	"Service Evaluation" - Helpline	NR	NR	Events: 2881 (NR)	NR	Ref: Arm 1 % change from baseline: 0.89, p=NR	No
Sharma, 2020[117]	Arm 1	Helpline IBD Clinical Specialist Nurse Contact	"Service Evaluation" - Helpline	NR	NR	Events: 1391 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	Helpline IBD Clinical Specialist Nurse Contact	"Service Evaluation" - Helpline	NR	NR	Events: 2455 (NR)	NR	Ref: Arm 1 % change from baseline: 0.76, p=NR	No
Sharma, 2020[117]	Arm 1	Helpline Pharmacy Contact	"Service Evaluation" - Helpline	NR	NR	Events: 130 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	Helpline Pharmacy Contact	"Service Evaluation" - Helpline	NR	NR	Events: 426 (NR)	NR	Ref: Arm 1 % change from baseline: 2.28, p=NR	No
Sharma, 2020[117]	Arm 1	IBD Infusion (Total)	"Service Evaluation" - IBD Infusion	NR	NR	Events: 274 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	IBD Infusion (Total)	"Service Evaluation" - IBD Infusion	NR	NR	Events: 298 (NR)	NR	Ref: Arm 1 % change from baseline: 0.09, p=NR	No
Sharma, 2020[117]	Arm 1	Lower Gastrointestinal Endoscopy	"Service Evaluation" - Radiology	NR	NR	Events: 114 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	Lower Gastrointestinal Endoscopy	"Service Evaluation" - Radiology	NR	NR	Events: 17 (NR)	NR	Ref: Arm 1 % change from baseline: -0.85, p=NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Sharma, 2020[117]	Arm 1	Luminal Surgery (Total Performed)	"Service Evaluation" - Luminal Surgery	NR	NR	Events: 6 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	Luminal Surgery (Total Performed)	"Service Evaluation" - Radiology	NR	NR	Events: 0 (NR)	NR	Ref: Arm 1 % change from baseline: -1, p=NR	No
Sharma, 2020[117]	Arm 1	MRI Pelvis Performed	"Service Evaluation" - Radiology	NR	NR	Events: 22 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	MRI Pelvis Performed	"Service Evaluation" - Radiology	NR	NR	Events: 3 (NR)	NR	Ref: Arm 1 % change from baseline: -0.86, p=NR	No
Sharma, 2020[117]	Arm 1	MRI Pelvis Requested	"Service Evaluation" - Radiology	NR	NR	Events: 30 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	MRI Pelvis Requested	"Service Evaluation" - Radiology	NR	NR	Events: 1 (NR)	NR	Ref: Arm 1 % change from baseline: -0.97, p=NR	No
Sharma, 2020[117]	Arm 1	MRI Small Bowel Performed	"Service Evaluation" - Radiology	NR	NR	Events: 93 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	MRI Small Bowel Performed	"Service Evaluation" - Radiology	NR	NR	Events: 12 (NR)	NR	Ref: Arm 1 % change from baseline: -0.87, p=NR	No
Sharma, 2020[117]	Arm 1	MRI Small Bowel Requested	"Service Evaluation" - Radiology	NR	NR	Events: 79 (NR)	NR	REF	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Sharma, 2020[117]	Arm 2	MRI Small Bowel Requested	"Service Evaluation" - Radiology	NR	NR	Events: 2 (NR)	NR	Ref: Arm 1 % change from baseline: -0.97, p=NR	No
Sharma, 2020[117]	Arm 1	Outpatient Contact (Total)	"Service Evaluation" - Outpatient	NR	NR	Events: 1036 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	Outpatient Contact (Total)	"Service Evaluation" - Outpatient	NR	NR	Events: 334 (NR)	NR	Ref: Arm 1 % change from baseline: -0.68, p=NR	No
Sharma, 2020[117]	Arm 1	Outpatient IBD Clinical Nurse Specialist Contact	"Service Evaluation" - Outpatient	NR	NR	Events: 21 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	Outpatient IBD Clinical Nurse Specialist Contact	"Service Evaluation" - Outpatient	NR	NR	Events: 21 (NR)	NR	Ref: Arm 1 % change from baseline: 0, p=NR	No
Sharma, 2020[117]	Arm 1	Outpatient Pharmacy Contact	"Service Evaluation" - Outpatient	NR	NR	Events: 85 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	Outpatient Pharmacy Contact	"Service Evaluation" - Outpatient	NR	NR	Events: 43 (NR)	NR	Ref: Arm 1 % change from baseline: -0.49, p=NR	No
Sharma, 2020[117]	Arm 1	Outpatient Psychology Contact	"Service Evaluation" - Outpatient	NR	NR	Events: 56 (NR)	NR	REF	No
Sharma, 2020[117]	Arm 2	Outpatient Psychology Contact	"Service Evaluation" - Outpatient	NR	NR	Events: 25 (NR)	NR	Ref: Arm 1 % change from baseline: -0.55, p=NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Winkleman, 2020[126]	Full group	Clinical Outcome: Further Follow-up	patients with successful video visit	49 days	94	44 (0.468)	NR	NR	No
Winkleman, 2020[126]	Full group	Clinical Outcome: Further Testing	patients with successful video visit	49 days	94	35 (0.372)	NR	NR	No
Winkleman, 2020[126]	Full group	Clinical Outcome: Prescription	patients with successful video visit	49 days	94	20 (0.212)	NR	NR	No
Winkleman, 2020[126]	Full group	Clinical Outcome: Scheduled Surgery/Procedure	patients with successful video visit	49 days	94	10 (0.106)	NR	NR	No
Zhu, 2021[133]	Arm 1	De-escalated immunosuppression change	2019 cohort (face to face)	NR	1286	162 (12.6)	NR	Ref	NR
Zhu, 2021[133]	Arm 2	De-escalated immunosuppression change	2020 cohort (telehealth)	NR	1493	150 (10)	NR	Ref: No change in immunosuppression Odds ratio: 0.75 (95% CI: 0.593 to 0.954), p=0.019	No
Zhu, 2021[133]	Arm 1	Discharged	2019 cohort (face to face)	NR	1443	87 (6)	NR	Ref	No
Zhu, 2021[133]	Arm 2	Discharged	2020 cohort (telehealth)	NR	1597	63 (3.9)	NR	Ref: Arm 1 Odds ratio: 0.64 (95% CI: 0.459 to 0.892), p=0.008	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Zhu, 2021[133]	Arm 1	Escalated immunosuppression change	2019 cohort (face to face)	NR	1286	166 (12.9)	NR	Ref	No
Zhu, 2021[133]	Arm 2	Escalated immunosuppression change	2020 cohort (telehealth)	NR	1493	174 (11.7)	NR	Ref: No change in immunosuppression Odds ratio: 0.85 (95% CI: 0.677 to 1.071), p=0.169	No
Zhu, 2021[133]	Arm 1	Injection or Aspirate performed	2019 cohort (face to face)	NR	1286	29 (2.3)	NR	Ref	No
Zhu, 2021[133]	Arm 2	Injection or Aspirate performed	2020 cohort (telehealth)	NR	1493	6 (0.4)	NR	Ref: Arm 1 Odds ratio: 0.18 (95% CI: 0.072 to 0.423), p≤0.001	No
Zhu, 2021[133]	Arm 1	Making a rheumatological diagnosis	2019 cohort (face to face)	NR	94	54 (57.4)	NR	Ref	No
Zhu, 2021[133]	Arm 2	Making a rheumatological diagnosis	2020 cohort (telehealth)	NR	105	30 (28.6)	NR	Ref: Arm1 Odds ratio: 0.3 (95% CI: 0.164 to 0.534), p≤0.001	No
Zhu, 2021[133]	Arm 1	No immunosuppression change	2019 cohort (face to face)	NR	1286	938 (72.9)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Time Point of Analysis	N at Analysis	Participants With Outcomes, n (%)	Within Arm Comparison	Between Arm Comparison	Adjusted
Zhu, 2021[133]	Arm 2	No immunosuppression change	2020 cohort (telehealth)	NR	1493	1155 (77.4)	NR	Ref: No change in immunosuppression Odds ratio: NR	No
Zhu, 2021[133]	Arm 1	Switched immunosuppression change	2019 cohort (face to face)	NR	1286	20 (1.6)	NR	Ref	No
Zhu, 2021[133]	Arm 2	Switched immunosuppression change	2020 cohort (telehealth)	NR	1493	14 (0.9)	NR	Ref: No change in immunosuppression Odds ratio: 0.57 (95% CI: 0.286 to 1.132), p=0.108	No

BMI=body mass index; BMTT= bilateral myringotomy with tympanostomy tube placement; CI=confidence interval; DTC= differentiated thyroid cancer; EQ-VAS=Euroqol visual analogue scale; FTW=fit to work; IBD=irritable bowel disease; LARC= long-acting reversible contraception; N=sample size; NR=not reported; OR=odds ratio; p=p-value; PED=pediatric emergency department; PPV=postpartum visit; PTA=pure tone average; Ref=reference; RTW=return to work; SARC= short-acting reversible contraception

Table D.8.2. Other outcome (continuous) results of studies investigating benefits and harms of telehealth during COVID-19 (Key Question 2)

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Albornoz-Cabello, 2021[17]	Arm 1	FLEXION	Full group	4 weeks	Baseline: 27 Followup: 27	Baseline: Mean: 110 (SD 16.2) Followup: Mean: 111 (SD 16.5)	Mean change from baseline: 1 (95% CI: -3 to 2), p=NS	Ref	No
Albornoz-Cabello, 2021[17]	Arm 2	FLEXION	Full group	4 weeks	Baseline: 27 Followup: 27	Baseline: Mean: 117 (SD 11) Followup: Mean: 126 (SD 12.3)	Mean change from baseline: 9 (95% CI: 5 to 13), p≤0.001	Ref: Arm1 (control) Mean change from baseline: 15 (95% CI: 4 to 24), p≤0.05	No
Albornoz-Cabello, 2021[17]	Arm 1	Low extremity functionality scale (KUJALA)	Full group	4 weeks	Baseline: 27 Followup: 27	Baseline: Mean: 50 (SD 13.7) Followup: Mean: 53 (SD 12.5)	Mean change from baseline: 3 (95% CI: 1 to 5), p≤0.05	Ref	No
Albornoz-Cabello, 2021[17]	Arm 2	Low extremity functionality scale (KUJALA)	Full group	4 weeks	Baseline: 27 Followup: 27	Baseline: Mean: 49 (SD 14.9) Followup: Mean: 69 (SD 13.1)	Mean change from baseline: 20 (95% CI: 16 to 23), p≤0.001	Ref: Arm1 (control) Mean change from baseline: 16 (95% CI: 8 to 22), p≤0.001	No
Albornoz-Cabello, 2021[17]	Arm 1	Low extremity functionality scale (LEFS)	Full group	4 weeks	Baseline: 27 Followup: 27	Baseline: Mean: 47 (SD 8.9) Followup: Mean: 50 (SD 10.3)	Mean change from baseline: 3 (95% CI: 1 to 5), p=NS	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Albornoz-Cabello, 2021[17]	Arm 2	Low extremity functionality scale (LEFS)	Full group	4 weeks	Baseline: 27 Followup: 27	Baseline: Mean: 45 (SD 15.2) Followup: Mean: 60 (SD 9)	Mean change from baseline: 15 (95% CI: 9 to 19), p≤0.001	Ref: Arm1 (control) Mean change from baseline: 10 (95% CI: 3 to 14), p≤0.05	No
Albornoz-Cabello, 2021[17]	Arm 1	Visual analogue scale (VAS)	Full group	4 weeks	Baseline: 27 Followup: 27	Baseline: Mean: 63 (SD 17.6) Followup: Mean: 63 (SD 18.8)	Mean change from baseline: 0 (95% CI: -2 to 3), p=NS	Ref	No
Albornoz-Cabello, 2021[17]	Arm 2	Visual analogue scale (VAS)	Full group	4 weeks	Baseline: 27 Followup: 27	Baseline: Mean: 58 (SD 12.1) Followup: Mean: 48 (SD 13.1)	Mean change from baseline: 10 (95% CI: 3.7 to 15), p≤0.05	Ref: Arm1 (control) Mean change from baseline: 15 (95% CI: 5 to 23), p≤0.05	No
Bogin, 2022[22]	Arm 1	Number of visits after the first video	Residents without readmission	NR	Baseline: NR Followup: 646	Baseline: NR Followup: Mean: 1.58 (SD 1.6)	NR	Ref	No
Bogin, 2022[22]	Arm 2	Number of visits after the first video	Residents with readmission	NR	Baseline: NR Followup: 76	Baseline: NR Followup: Mean: 2.26 (SD 1.9)	NR	Ref: Arm 1 p-value only: , p=0.002	No
Bogin, 2022[22]	Arm 1	Video visit length (minutes)	Residents without readmission	NR	Baseline: NR Followup: 646	Baseline: NR Followup: Mean: 30 (SD 15.9)	NR	Ref	No
Bogin, 2022[22]	Arm 2	Video visit length (minutes)	Residents with readmission	NR	Baseline: NR Followup: 76	Baseline: NR Followup: Mean: 34 (SD 22.7)	NR	Ref: Arm 1 p-value only: , p=0.3	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Bogin, 2022[22]	Arm 1	Video visit length >=30min	Residents without readmission	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Bogin, 2022[22]	Arm 2	Video visit length >=30min	Residents with readmission	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 p-value only: , p=0.81	No
Boscari, 2021[25]	Full group	Coefficient of variation	Full group	8 weeks	Baseline: 71 Followup: 71	Baseline: Mean: 33.9 (SD 4.8) Followup: Mean: 33.9 (SD 5.5)	Mean change from baseline: NR, p=0.9	NR	No
Boscari, 2021[25]	Full group	Glucose management indicator	Full group	8 weeks	Baseline: 71 Followup: 71	Baseline: Mean: 7.16 (SD 0.56) Followup: Mean: 7.05 (SD 0.53)	Mean change from baseline: NR, p=0.002	NR	No
Boscari, 2021[25]	Full group	Mean glucose (mg/dl)	Full group	8 weeks	Baseline: 71 Followup: 71	Baseline: Mean: 161.1 (SD 23.1) Followup: Mean: 156.3 (SD 21.5)	Mean change from baseline: NR, p=0.001	NR	No
Boscari, 2021[25]	Full group	Sensor use	Full group	8 weeks	Baseline: 71 Followup: 71	Baseline: Mean: 92.6 (SD 14.3) Followup: Mean: 92.3 (SD 15.3)	Mean change from baseline: NR, p=0.9	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Boscari, 2021[25]	Full group	Time in hypoglycemia	Full group	8 weeks	Baseline: 71 Followup: 71	Baseline: Mean: 33.4 (SD 15.7) Followup: Mean: 30.5 (SD 15.3)	Mean change from baseline: NR, p=0.002	NR	No
Boscari, 2021[25]	Full group	Time in target	Full group	8 weeks	Baseline: 71 Followup: 71	Baseline: Mean: 63.6 (SD 15.3) Followup: Mean: 66.3 (SD 15.1)	Mean change from baseline: NR, p=0.0009	NR	No
Cancer, 2021[27]	Arm 1	Rapid Automatized Naming Test	In-presence	5 weeks	Baseline: 15 Followup: 15	Baseline: Mean: -1.82 (SD 1.18) Followup: Mean: -1.71 (SD 1.14)	NR	Ref	No
Cancer, 2021[27]	Arm 2	Rapid Automatized Naming Test	Telerehabilitation	5 weeks	Baseline: 15 Followup: 15	Baseline: Mean: -3.02 (SD 2.69) Followup: Mean: -1.19 (SD 1.86)	NR	Ref: Arm 1 p-value only: , p=0.37	No
Cancer, 2021[27]	Arm 1	Reading accuracy	In-presence	5 weeks	Baseline: 15 Followup: 15	Baseline: Mean: -3.35 (SD 3.94) Followup: Mean: -2.3 (SD 2.29)	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Cancer, 2021[27]	Arm 2	Reading accuracy	Telerehabilitation	5 weeks	Baseline: 15 Followup: 15	Baseline: Mean: -2.89 (SD 2.06) Followup: Mean: -2.47 (SD 2.42)	NR	Ref: Arm 1 p-value only: , p=<0.04	No
Cancer, 2021[27]	Arm 1	Reading speed	In-presence	5 weeks	Baseline: 15 Followup: 15	Baseline: Mean: -1.8 (SD 0.62) Followup: Mean: -1.34 (SD 0.83)	NR	Ref	No
Cancer, 2021[27]	Arm 2	Reading speed	Telerehabilitation	5 weeks	Baseline: 15 Followup: 15	Baseline: Mean: -1.7 (SD 0.63) Followup: Mean: -1.21 (SD 0.72)	NR	Ref: Arm 1 p-value only: , p=<0.001	No
Candel, 2020[28]	Arm 1	HAD-A Score	full group	NR	Baseline: 25 Followup: NR	Baseline: Mean: 5.2 (95% CI: 3.8 to 6.7) Followup: NR	NR	Ref	No
Candel, 2020[28]	Arm 2	HAD-A Score	full group	NR	Baseline: 25 Followup: NR	Baseline: Mean: 4.5 (95% CI: 2.7 to 6.3) Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.49	No
Candel, 2020[28]	Arm 1	HAD-A Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Candel, 2020[28]	Arm 2	HAD-A Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 p=0.49	No
Candel, 2020[28]	Arm 1	Number of PPE set used by Nurses per patient	full group	NR	Baseline: 25 Followup: NR	Baseline: Mean: 2 Followup: NR	NR	Ref	No
Candel, 2020[28]	Arm 2	Number of PPE set used by Nurses per patient	full group	NR	Baseline: 25 Followup: NR	Baseline: Mean: 2 Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.13	No
Candel, 2020[28]	Arm 1	Number of PPE set used by Nurses per patient	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Candel, 2020[28]	Arm 2	Number of PPE set used by Nurses per patient	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.13	No
Candel, 2020[28]	Arm 1	Number of PPE set used by Physician per patient	full group	NR	Baseline: 25 Followup: NR	Baseline: Mean: 1.7 Followup: NR	NR	Ref	No
Candel, 2020[28]	Arm 2	Number of PPE set used by Physician per patient	full group	NR	Baseline: 25 Followup: NR	Baseline: Mean: 1.3 Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.013	No
Candel, 2020[28]	Arm 1	Number of PPE set used by Physician per patient	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Candel, 2020[28]	Arm 2	Number of PPE set used by Physician per patient	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.013	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Capozza, 2020[29]	Full group	CDR- Behavior	full group	6.78 months	Baseline: 32 Followup: 32	Baseline: Mean: 1.41 (SD 0.7) Followup: Mean: 1.58 (SD 0.77)	Mean change from baseline: p=0.01	NR	No
Capozza, 2020[29]	Full group	CDR- Language	full group	6.78 months	Baseline: 32 Followup: 32	Baseline: Mean: 0.69 (SD 0.66) Followup: Mean: 0.86 (SD 0.79)	Mean change from baseline: p=0.009	NR	No
Capozza, 2020[29]	Full group	CDR SoB	full group	6.78 months	Baseline: 32 Followup: 32	Baseline: Mean: 5.3 (SD 3.13) Followup: Mean: 5.41 (SD 3.11)	Mean change from baseline: p=0.13	NR	No
Chang, 2021[32]	Arm 1	Average number of medications started	full group	NR	Baseline: 46 Followup: NR	Baseline: Mean: 0.39 (NR) Followup: NR	NR	NR	No
Chang, 2021[32]	Arm 2	Average number of medications started	full group	NR	Baseline: 50 Followup: NR	Baseline: Mean: 0.22 (NR) Followup: NR	NR	NR	No
Chesnel, 2021[33]	Full group	Difficulty to obtain relevant information due to the phone way (numerical scale of 0–10)	Full group	NR	Baseline: 328 Followup: 328	Baseline: NR Followup: Mean: 1 (SD 2)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Chesnel, 2021[33]	Full group	Efficiency of the consultation (numerical scale of 0–10)	Full group	NR	Baseline: 328 Followup: 328	Baseline: NR Followup: Mean: 9.3 (SD 1.5)	NR	NR	No
De Marchi, 2021[43]	Full group	Mean monthly decline for patients (ALSFRS-R score)	0	Before televisit NR	Baseline: NR Followup: 19	Baseline: NR Followup: Mean: 0.88 (SD 1.17)	NR	NR	No
De Marchi, 2021[43]	Full group	Mean monthly decline for patients (ALSFRS-R score)	0	During televist NR	Baseline: NR Followup: 19	Baseline: NR Followup: Mean: 0.49 (SD 0.75)	NR	NR	No
Etherton, 2021[45]	Arm 1	Number of cases with Stroke diagnosis (per week)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Number of cases with Stroke diagnosis (per week)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 % change from baseline: NR, p=0.2	No
Etherton, 2021[45]	Arm 1	Number of cases with TIA diagnosis (per week)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Number of cases with TIA diagnosis (per week)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 % change from baseline: NR, p=0.02	No
Etherton, 2021[45]	Arm 1	Patients receiving alteplase (per week)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Patients receiving alteplase (per week)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 % change from baseline: NR, p=0.84	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Etherton, 2021[45]	Arm 1	Patients receiving alteplase (per week)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Patients receiving alteplase (per week)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 % change from baseline: NR, p=0.42	No
Etherton, 2021[45]	Arm 1	Time form CSC ED arrival to Groin Puncture for thrombectomy (mins)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: Median: 67.5 (IQR: 21.5 to 107.2) Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Time form CSC ED arrival to Groin Puncture for thrombectomy (mins)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: Median: 64.5 (IQR: 33.8 to 129.5) Followup: NR	NR	Ref: Arm 1 p=0.78	No
Etherton, 2021[45]	Arm 1	Time from ED arrival to alteplase (mins)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: Median: 64.5 (IQR: 49.8 to 81.8) Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Time from ED arrival to alteplase (mins)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: Median: 70 (IQR: 59.5 to 104.5) Followup: NR	NR	Ref: Arm 1 p=0.25	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Etherton, 2021[45]	Arm 1	Time from ED arrival to alteplase (mins)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: Median: 42 (IQR: 28 to 64) Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Time from ED arrival to alteplase (mins)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: Median: 43 (IQR: 39 to 51) Followup: NR	NR	Ref: Arm 1 p=0.56	No
Etherton, 2021[45]	Arm 1	Time from ED arrival to telehealth consult (mins)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: Median: 35 (IQR: 19.8 to 55.8) Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Time from ED arrival to telehealth consult (mins)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: Median: 35 (IQR: 23 to 52) Followup: NR	NR	Ref: Arm 1 p=0.83	No
Etherton, 2021[45]	Arm 1	Time from LKW to ED Presentation (mins)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: Median: 68.5 (IQR: 42 to 127) Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Time from LKW to ED Presentation (mins)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: Median: 65 (IQR: 38 to 97.2) Followup: NR	NR	Ref: Arm 1 p=0.44	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Etherton, 2021[45]	Arm 1	Time from LKW to ED Presentation (mins)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: Median: 686.5 (IQR: 198 to 2095) Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Time from LKW to ED Presentation (mins)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: Median: 704 (IQR: 226 to 1689.5) Followup: NR	NR	Ref: Arm 1 p=0.87	No
Etherton, 2021[45]	Arm 1	Time from symptoms to ED presentation (mins)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: Median: 51 (IQR: 35 to 85) Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Time from symptoms to ED presentation (mins)	Telestroke Consult	NR	Baseline: NR Followup: NR	Baseline: Median: 55.5 (IQR: 36.8 to 76.2) Followup: NR	NR	Ref: Arm 1 p=0.98	No
Etherton, 2021[45]	Arm 1	Time from symptoms to ED presentation (mins)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: Median: 299 (IQR: 110 to 936) Followup: NR	NR	Ref	No
Etherton, 2021[45]	Arm 2	Time from symptoms to ED presentation (mins)	CSC Admission	NR	Baseline: NR Followup: NR	Baseline: Median: 272 (IQR: 138.2 to 795.5) Followup: NR	NR	Ref: Arm 1 p=0.99	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Gaetani, 2021[50]	Arm 1	Mean ESS	Individuals with Clinically Relevant episodes of Epistaxis	244 days	Baseline: 32 Followup: 32	Baseline: Mean: 5.5 (SD 1.9) Followup: Mean: 3.6 (SD 1.4)	Mean change from baseline: -1.9, p≤0.01	NR	No
Gaetani, 2021[50]	Arm 1	Mean ESS	full group	244 days	Baseline: 45 Followup: 45	Baseline: Mean: 4.4 (SD 2.4) Followup: Mean: 3 (SD 1.6)	Mean change from baseline: -1.4, p≤0.01	NR	No
Gaetani, 2021[50]	Arm 1	Patients with EQ-VAS Improved	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Total Improved from Baseline: 0.311, p=NR	NR	No
Gaetani, 2021[50]	Arm 1	Patients with EQ-VAS Stable	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Total Stable from Baseline: 0.556, p=NR	NR	No
Gaetani, 2021[50]	Arm 1	Patients with EQ-VAS worsened	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Total Worsened from Baseline: 0.133, p=NR	NR	No
Gaetani, 2021[50]	Arm 1	Patients with Normal Euro-Quality of Live Visual Analogue Scale (EQ-VAS)	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	% change from baseline: 0.13, p=NR	NR	No
Gaetani, 2021[50]	Arm 1	Patients with Pathologic EQ-VAS	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	% change from baseline: -0.13, p=NR	NR	No
Garmendia, 2021[51]	Arm 1	Sleep Apnea Symptom Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Garmendia, 2021[51]	Arm 2	Sleep Apnea Symptom Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 t-test: NR, p=	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Grandizio, 2022[52]	Arm 1	Elbow flexion test	In-person evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Elbow flexion test	Telemedicine evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Agreement %: 97, p=Kappa: 0.94	No
Grandizio, 2022[52]	Arm 1	Median nerve compression test	In-person evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Median nerve compression test	Telemedicine evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Agreement %: 94, p=Kappa: 0.88	No
Grandizio, 2022[52]	Arm 1	Median nerve numbness	In-person evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Median nerve numbness	Telemedicine evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Agreement %: 100, p=Kappa: 1	No
Grandizio, 2022[52]	Arm 1	Median nerve sensory changes	In-person evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Median nerve sensory changes	Telemedicine evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Agreement %: 63, p=Kappa: 0.26	No
Grandizio, 2022[52]	Arm 1	Nocturnal numbness	In-person evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Nocturnal numbness	Telemedicine evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Agreement %: 100, p=Kappa: 1	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Grandizio, 2022[52]	Arm 1	Positive Phalen's test	In-person evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Positive Phalen's test	Telemedicine evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Agreement %: 97, p=Kappa: 0.94	No
Grandizio, 2022[52]	Arm 1	Positive Tinel sign	In-person evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Positive Tinel sign	Telemedicine evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Agreement %: 78, p=Kappa: 0.56	No
Grandizio, 2022[52]	Arm 1	Thenar atrophy or weakness	In-person evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Thenar atrophy or weakness	Telemedicine evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Agreement %: 94, p=Kappa: 0.88	No
Grandizio, 2022[52]	Arm 1	Tinel sign	In-person evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Grandizio, 2022[52]	Arm 2	Tinel sign	Telemedicine evaluation	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Agreement %: 84, p=Kappa: 0.68	No
Gross, 2020[53]	Arm 2	Nature of FTW Restrictions - Anticipated duration of RTW restrictions in weeks	full group	NR	Baseline: 1205 Followup: NR	Baseline: Mean: 4.6 (SD 4.2) Followup: NR	NR	Ref: Arm 1 Mean change from baseline: NR, p≤0.001	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Gross, 2020[53]	Arm 1	Nature of FTW Restrictions - Anticipated duration of RTW restrictions in weeks	full group	NR	Baseline: 2935 Followup: NR	Baseline: Mean: 3.8 (SD 3.8) Followup: NR	NR	REF	No
Gross, 2020[53]	Arm 2	Nature of RTW Restrictions - Anticipated duration of RTW restrictions in weeks	full group	NR	Baseline: 1205 Followup: NR	Baseline: Mean: 3.5 (SD 4) Followup: NR	NR	Ref: Arm 1 Mean change from baseline: NR, p≤0.001	No
Gross, 2020[53]	Arm 1	Nature of RTW Restrictions - Anticipated duration of RTW restrictions in weeks	full group	NR	Baseline: 2935 Followup: NR	Baseline: Mean: 4.4 (SD 3.6) Followup: NR	NR	REF	No
Hameed, 2021[54]	Arm 1	Sit-to-stand score	full group	2 weeks	Baseline: 6 Followup: 6	Baseline: Mean: 12 (SD 4) Followup: Mean: 11 (SD 7)	Wilcoxon Signed Rank Test: 0, p=>.99	NR	No
Hameed, 2021[54]	Arm 3	Sit-to-stand score	full group	2 weeks	Baseline: 8 Followup: 8	Baseline: Mean: 8 (SD 3) Followup: Mean: 12 (SD 1)	Wilcoxon Signed Rank Test: -2.53, p=0.01	NR	No
Hameed, 2021[54]	Arm 4	Sit-to-stand score	full group	2 weeks	Baseline: 8 Followup: 8	Baseline: Mean: 10 (SD 5) Followup: Mean: 13 (SD 3)	Wilcoxon Signed Rank Test: -1.89, p=0.06	NR	No
Hameed, 2021[54]	Arm 2	Sit-to-stand score	full group	2 weeks	Baseline: 31 Followup: 31	Baseline: Mean: 9 (SD 4) Followup: Mean: 13 (SD 3)	Wilcoxon Signed Rank Test: -4.26, p≤.001	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hameed, 2021[54]	Arm 1	Sit-to-stand score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's d with hedges correction: 0.15, p=NR	NR	No
Hameed, 2021[54]	Arm 2	Sit-to-stand score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's d with hedges correction: 1.14, p=NR	NR	No
Hameed, 2021[54]	Arm 3	Sit-to-stand score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's d with hedges correction: 1.02, p=NR	NR	No
Hameed, 2021[54]	Arm 4	Sit-to-stand score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's d with hedges correction: 0.61, p=NR	NR	No
Hameed, 2021[54]	Arm 1	Step Test Score	full group	2 weeks	Baseline: 6 Followup: 6	Baseline: Mean: 59 (SD 30) Followup: Mean: 69 (SD 12)	Wilcoxon Signed Rank Test: -1.16, p=0.25	NR	No
Hameed, 2021[54]	Arm 3	Step Test Score	full group	2 weeks	Baseline: 8 Followup: 8	Baseline: Mean: 46 (SD 27) Followup: Mean: 71 (SD 30)	Wilcoxon Signed Rank Test: -2.2, p=0.02	NR	No
Hameed, 2021[54]	Arm 4	Step Test Score	full group	2 weeks	Baseline: 8 Followup: 8	Baseline: Mean: 54 (SD 24) Followup: Mean: 76 (SD 14)	Wilcoxon Signed Rank Test: -0.2, p=0.03	NR	No
Hameed, 2021[54]	Arm 2	Step Test Score	full group	2 weeks	Baseline: 31 Followup: 31	Baseline: Mean: 44 (SD 23) Followup: Mean: 73 (SD 26)	Wilcoxon Signed Rank Test: -4.21, p≤.001	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hameed, 2021[54]	Arm 1	Step Test Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's d with hedges correction: 0.38, p=NR	NR	No
Hameed, 2021[54]	Arm 2	Step Test Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's d with hedges correction: 0.96, p=NR	NR	No
Hameed, 2021[54]	Arm 3	Step Test Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's d with hedges correction: 1.11, p=NR	NR	No
Hameed, 2021[54]	Arm 4	Step Test Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's d with hedges correction: 0.85, p=NR	NR	No
Hamner, 2021[55]	Arm 1	Changes in KTEA-3 (Letter and Word)	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Hamner, 2021[55]	Arm 2	Changes in KTEA-3 (Letter and Word)	Telehealth	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Mean difference: 1.11, p=0.33	No
Hamner, 2021[55]	Arm 1	Changes in KTEA-3 (Math concepts)	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Hamner, 2021[55]	Arm 2	Changes in KTEA-3 (Math concepts)	Telehealth	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Mean difference: 2.95, p=0.03	No
Hamner, 2021[55]	Arm 1	WISC-V (Digit span)	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Hamner, 2021[55]	Arm 2	WISC-V (Digit span)	Telehealth	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Mean difference: 0.43, p=0.18	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hamner, 2021[55]	Arm 1	WISC-V (Matrix reasoning)	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Hamner, 2021[55]	Arm 2	WISC-V (Matrix reasoning)	Telehealth	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Mean difference: -0.24, p=0.42	No
Hamner, 2021[55]	Arm 1	WISC-V (Similarities)	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Hamner, 2021[55]	Arm 2	WISC-V (Similarities)	Telehealth	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Mean difference: 0.18, p=0.48	No
Hamner, 2021[55]	Arm 1	WISC-V (Visual puzzles)	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Hamner, 2021[55]	Arm 2	WISC-V (Visual puzzles)	Telehealth	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Mean difference: 0.96, p=<0.01	No
Hamner, 2021[55]	Arm 1	WISC-V (Vocabulary)	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Hamner, 2021[55]	Arm 2	WISC-V (Vocabulary)	Telehealth	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 Mean difference: 0.44, p=0.11	No
Hernando-Garijo, 2021[57]	Arm 2	6MWT	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 403.57 (SD 107.13) Followup: Mean: 434.72 (SD 73.78)	Mean change from baseline: -30.7 (95% CI: -61.5 to 14.13), p=0.051	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 1	6MWT	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 407.01 (SD 137.09) Followup: Mean: 411.72 (SD 145.83)	Mean change from baseline: -11.71 (95% CI: -26.16 to 2.73), p=0.104	NR	No
Hernando-Garijo, 2021[57]	Arm 2	6MWT	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0.3, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	6MWT	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	6MWT	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 1.54, p=0.225	No
Hernando-Garijo, 2021[57]	Arm 2	ACT	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 9.6 (SD 4.31) Followup: Mean: 11.38 (SD 4.27)	Mean change from baseline: -2.23 (95% CI: -3.65 to -0.81), p=0.005	NR	No
Hernando-Garijo, 2021[57]	Arm 1	ACT	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 10.06 (SD 5.56) Followup: Mean: 10.33 (SD 5.42)	Mean change from baseline: -0.26 (95% CI: -1.81 to 1.27), p=0.717	NR	No
Hernando-Garijo, 2021[57]	Arm 2	ACT	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0.4, p=NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 1	ACT	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	ACT	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 3.98, p=0.056	No
Hernando-Garijo, 2021[57]	Arm 2	Algometer score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 45.42 (SD 12.56) Followup: Mean: 56.85 (SD 15.28)	Mean change from baseline: -11.43 (95% CI: -18.38 to -4.48), p=0.004	NR	No
Hernando-Garijo, 2021[57]	Arm 1	Algometer score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 45.2 (SD 14.68) Followup: Mean: 42.79 (SD 15.32)	Mean change from baseline: 2.4 (95% CI: -3.48 to 8.29), p=0.391	NR	No
Hernando-Garijo, 2021[57]	Arm 2	Algometer score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0.8, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	Algometer score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -0.1, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	Algometer score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 10.67, p=0.003	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 2	Algometer tender points	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 16 (SD 3.38) Followup: Mean: 14.13 (SD 4.12)	Mean change from baseline: 1.86 (95% CI: 0.56 to 3.17), p=0.008	NR	No
Hernando-Garijo, 2021[57]	Arm 1	Algometer tender points	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 16.5 (SD 2.47) Followup: Mean: 16.78 (SD 1.84)	Mean change from baseline: -0.28 (95% CI: -1.25 to 0.68)	NR	No
Hernando-Garijo, 2021[57]	Arm 2	Algometer tender points	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -0.5, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	Algometer tender points	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0.1, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	Algometer tender points	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 7.9, p=0.009	No
Hernando-Garijo, 2021[57]	Arm 2	FIQ-R score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 59.44 (SD 9.04) Followup: Mean: 44 (SD 15.21)	Mean change from baseline: 15.43 (95% CI: 7.81 to 23.05), p=0.001	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 1	FIQ-R score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 55.36 (SD 16.46) Followup: Mean: 46.9 (SD 20.47)	Mean change from baseline: 8.45 (95% CI: -1.99 to 18.9), p=0.104	NR	No
Hernando-Garijo, 2021[57]	Arm 2	FIQ-R score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -1.2, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	FIQ-R score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -0.4, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	FIQ-R score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 1.36, p=0.254	No
Hernando-Garijo, 2021[57]	Arm 2	HADS	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 20.52 (SD 6.83) Followup: Mean: 11.7 (SD 8.74)	Mean change from baseline: 8.82 (95% CI: 3.33 to 14.3), p=0.004	NR	No
Hernando-Garijo, 2021[57]	Arm 1	HADS	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 20.43 (SD 8.37) Followup: Mean: 21.25 (SD 9.42)	Mean change from baseline: -0.81 (95% CI: -2.5 to 0.87), p=0.321	NR	No
Hernando-Garijo, 2021[57]	Arm 2	HADS	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -1.1, p=NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 1	HADS	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	HADS	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 12.03, p=0.002	No
Hernando-Garijo, 2021[57]	Arm 2	HADS-A	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 10.88 (SD 3.38) Followup: Mean: 6.29 (SD 5.13)	Mean change from baseline: 4.58 (95% CI: 1.69 to 7.47), p=0.004	NR	No
Hernando-Garijo, 2021[57]	Arm 1	HADS-A	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 10.81 (SD 4.1) Followup: Mean: 11 (SD 4.66)	Mean change from baseline: -0.18 (95% CI: -1.27 to 0.89), p=0.718	NR	No
Hernando-Garijo, 2021[57]	Arm 2	HADS-A	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -1, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	HADS-A	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	HADS-A	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 10.25, p=0.003	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 2	HADS-D	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 9.64 (SD 4.16) Followup: Mean: 5.41 (SD 4.13)	Mean change from baseline: 4.23 (95% CI: 1.51 to 6.95), p=0.005	NR	No
Hernando-Garijo, 2021[57]	Arm 1	HADS-D	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 9.62 (SD 4.58) Followup: Mean: 1.31 (SD 5.19)	Mean change from baseline: -0.68 (95% CI: -1.65 to 0.27), p=0.151	NR	No
Hernando-Garijo, 2021[57]	Arm 2	HADS-D	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -1, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	HADS-D	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0.1, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	HADS-D	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 2.97, p=0.001	No
Hernando-Garijo, 2021[57]	Arm 2	Helplessness Score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 12.1 (SD 6.3) Followup: Mean: 8.9 (SD 6.1)	Mean change from baseline: 2.92 (95% CI: 0.46 to 5.39), p=0.023	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 1	Helplessness Score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 12.4 (SD 5.2) Followup: Mean: 10.2 (SD 7.4)	Mean change from baseline: 1.75 (95% CI: -1.13 to 4.63), p=0.215	NR	No
Hernando-Garijo, 2021[57]	Arm 2	Helplessness Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Other (specify): -0.5, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	Helplessness Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Other (specify): -0.3, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	Helplessness Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 0.43, p=0.518	No
Hernando-Garijo, 2021[57]	Arm 2	Magnification Score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 5.5 (SD 2.9) Followup: Mean: 3.6 (SD 2.4)	Mean change from baseline: 1.71 (95% CI: 0.38 to 3.04), p=0.015	NR	No
Hernando-Garijo, 2021[57]	Arm 1	Magnification Score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 4.4 (SD 2.5) Followup: Mean: 3.9 (SD 3)	Mean change from baseline: 0.56 (95% CI: -0.55 to 1.67), p=0.3	NR	No
Hernando-Garijo, 2021[57]	Arm 2	Magnification Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -0.7, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	Magnification Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -0.1, p=NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 2	Magnification Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 2.05, p=0.163	No
Hernando-Garijo, 2021[57]	Arm 2	PCS score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 24.8 (SD 12) Followup: Mean: 17.6 (SD 12.4)	Mean change from baseline: 7 (95% CI: 1.19 to 12.8), p=0.22	NR	No
Hernando-Garijo, 2021[57]	Arm 1	PCS score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 24.1 (SD 10.8) Followup: Mean: 23.5 (SD 14)	Mean change from baseline: 1.07 (95% CI: -4.54 to 6.68), p=0.687	NR	No
Hernando-Garijo, 2021[57]	Arm 2	PCS score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -0.6, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	PCS score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: 0, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	PCS score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 0.415, p=0.525	No
Hernando-Garijo, 2021[57]	Arm 2	Rumination Score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 7.2 (SD 3.8) Followup: Mean: 5.1 (SD 4.7)	Mean change from baseline: 2.34 (95% CI: -0.29 to 5.01), p=0.078	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 1	Rumination Score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 7.2 (SD 3.6) Followup: Mean: 6.9 (SD 4.9)	Mean change from baseline: 1.75 (95% CI: -1.65 to 2.15), p=0.783	NR	No
Hernando-Garijo, 2021[57]	Arm 2	Rumination Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -0.5, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	Rumination Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -0.3, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 2	Rumination Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 1.91, p=0.169	No
Hernando-Garijo, 2021[57]	Arm 2	VAS Score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 7.08 (SD 1.45) Followup: Mean: 4.92 (SD 2)	Mean change from baseline: 2.15 (95% CI: 1.37 to 2.94), p≤.001	NR	No
Hernando-Garijo, 2021[57]	Arm 1	VAS Score	full group	15 weeks	Baseline: 17 Followup: 17	Baseline: Mean: 7.29 (SD 1.07) Followup: Mean: 6.46 (SD 1.92)	Mean change from baseline: 0.82 (95% CI: -0.3 to 1.68), p=0.058	NR	No
Hernando-Garijo, 2021[57]	Arm 2	VAS Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -1.2, p=NR	NR	No
Hernando-Garijo, 2021[57]	Arm 1	VAS Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	Cohen's d: -0.5, p=NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Hernando-Garijo, 2021[57]	Arm 2	VAS Score	full group	15 weeks	Baseline: NR Followup: 17	Baseline: NR Followup: NR	NR	Ref: Arm 1 Between group f test: 5.99, p=0.021	No
Hughes, 2021[58]	Arm 1	Number of Urine Drug Screens	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Hughes, 2021[58]	Arm 2	Number of Urine Drug Screens	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Hughes, 2021[58]	Arm 3	Number of Urine Drug Screens	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1, Arm 2 Chi-Squared: NR, p≤.001	No
Jaenisch, 2020[61]	Full group	Correlation of age with and non-accessable examination results	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Correlation Coefficient: 0.579, p≤0.01	NR	No
Jaenisch, 2020[61]	Full group	Correlation of age with Number of Deviations among examinations	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Correlation Coefficient: 0.588, p≤0.01	NR	No
Jaenisch, 2020[61]	Full group	Correlation of ASA with and non-accessable examination results	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Correlation Coefficient: 0.509, p≤0.01	NR	No
Jaenisch, 2020[61]	Full group	Correlation of ASA with Number of Deviations among examinations	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Correlation Coefficient: 0.396, p≤0.05	NR	No
Jaenisch, 2020[61]	Full group	Correlation of BMI with and non-accessable examination results	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Correlation Coefficient: 0.485, p≤0.01	NR	No
Jaenisch, 2020[61]	Full group	Correlation of BMI with Number of Deviations among examinations	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Correlation Coefficient: 0.389, p≤0.05	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Jaenisch, 2020[61]	Full group	Correlation of sex with and non-accessable examination results	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Correlation Coefficient: NR, p=0.52	NR	No
Jaenisch, 2020[61]	Full group	Correlation of sex with Number of Deviations among examinations	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Correlation Coefficient: NR, p=0.55	NR	No
Jaenisch, 2020[61]	Full group	Exam Agreement: Function	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.61, p=NR	NR	No
Jaenisch, 2020[61]	Full group	Exam Agreement: Inspection	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.76, p=NR	NR	No
Jaenisch, 2020[61]	Full group	Exam Agreement: Palpation	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.38, p=NR	NR	No
Jaenisch, 2020[61]	Full group	Exam Agreement: Provocation	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.33, p=NR	NR	No
Jaenisch, 2020[61]	Full group	Exam Agreement: Range of Motion	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.36, p=NR	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Adams test	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.407 (95% CI: 0.181 to 0.633), p=0.001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: C I - C IV	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.969 (95% CI: 0.907 to 1), p≤0.0001	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Jansen, 2020[62]	Full group	Exam Agreement: C I and C II	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.938 (95% CI: 0.852 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: C III and C IV	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.969 (95% CI: 0.907 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: C V	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.876 (95% CI: 0.757 to 0.995), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: C VI	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.907 (95% CI: 0.802 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: C VII	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.907 (95% CI: 0.802 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: C VIII	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.935 (95% CI: 0.844 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Cervical spine neuroforaminal compression test	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.938 (95% CI: 0.852 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Defecation quality	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 1 (95% CI: 1 to 1), p≤0.0001	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Jansen, 2020[62]	Full group	Exam Agreement: Dorsal inspection	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.752 (95% CI: 0.0592 to 0.912), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Dorsiflexion	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.814 (95% CI: 0.672 to 0.956), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Gait	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.944 (95% CI: 0.866 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Great toe extension	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.721 (95% CI: 0.554 to 0.888), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Hip flexion	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.659 (95% CI: 0.48 to 0.838), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Knee Extension	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.721 (95% CI: 0.554 to 0.888), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Lasegue	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.512 (95% CI: 0.295 to 0.728), p≤0.0001	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Jansen, 2020[62]	Full group	Exam Agreement: Lateral inspection	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.814 (95% CI: 0.672 to 0.956), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Lhermitte	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.686 (95% CI: 0.498 to 0.874), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: NRS Pain	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.974 (95% CI: 0.923 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Pain Location	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 1 (95% CI: 1 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Pain on heel strike	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.86 (95% CI: 0.726 to 0.955), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Plantarflexion	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.721 (95% CI: 0.554 to 0.888), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Reverse Lasegue	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.407 (95% CI: 0.181 to 0.633), p=0.001	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Jansen, 2020[62]	Full group	Exam Agreement: Sensory deficits	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 1 (95% CI: 1 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Signs of infection	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.93 (95% CI: 0.833 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Th 1	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.907 (95% CI: 0.802 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Urination frequency	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 1 (95% CI: 1 to 1), p≤0.0001	NR	No
Jansen, 2020[62]	Full group	Exam Agreement: Wound inspection	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Cohen's Kappa: 0.973 (95% CI: 0.919 to 1), p≤0.0001	NR	No
Kazi, 2021[64]	Full group	Mean diagnoses per visit	Full group	NR	Baseline: NR Followup: 2623	Baseline: NR Followup: Mean: 1.11 (SD 0.02)	NR	NR	No
Kazi, 2021[64]	Arm 2	Mean diagnoses per visit	Asynchronous visits	NR	Baseline: NR Followup: 951	Baseline: NR Followup: Mean: 1.01 (SD 0.03)	NR	Ref	No
Kazi, 2021[64]	Arm 3	Mean diagnoses per visit	Synchronous visits	NR	Baseline: NR Followup: 1672	Baseline: NR Followup: Mean: 1.16 (SD 0.03)	NR	Ref: Arm 2 p≤0.001	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Kazi, 2021[64]	Full group	Mean prescriptions written per visit	Full group	NR	Baseline: NR Followup: 2623	Baseline: NR Followup: Mean: 1.15 (SD 0.03)	NR	NR	No
Kazi, 2021[64]	Arm 2	Mean prescriptions written per visit	Asynchronous visits	NR	Baseline: NR Followup: 951	Baseline: NR Followup: Mean: 1.39 (SD 0.06)	NR	Ref	No
Kazi, 2021[64]	Arm 3	Mean prescriptions written per visit	Synchronous visits	NR	Baseline: NR Followup: 1672	Baseline: NR Followup: Mean: 1.01 (SD 0.04)	NR	Ref: Arm 2 p≤0.001	No
Kronenberger, 2021[71]	Arm 1	Letter–Number Sequencing Raw Score	Teleassessment	NR	Baseline: NR Followup: 30	Baseline: NR Followup: Mean: 19.1 (SD 3)	NR	NR	No
Kronenberger, 2021[71]	Arm 2	Letter–Number Sequencing Raw Score	Teleassessment	NR	Baseline: NR Followup: 22	Baseline: NR Followup: Mean: 15.8 (SD 4.5)	NR	NR	No
Kronenberger, 2021[71]	Arm 1	Letter–Number Sequencing Raw Score	Face to face	NR	Baseline: NR Followup: 30	Baseline: NR Followup: Mean: 18.2 (SD 3.6)	NR	NR	No
Kronenberger, 2021[71]	Arm 2	Letter–Number Sequencing Raw Score	Face to face	NR	Baseline: NR Followup: 22	Baseline: NR Followup: Mean: 15.4 (SD 4.4)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Kronenberger, 2021[71]	Arm 1	Longest Digit Span Backward Raw Score	Teleassessment	NR	Baseline: NR Followup: 30	Baseline: NR Followup: Mean: 4.6 (SD 1.3)	NR	NR	No
Kronenberger, 2021[71]	Arm 2	Longest Digit Span Backward Raw Score	Teleassessment	NR	Baseline: NR Followup: 22	Baseline: NR Followup: Mean: 4.3 (SD 1)	NR	NR	No
Kronenberger, 2021[71]	Arm 1	Longest Digit Span Backward Raw Score	Face to face	NR	Baseline: NR Followup: 30	Baseline: NR Followup: Mean: 4.6 (SD 1.3)	NR	NR	No
Kronenberger, 2021[71]	Arm 2	Longest Digit Span Backward Raw Score	Face to face	NR	Baseline: NR Followup: 22	Baseline: NR Followup: Mean: 3.9 (SD 1.1)	NR	NR	No
Kronenberger, 2021[71]	Arm 1	Longest Digit Span Forward Raw Score	Teleassessment	NR	Baseline: NR Followup: 30	Baseline: NR Followup: Mean: 6.3 (SD 1.4)	NR	NR	No
Kronenberger, 2021[71]	Arm 2	Longest Digit Span Forward Raw Score	Teleassessment	NR	Baseline: NR Followup: 22	Baseline: NR Followup: Mean: 5.3 (SD 1.4)	NR	NR	No
Kronenberger, 2021[71]	Arm 1	Longest Digit Span Forward Raw Score	Face to face	NR	Baseline: NR Followup: 30	Baseline: NR Followup: Mean: 6 (SD 1)	NR	NR	No
Kronenberger, 2021[71]	Arm 2	Longest Digit Span Forward Raw Score	Face to face	NR	Baseline: NR Followup: 22	Baseline: NR Followup: Mean: 4.9 (SD 1.5)	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Kronenberger, 2021[71]	Arm 1	Nonword Repetition Raw Score	Teleassessment	NR	Baseline: NR Followup: 30	Baseline: NR Followup: Mean: 34.3 (SD 4.2)	NR	NR	No
Kronenberger, 2021[71]	Arm 2	Nonword Repetition Raw Score	Teleassessment	NR	Baseline: NR Followup: 22	Baseline: NR Followup: Mean: 17.1 (SD 7)	NR	NR	No
Kronenberger, 2021[71]	Arm 1	Nonword Repetition Raw Score	Face to face	NR	Baseline: NR Followup: 30	Baseline: NR Followup: Mean: 85 (SD 10.4)	NR	NR	No
Kronenberger, 2021[71]	Arm 2	Nonword Repetition Raw Score	Face to face	NR	Baseline: NR Followup: 22	Baseline: NR Followup: Mean: 43 (SD 16)	NR	NR	No
Loftus, 2022[78]	Arm 1	Days on campus	Contemporary cohort (type of visit unclear)	NR	Baseline: NR Followup: 95	Baseline: NR Followup: Mean: 5.2 (SD 2.4)	NR	Ref	No
Loftus, 2022[78]	Arm 2	Days on campus	C3 pilot (includes telehealth component)	NR	Baseline: NR Followup: 34	Baseline: NR Followup: Mean: 7 (SD 2.5)	NR	Ref: Arm 1 p-value only: , p=0.0005	No
Loftus, 2022[78]	Arm 1	Message: patient calls	Contemporary cohort (type of visit unclear)	NR	Baseline: NR Followup: 95	Baseline: NR Followup: Mean: 2.7 (SD 5)	NR	Ref	No
Loftus, 2022[78]	Arm 2	Message: patient calls	C3 pilot (includes telehealth component)	NR	Baseline: NR Followup: 34	Baseline: NR Followup: Mean: 2.8 (SD 2.9)	NR	Ref: Arm 1 p-value only: , p=0.15	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Loftus, 2022[78]	Arm 1	Message: patient medical advice request	Contemporary cohort (type of visit unclear)	NR	Baseline: NR Followup: 95	Baseline: NR Followup: Mean: 8 (SD 9.7)	NR	Ref	No
Loftus, 2022[78]	Arm 2	Message: patient medical advice request	C3 pilot (includes telehealth component)	NR	Baseline: NR Followup: 34	Baseline: NR Followup: Mean: 11.6 (SD 10.6)	NR	Ref: Arm 1 p-value only: , p=0.06	No
Loftus, 2022[78]	Arm 1	Message: patient schedule request	Contemporary cohort (type of visit unclear)	NR	Baseline: NR Followup: 95	Baseline: NR Followup: Mean: 0.5 (SD 1.4)	NR	Ref	No
Loftus, 2022[78]	Arm 2	Message: patient schedule request	C3 pilot (includes telehealth component)	NR	Baseline: NR Followup: 34	Baseline: NR Followup: Mean: 0.3 (SD 1)	NR	Ref: Arm 1 p-value only: , p=0.23	No
Longobardi, 2021[79]	Full group	HADS score	full group	NR	Baseline: 37 Followup: 37	Baseline: Mean: 13.97 (SD 9.01) Followup: Mean: 10.23 (SD 8.16)	Mean change from baseline: p≤0.0001	NR	No
Longobardi, 2021[79]	Full group	HADS-A score	full group	NR	Baseline: 37 Followup: 37	Baseline: Mean: 6.94 (SD 4.65) Followup: Mean: 4.86 (SD 3.91)	Mean change from baseline: p≤0.0001	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Longobardi, 2021[79]	Full group	HADS-D Score	full group	NR	Baseline: 37 Followup: 37	Baseline: Mean: 6.97 (SD 5.31) Followup: Mean: 5.36 (SD 4.93)	Mean change from baseline: p=0.0001	NR	No
Malliaras, 2020[81]	Arm 1	Health related quality of life, EQ5D	Full group	12 weeks	Baseline: 12 Followup: 11	Baseline: Mean: 0.76 (SD 0.11) Followup: Mean: 0.73 (SD 0.09)	Mean change from baseline: -0.02 (95% CI: -0.14 to 0.1), p=NR	NR	No
Malliaras, 2020[81]	Arm 2	Health related quality of life, EQ5D	Full group	12 weeks	Baseline: 12 Followup: 12	Baseline: Mean: 0.74 (SD 0.13) Followup: Mean: 0.77 (SD 0.13)	Mean change from baseline: 0.01 (95% CI: -0.1 to 0.12), p=NR	NR	No
Malliaras, 2020[81]	Arm 3	Health related quality of life, EQ5D	Full group	12 weeks	Baseline: 12 Followup: 12	Baseline: Mean: 0.74 (SD 0.12) Followup: Mean: 0.78 (SD 0.07)	Mean change from baseline: 0.03 (95% CI: -0.02 to 0.09), p=NR	NR	No
Malliaras, 2020[81]	Arm 1	kinesiophobia, Tampa Scale for Kinesiophobia (TSK)	Full group	12 weeks	Baseline: 12 Followup: 11	Baseline: Mean: 36 (SD 7) Followup: Mean: 36.3 (SD 6.5)	Mean change from baseline: -1.9 (95% CI: -5.9 to -3), p=NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Malliaras, 2020[81]	Arm 2	kinesiophobia, Tampa Scale for Kinesiophobia (TSK)	Full group	12 weeks	Baseline: 12 Followup: 12	Baseline: Mean: 35.2 (SD 5.8) Followup: Mean: 30.6 (SD 5.7)	Mean change from baseline: -5 (95% CI: -7 to -3), p=NR	NR	No
Malliaras, 2020[81]	Arm 3	kinesiophobia, Tampa Scale for Kinesiophobia (TSK)	Full group	12 weeks	Baseline: 12 Followup: 12	Baseline: Mean: 35.5 (SD 6.7) Followup: Mean: 31.1 (SD 6.6)	Mean change from baseline: -4.4 (95% CI: -8.8 to -0.1), p=NR	NR	No
Martin, 2021[83]	Arm 1	Change in Dypnea Score at 3 month	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Median change from baseline: 2 (95% CI: -2 to 7), p=NR	Ref	No
Martin, 2021[83]	Arm 2	Change in Dypnea Score at 3 month	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Median change from baseline: 2.5 (95% CI: 0 to 6), p=NR	Ref: Arm 1 Mean change from baseline: NR, p=0.56	No
Martin, 2021[83]	Arm 1	Change in Heart Rate at 3 months	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Mean change from baseline: 23.1 (95% CI: 16.5 to 29.7), p=NR	Ref	No
Martin, 2021[83]	Arm 2	Change in Heart Rate at 3 months	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Mean change from baseline: 42.6 (95% CI: 29.4 to 55.8), p=NR	Ref: Arm 1 Mean change from baseline: NR, p=0.036	No
Martin, 2021[83]	Arm 1	Change in STST at 3 months	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Median change from baseline: 5 (95% CI: -4 to 11), p=NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Martin, 2021[83]	Arm 2	Change in STST at 3 months	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Median change from baseline: 10 (95% CI: 5 to 19), p=NR	Ref: Arm 1 Mean change from baseline: NR, p=0.004	No
Martin, 2021[83]	Arm 1	Dyspnea Score after STST	full group	NR	Baseline: 13 Followup: NR	Baseline: Median: 5 (Range: 1 to 10) Followup: NR	NR	Ref	No
Martin, 2021[83]	Arm 2	Dyspnea Score after STST	full group	NR	Baseline: 14 Followup: NR	Baseline: Median: 5 (Range: 3 to 8) Followup: NR	NR	Ref: Arm 1 Other (specify): NR, p=0.966	No
Martin, 2021[83]	Arm 1	Dyspnea Score after STST	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Martin, 2021[83]	Arm 2	Dyspnea Score after STST	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 Other (specify): NR, p=0.966	No
Martin, 2021[83]	Arm 1	Dyspnea Score at Rest	full group	NR	Baseline: 13 Followup: NR	Baseline: Median: 2 (Range: 0 to 5) Followup: NR	NR	Ref	No
Martin, 2021[83]	Arm 2	Dyspnea Score at Rest	full group	NR	Baseline: 14 Followup: NR	Baseline: Median: 0 (Range: 0 to 3) Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.836	No
Martin, 2021[83]	Arm 1	Dyspnea Score at Rest	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Martin, 2021[83]	Arm 2	Dyspnea Score at Rest	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 Other (specify): NR, p=0.836	No
Martin, 2021[83]	Arm 1	Heart Rate after STST	full group	NR	Baseline: 13 Followup: NR	Baseline: Mean: 102 (SD 15.4) Followup: NR	NR	Ref	No
Martin, 2021[83]	Arm 2	Heart Rate after STST	full group	NR	Baseline: 14 Followup: NR	Baseline: Mean: 110.5 (SD 18.5) Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.26	No
Martin, 2021[83]	Arm 1	Heart Rate at Rest	full group	NR	Baseline: 13 Followup: NR	Baseline: Mean: 86.2 (SD 15.3) Followup: NR	NR	Ref	No
Martin, 2021[83]	Arm 2	Heart Rate at Rest	full group	NR	Baseline: 14 Followup: NR	Baseline: Mean: 90.5 (SD 17.3) Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.547	No
Martin, 2021[83]	Arm 1	Number of Repititions during STST	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref	No
Martin, 2021[83]	Arm 2	Number of Repititions during STST	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.123	No
Martin, 2021[83]	Arm 1	SpO2 after STST	full group	NR	Baseline: 13 Followup: NR	Baseline: Mean: 92.5 (SD 1.7) Followup: NR	NR	Ref	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Martin, 2021[83]	Arm 2	SpO2 after STST	full group	NR	Baseline: 14 Followup: NR	Baseline: Mean: 91.8 (SD 3.3) Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.568	No
Martin, 2021[83]	Arm 1	SpO2 at Rest	full group	NR	Baseline: 13 Followup: NR	Baseline: Mean: 94.8 (SD 1.9) Followup: NR	NR	Ref	No
Martin, 2021[83]	Arm 2	SpO2 at Rest	full group	NR	Baseline: 14 Followup: NR	Baseline: Mean: 95.1 (SD 1.9) Followup: NR	NR	Ref: Arm 1 t-test: NR, p=0.655	No
McLachlan, 2021[86]	Full group	Blood Pressure	full group	203 days	Baseline: 50 Followup: 50	Baseline: Other (specify): 120 (NR) Followup: Presumed Mean: 118 (NR)	Assumed mean change: NR, p=0.004	NR	No
McLachlan, 2021[86]	Full group	Heart Rate	full group	203 days	Baseline: 50 Followup: 50	Baseline: Other (specify): 76.5 (NR) Followup: Presumed Mean: 65 (NR)	Assumed mean change: NR, p=0.002	NR	No
McLachlan, 2021[86]	Full group	Heart Rate	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Assume mean change p=0.002	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
McLachlan, 2021[86]	Full group	pro-BNP	full group	203 days	Baseline: 50 Followup: 50	Baseline: Other (specify): 204.5 (Other (specify) NR) Followup: Other (specify): 65 (NR)	Assumed mean change: p=0.001	NR	No
Offiah, 2022[91]	Arm 1	Medical specialty referral	Traditional clinic	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Offiah, 2022[91]	Arm 2	Medical specialty referral	Virtual clinic	NR	Baseline: NR Followup: NR	NR	NR	Ref: Assuming Arm1 p-value only: , p=0.0028	No
Offiah, 2022[91]	Arm 1	Referral for coronary artery bypass grafting	Traditional clinic	NR	Baseline: NR Followup: NR	NR	NR	NR	No
Offiah, 2022[91]	Arm 2	Referral for coronary artery bypass grafting	Virtual clinic	NR	Baseline: NR Followup: NR	NR	NR	NR	No
Offiah, 2022[91]	Arm 1	Referral for device	Traditional clinic	NR	Baseline: NR Followup: NR	NR	NR	NR	No
Offiah, 2022[91]	Arm 2	Referral for device	Virtual clinic	NR	Baseline: NR Followup: NR	NR	NR	NR	No
Offiah, 2022[91]	Arm 1	Referral for valve surgery	Traditional clinic	NR	Baseline: NR Followup: NR	NR	NR	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Offiah, 2022[91]	Arm 2	Referral for valve surgery	Virtual clinic	NR	Baseline: NR Followup: NR	NR	NR	NR	No
Offiah, 2022[91]	Arm 1	Specialist nurse clinic referral	Traditional clinic	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Offiah, 2022[91]	Arm 2	Specialist nurse clinic referral	Virtual clinic	NR	Baseline: NR Followup: NR	NR	NR	Ref: Assuming Arm1 p-value only: , p=0.037	No
Onishi, 2021[93]	Full group	HbA1c at post-period	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (Average days between clinic visits/telemedicine): 0.00351, p≤0.001	NR	Sex, Type of Diabetes, Pre-HgbA1c, Pre-BMI, Change in BMI, Age
Onishi, 2021[93]	Full group	HbA1c at post-period	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (Average days between clinic visits/telemedicine): -0.09261, p=0.004	NR	Visiting the clinic, Sex, Type of Diabetes, Pre-HgbA1c, Pre-BMI, Change in BMI, Age
Parise, 2021[95]	Arm 2	Glucose management indicator	Included in telemedicine study	3 months	Baseline: 166 Followup: 166	Baseline: Mean: 7.2 (SD 0.7) Followup: Mean: 7.1 (SD 0.6)	NR	Ref: NR p=0.23	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Parise, 2021[95]	Arm 2	Mean daily glucose	Included in telemedicine study	3 months	Baseline: 166 Followup: 166	Baseline: Mean: 163 (SD 29) Followup: Mean: 159 (SD 25)	NR	Ref: NR p=0.25	No
Parise, 2021[95]	Arm 2	Time above range	Included in telemedicine study	3 months	Baseline: 166 Followup: 166	Baseline: Mean: 34 (SD 18) Followup: Mean: 32 (SD 18)	NR	Ref: NR p=0.08	No
Parise, 2021[95]	Arm 2	Time below range	Included in telemedicine study	3 months	Baseline: 166 Followup: 166	Baseline: Mean: 3.5 (SD 4.1) Followup: Mean: 3.4 (SD 3.8)	NR	Ref: NR p=0.58	No
Parise, 2021[95]	Arm 2	Time in range	Included in telemedicine study	3 months	Baseline: 166 Followup: 166	Baseline: Mean: 62 (SD 18) Followup: Mean: 65 (SD 16)	NR	Ref: NR p=0.02	No
Pinsker, 2021[97]	NR	Diabetes	Diabetes	NR	NR	Baseline: NR Followup: 1	NR	Diabetic center	Arm 1
Pinsker, 2021[97]	NR	Diabetes	Diabetes	NR	NR	Baseline: NR Followup: 1	NR	Diabetic center	Arm 2

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Pinsker, 2021[97]	Arm 1	Percentage Time in range glucose 70-180 mg/dL	full group	NR	Baseline: NR Followup: 14284	Baseline: NR Followup: Median: 67 (IQR 54-78)	NR	Ref	Training method, age, previous therapy, trainer type, baseline A1c
Pinsker, 2021[97]	Arm 2	Percentage Time in range glucose 70-180 mg/dL	full group	NR	Baseline: NR Followup: 8984	Baseline: NR Followup: Median: 72 (IQR 60-81)	NR	Ref: Arm 1 NR, p≤0.01	Training method, age, previous therapy, trainer type, baseline A1c
Pinsker, 2021[97]	Arm 1	Percentage Time with glucose <70 mg/dL	full group	NR	Baseline: NR Followup: 14284	Baseline: NR Followup: Median: 0.9 (IQR 0.3-1.9)	NR	Ref	Training method, age, previous therapy, trainer type, baseline A1c
Pinsker, 2021[97]	Arm 2	Percentage Time with glucose <70 mg/dL	full group	NR	Baseline: NR Followup: 8984	Baseline: NR Followup: Median: 0.9 (IQR 0.4-1.9)	NR	Ref: Arm 1 NR, p=0.13	Training method, age, previous therapy, trainer type, baseline A1c

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Rachmeil, 2020[99]	Full group	% Basal insulin per day	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 44 (IQR 38, 54) Followup: Mean: 45 (IQR 39, 51.5)	Mean change from baseline: NR, p=0.55	NR	No
Rachmeil, 2020[99]	Full group	% Time < 54 mg/dL	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 0.05 (IQR 0.0, 2.0) Followup: Mean: 0.5 (IQR 0.0, 1.1)	Mean change from baseline: NR, p=0.87	NR	No
Rachmeil, 2020[99]	Full group	% Time > 250 mg/dL	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 8.8 (IQR 3.6, 19.0) Followup: Mean: 8 (IQR 2.0, 12.6)	Mean change from baseline: NR, p=0.002	NR	No
Rachmeil, 2020[99]	Full group	% Time CGM Active	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 92.8 (IQR 85.0, 97.2) Followup: Mean: 92.4 (IQR 85.8, 97.1)	Mean change from baseline: NR, p=0.001	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Rachmeil, 2020[99]	Full group	% Time in 180–250 mg/dL	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 32 (IQR 20.0, 42.1) Followup: Mean: 28.6 (IQR 19.0, 37.3)	Mean change from baseline: NR, p≤0.001	NR	No
Rachmeil, 2020[99]	Full group	% Time in 54–70 mg/dL	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 2.6 (IQR 1.0, 5.3) Followup: Mean: 2.3 (IQR 1.0, 5.0)	Mean change from baseline: NR, p=0.005	NR	No
Rachmeil, 2020[99]	Full group	% Time-in-range, (70–180 mg/dl)	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 59 (SD 17.2) Followup: Mean: 62.9 (SD 16)	Mean change from baseline: NR, p=0.05	NR	No
Rachmeil, 2020[99]	Full group	Coefficient of variation, %	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Coefficient of Variation: 37.1 (SD 7.1) Followup: Coefficient of Variation: 35.6 (SD 7.2)	% change from baseline: NR, p=0.16	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Rachmeil, 2020[99]	Full group	Estimated HbA1c (GMI), %	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 7.35 (SD 0.85) Followup: Mean: 7.2 (SD 0.81)	Mean change from baseline: NR, p≤0.001	NR	No
Rachmeil, 2020[99]	Full group	Estimated HbA1c (GMI), mmol/mol	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 56.8 (SD 9.3) Followup: Mean: 55.2 (SD 8.9)	NR	NR	No
Rachmeil, 2020[99]	Full group	Mean daily carbohydrate (gram)	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 135 (IQR 100, 175) Followup: Mean: 140 (IQR 108, 178)	Mean change from baseline: NR, p=0.48	NR	No
Rachmeil, 2020[99]	Full group	Mean glucose, mg/dL	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 164 (SD 29) Followup: Mean: 160 (SD 26)	Mean change from baseline: NR, p=0.001	NR	No
Rachmeil, 2020[99]	Full group	Mean TDD (unit/kg/d)	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 0.8 (IQR 0.6, 1.9) Followup: Mean: 0.8 (IQR 0.6, 1.0)	Mean change from baseline: NR, p=0.19	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Rachmeil, 2020[99]	Full group	Physical activity (hours/week)	"full data group"	4 weeks	Baseline: 121 Followup: 121	Baseline: Mean: 2 (IQR 0, 4) Followup: Mean: 3 (IQR 1, 5)	Mean change from baseline: p≤0.001	NR	No
Rachmeil, 2020[99]	Full group	School zooming (% of patients)	"full data group"	4 weeks	Baseline: 74 Followup: 74	Baseline: Percent of Patients: 75.7 (NR) Followup: Percent of Patients: 86.8 (NR)	% change from baseline: p=0.008	NR	No
Rachmeil, 2020[99]	Full group	Sleep pattern changes (% of patients)	"full data group"	4 weeks	Baseline: 116 Followup: 116	Baseline: Percent of parents: 31.9 (NR) Followup: Percent of parents: 29.2 (NR)	% change from baseline: p=0.47	NR	No
Rachmeil, 2020[99]	Full group	Time-in-Range	"full data group"	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (% Time < 54 mg/dL): -2.65 (95% CI: -6.114 to 0.819), p=0.133	NR	% Time at Glucose <54, 70-180, 180-250; Total Daily Insulin Dose; Single Household parent

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Rachmeil, 2020[99]	Full group	Time-in-Range	"full data group"	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (% Time in 70-180 mg/dL): -0.506 (95% CI: -0.99 to -0.023), p=0.04	NR	% Time at Glucose <54, 70-180, 180-250; Total Daily Insulin Dose; Single Household parent
Rachmeil, 2020[99]	Full group	Time-in-Range	"full data group"	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (% Time in 180–250 mg/dL): -0.012 (95% CI: -0.595 to 0.571), p=0.967	NR	% Time at Glucose <54, 70-180, 180-250; Total Daily Insulin Dose; Single Household parent
Rachmeil, 2020[99]	Full group	Time-in-Range	"full data group"	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (Mean TDD (unit/kg/d)): 15.908 (95% CI: -2.225 to 34.072), p=0.085	NR	% Time at Glucose <54, 70-180, 180-250; Total Daily Insulin Dose; Single Household parent

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Rachmeil, 2020[99]	Full group	Time-in-Range	"full data group"	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (Single Household Parent): 13.189 (95% CI: 0.621 to 27.016), p=0.04	NR	% Time at Glucose <54, 70-180, 180-250; Total Daily Insulin Dose; Single Household parent
Ragheb, 2021[100]	Arm 1	Median standard of care score	In-person	NR	Baseline: NR Followup: 171	Baseline: NR Followup: Median: 9 (IQR 9, 9)	NR	Ref	No
Ragheb, 2021[100]	Arm 2	Median standard of care score	Telehealth	NR	Baseline: NR Followup: 51	Baseline: NR Followup: Median: 9 (IQR 8, 9)	NR	Ref: Arm 1 p-value only: , p=0.0013	No
Ragheb, 2021[100]	Arm 1	Meets 8/9 standard of care items	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Ragheb, 2021[100]	Arm 2	Meets 8/9 standard of care items	Telehealth	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 p-value only: , p=0.42	No
Ragheb, 2021[100]	Arm 1	Meets all standard of care items	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Ragheb, 2021[100]	Arm 2	Meets all standard of care items	Telehealth	NR	Baseline: NR Followup: NR	NR	NR	Ref: Arm 1 p-value only: , p=0.0003	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Reider-Demer, 2022[102]	Arm 1	Roundtrip travel distance (miles)	Pre-COVID19 patients	NR	Baseline: NR Followup: 485	Baseline: NR Followup: Median: 49 (IQR Q1: 22, Q3: 112)	NR	Ref	No
Reider-Demer, 2022[102]	Arm 2	Roundtrip travel distance (miles)	COVID19 patients	NR	Baseline: NR Followup: 6706	Baseline: NR Followup: Median: 33 (IQR Q1: 15, Q3: 64)	NR	Ref: Assuming Arm1 p-value only: , p=<0.0001	No
Reider-Demer, 2022[102]	Arm 1	Roundtrip travel time (min)	Pre-COVID19 patients	NR	Baseline: NR Followup: 485	Baseline: NR Followup: Median: 92 (IQR Q1: 59, Q3: 159)	NR	Ref	No
Reider-Demer, 2022[102]	Arm 2	Roundtrip travel time (min)	COVID19 patients	NR	Baseline: NR Followup: 6706	Baseline: NR Followup: Median: 73 (IQR Q1: 51, Q3: 107)	NR	Ref: Assuming Arm1 p-value only: , p=<0.0001	No
Reider-Demer, 2022[102]	Arm 1	Total savings per video visit	Pre-COVID19 patients	NR	Baseline: NR Followup: 485	Baseline: NR Followup: Median: 66 (IQR $49, Q3: $108)	NR	Ref	No
Reider-Demer, 2022[102]	Arm 2	Total savings per video visit	COVID19 patients	NR	Baseline: NR Followup: 6706	Baseline: NR Followup: Median: 53 (IQR Q1: $38, Q3: $81)	NR	Ref: Assuming Arm1 p-value only: , p=<0.0001	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Rizzoli, 2021[105]	Full group	Disability (MIDAS score)	Full group	6 months	Baseline: 14 Followup: 14	Baseline: Mean: 67.7 (SD 52.6) Followup: Mean: 35.1 (SD 36.5)	NR	NR	No
Rizzoli, 2021[105]	Full group	Medication intake	Full group	6 months	Baseline: 14 Followup: 14	Baseline: Mean: 19.4 (SD 5.8) Followup: Mean: 7.5 (SD 5)	NR	NR	No
Rizzoli, 2021[105]	Full group	Migraine days	Full group	6 months	Baseline: 14 Followup: 14	Baseline: Mean: 20.6 (SD 6.04) Followup: Mean: 8.7 (SD 4.5)	NR	NR	No
Schafer, 2022[111]	Arm 1	Middle ear effusion	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Schafer, 2022[111]	Arm 2	Middle ear effusion	Telemedicine (not specified)	NR	Baseline: NR Followup: NR	NR	NR	Ref: Assuming Arm1 p-value only: , p=<0.0001	No
Schafer, 2022[111]	Arm 1	Underwent surgery	In-person	NR	Baseline: NR Followup: NR	NR	NR	Ref	No
Schafer, 2022[111]	Arm 2	Underwent surgery	Telemedicine (not specified)	NR	Baseline: NR Followup: NR	NR	NR	Ref: Assuming Arm1 p-value only: , p=0.106	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Seghezzo, 2021[113]	Arm 1	PACC Score	full group	236.5 days	Baseline: 43 Followup: 28	Baseline: Median: 0.13 (IQR 1.08) Followup: Median: 0.25 (IQR 1.13)	Pearson Correlation Coefficient: 0.82 (95% CI: 0.66 to 0.98), p=NR	NR	Age, Internet Speed, Time Between Assessments, Educational qualification, Video Assessor, Person Assessor
Seghezzo, 2021[113]	Arm 1	PACC Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Mean change from baseline: -0.013, p=NR	NR	Age, Internet Speed, Time Between Assessments, Educational qualification, Video Assessor, Person Assessor
Seghezzo, 2021[113]	Arm 1	PACC Score	full group	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Median change from baseline: -0.042, p=NR	NR	Age, Internet Speed, Time Between Assessments, Educational qualification, Video Assessor, Person Assessor

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Seghezzo, 2021[113]	Arm 1	PACC Score	Age	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (Age): 0.008 (95% CI: -0.014 to 0.03), p=NR	NR	Age, Internet Speed, Time Between Assessments, Educational qualification, Video Assessor, Person Assessor
Seghezzo, 2021[113]	Arm 1	PACC Score	Education	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (Primary School): 0.42 (95% CI: -0.14 to 0.98), p=NR	NR	Age, Internet Speed, Time Between Assessments, Educational qualification, Video Assessor, Person Assessor
Seghezzo, 2021[113]	Arm 1	PACC Score	Education	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (A level): -0.009 (95% CI: -0.5 to 0.48), p=NR	NR	Age, Internet Speed, Time Between Assessments, Educational qualification, Video Assessor, Person Assessor

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Seghezzo, 2021[113]	Arm 1	PACC Score	Education	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (Undergraduate): 0.16 (95% CI: -0.27 to 0.58), p=NR	NR	Age, Internet Speed, Time Between Assessments, Educational qualification, Video Assessor, Person Assessor
Seghezzo, 2021[113]	Arm 1	PACC Score	Education	NR	Baseline: NR Followup: NR	Baseline: NR Followup: NR	Beta Coefficient (Post-Graduate): -0.68 (95% CI: -1.62 to 0.27), p=NR	NR	Age, Internet Speed, Time Between Assessments, Educational qualification, Video Assessor, Person Assessor
Tailby, 2021[119]	Full group	Neuropsychological Test: ^BNT	face-to-face	NR	Baseline: 4 Followup: NR	Baseline: Mean: -1.18 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.89	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: ^BNT	onsite Tele-NP	NR	Baseline: 6 Followup: NR	Baseline: Mean: -1.76 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.89	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^BNT	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -1.9 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.89	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^BNT	full group	NR	Baseline: 28 Followup: NR	Baseline: Mean: -1.77 (SD 1.65) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.89	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: ^DSB	face-to-face	NR	Baseline: 0 Followup: NR	Baseline: Mean: NR Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.71	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^DSB	onsite Tele-NP	NR	Baseline: 6 Followup: NR	Baseline: Mean: 0.06 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.71	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^DSB	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.15 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.71	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: ^DSB	full group	NR	Baseline: 24 Followup: NR	Baseline: Mean: -0.1 (SD 0.97) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.71	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^IED: yerta	onsite Tele-NP	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.27 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.67	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^IED: yerta	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.4 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.67	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: ^IED: yerta	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.04 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.67	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^IED: yerta	full group	NR	Baseline: 28 Followup: NR	Baseline: Mean: -0.14 (SD 0.94) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.67	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^Oral TMT B	face-to-face	NR	Baseline: 0 Followup: NR	Baseline: Mean: NR Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.11	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: ^Oral TMT B	onsite Tele-NP	NR	Baseline: 6 Followup: NR	Baseline: Mean: -1.45 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.11	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^Oral TMT B	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.75 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.11	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^Oral TMT B	full group	NR	Baseline: 24 Followup: NR	Baseline: Mean: -0.93 (SD 0.91) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.11	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: ^SWM be468	onsite Tele-NP	NR	Baseline: 5 Followup: NR	Baseline: Mean: 0.04 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.68	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^SWM be468	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: 0.02 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.68	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^SWM be468	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.35 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.68	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: ^SWM be468	full group	NR	Baseline: 28 Followup: NR	Baseline: Mean: -0.21 (SD 1.45) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.68	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^SWM Strategy	onsite Tele-NP	NR	Baseline: 5 Followup: NR	Baseline: Mean: 0.02 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.78	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^SWM Strategy	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.41 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.78	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: ^SWM Strategy	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.15 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.78	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ^SWM Strategy	full group	NR	Baseline: 28 Followup: NR	Baseline: Mean: -0.16 (SD 1.12) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.78	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: Animals	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.52 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.65	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: Animals	onsite Tele-NP	NR	Baseline: 6 Followup: NR	Baseline: Mean: -0.56 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.65	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: Animals	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.26 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.65	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: Animals	full group	NR	Baseline: 29 Followup: NR	Baseline: Mean: -0.37 (SD 1.4) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.65	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: COWAT	face-to-face	NR	Baseline: 0 Followup: NR	Baseline: Mean: NR Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.07	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: COWAT	onsite Tele-NP	NR	Baseline: 6 Followup: NR	Baseline: Mean: -1.86 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.07	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: COWAT	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -1.11 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.07	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: COWAT	full group	NR	Baseline: 24 Followup: NR	Baseline: Mean: -1.3 (SD 0.87) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.07	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: FSIQ-2	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.16 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.36	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: FSIQ-2	onsite Tele-NP	NR	Baseline: 6 Followup: NR	Baseline: Mean: -0.57 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.36	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: FSIQ-2	home Tele-NP	NR	Baseline: 17 Followup: NR	Baseline: Mean: 0.06 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.36	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: FSIQ-2	full group	NR	Baseline: 28 Followup: NR	Baseline: Mean: -0.11 (SD 0.82) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.36	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: Oral SDMT	face-to-face	NR	Baseline: 0 Followup: NR	Baseline: Mean: NR Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.16	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: Oral SDMT	onsite Tele-NP	NR	Baseline: 1 Followup: NR	Baseline: Mean: -2.73 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.16	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: Oral SDMT	home Tele-NP	NR	Baseline: 8 Followup: NR	Baseline: Mean: -0.93 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.16	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: Oral SDMT	full group	NR	Baseline: 9 Followup: NR	Baseline: Mean: -1.13 (SD 1.18) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.16	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: OTS: 1st Try	onsite Tele-NP	NR	Baseline: 5 Followup: NR	Baseline: Mean: 0.27 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.53	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: OTS: 1st Try	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.04 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.53	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: OTS: 1st Try	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: 0.31 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.53	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: OTS: 1st Try	full group	NR	Baseline: 28 Followup: NR	Baseline: Mean: 0.24 (SD 0.99) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.53	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: PAL: fams28	onsite Tele-NP	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.72 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.97	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: PAL: fams28	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: 0.01 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.97	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: PAL: fams28	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.18 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.97	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: PAL: fams28	full group	NR	Baseline: 28 Followup: NR	Baseline: Mean: -0.24 (SD 1.24) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.97	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: PAL: tea28	onsite Tele-NP	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.54 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.95	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: PAL: tea28	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.05 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.95	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: PAL: tea28	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.06 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.95	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: PAL: tea28	full group	NR	Baseline: 28 Followup: NR	Baseline: Mean: -0.12 (SD 1.17) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.95	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: delay	onsite Tele-NP	NR	Baseline: 6 Followup: NR	Baseline: Mean: -1.69 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.23	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: delay	face-to-face	NR	Baseline: 6 Followup: NR	Baseline: Mean: -1.66 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.23	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: delay	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -1.02 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.23	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: delay	full group	NR	Baseline: 29 Followup: NR	Baseline: Mean: -1.27 (SD 1.28) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.23	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: loss	onsite Tele-NP	NR	Baseline: 2 Followup: NR	Baseline: Mean: -1.29 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.66	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: loss	face-to-face	NR	Baseline: 2 Followup: NR	Baseline: Mean: -1.18 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.66	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: loss	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.97 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.66	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: loss	full group	NR	Baseline: 29 Followup: NR	Baseline: Mean: -1.07 (SD 1.27) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.66	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: sum(A1-A3)	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: -1.1 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.42	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: sum(A1-A3)	onsite Tele-NP	NR	Baseline: 6 Followup: NR	Baseline: Mean: -1.22 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.42	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: sum(A1-A3)	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.77 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.42	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RAVLT: sum(A1-A3)	full group	NR	Baseline: 29 Followup: NR	Baseline: Mean: -0.92 (SD 1.05) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.42	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: RVP: a'	onsite Tele-NP	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.97 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.47	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RVP: a'	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: -0.16 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.47	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: RVP: a'	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: -0.08 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.47	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: RVP: a'	full group	NR	Baseline: 28 Followup: NR	Baseline: Mean: -0.25 (SD 0.89) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.47	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ToPF	face-to-face	NR	Baseline: 5 Followup: NR	Baseline: Mean: 0.11 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.07	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ToPF	onsite Tele-NP	NR	Baseline: 6 Followup: NR	Baseline: Mean: -0.19 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.07	NR	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Tailby, 2021[119]	Full group	Neuropsychological Test: ToPF	home Tele-NP	NR	Baseline: 18 Followup: NR	Baseline: Mean: 0.59 (NR) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.07	NR	No
Tailby, 2021[119]	Full group	Neuropsychological Test: ToPF	full group	NR	Baseline: 29 Followup: NR	Baseline: Mean: 0.34 (SD 0.75) Followup: NR	Comparing means (ANOVA, F Test or H-Value if non-parametric between total, home Tele-NP, onsite Tele-NP, and face-to-face): NR, p=0.07	NR	No
Wu, 2021[127]	Arm 1	EQ-5D score	Full group	Before prehabilitation program NR	Baseline: NR Followup: 66	Baseline: NR Followup: Mean: 0.795 (IQR 0.691-0.857)	NR	Ref	No
Wu, 2021[127]	Arm 2	EQ-5D score	Full group	Post prehabilitation program NR	Baseline: NR Followup: 66	Baseline: NR Followup: Mean: 0.796 (IQR 0.725-1.00)	NR	Ref: Arm1 p=0.092	No

Author, Year	Arm	Outcome Definition	Subgroup	Followup Timepoint	N	Outcome	Within Arm Comparison	Between Arm Comparison	Adjusted
Wu, 2021[127]	Arm 1	EQ-VAS score	Full group	Before prehabilitation program NR	Baseline: NR Followup: 66	Baseline: NR Followup: Mean: 75 (IQR 65-86)	NR	Ref	No
Wu, 2021[127]	Arm 2	EQ-VAS score	Full group	Post prehabilitation program NR	Baseline: NR Followup: 66	Baseline: NR Followup: Mean: 80 (IQR 70-90)	NR	Ref: Arm1 p=0.001	No
Wu, 2021[127]	Arm 1	FACIT Fatigue score	Full group	Before prehabilitation program NR	Baseline: NR Followup: 66	Baseline: NR Followup: Mean: 44 (IQR 38-48)	NR	Ref	No
Wu, 2021[127]	Arm 2	FACIT Fatigue score	Full group	Post prehabilitation program NR	Baseline: NR Followup: 66	Baseline: NR Followup: Mean: 47 (IQR 43-50)	NR	Ref: Arm1 p=0	No

6MWT=6 minute walk test; ACT=arm curl test; ASA= American Society of Anesthesiologists; BNP= Brain natriuretic peptide; BNT= Boston Naming Test; CDR SoB= Clinical Dementia Rating sum of boxes; CDR= Clinical Dementia Rating; CDR-FTD= Clinical Dementia Rating Scale–Frontotemporal Dementia; CI=confidence interval; COWAT= Controlled Oral Word Association Test; CSC ED= comprehensive stroke center emergency department; DSB=digit span test; ED=emergency department; EQ-VAS=Euroqol visual analogue scale; ESS= Epworth Sleepiness Scale; FACIT= Fatigue Subscale; FIQ-R=Revised Fibromyalgia Impact Questionnaire; FISQ-2=Full scale IQ test; FTW=fit to work; HADS= Hospital Anxiety and Depression Scale; IED= Intra-Extra Dimensional Set Shift; IQR=interquartile range; KTEA-3=Kaufman Test of Educational Achievement Third Edition; LKW=last known well; N=sample size; NR=not reported; NS=non-significant; OTS= One Touch; p=p-value; PACC= Preclinical Alzheimer Cognitive Composite; PAL= Paired Associate Learning;; PCS= Pain Catastrophizing Scale; PPE=personal protective equipment; RAVLT= Rey Auditory Verbal Learning Test; Ref=reference; RTW=return to work; RVP= Rapid Visual Information Processing; SD=standard deviation; SDMT= Symbol Digit Modalities Test; Stockings of Cambridge; STST= sit-to-stand test; SWM=spatial working memory; TDD= total daily dose; TIA= transient ischemic attack; TMT= Trail Making Test; ToPF= Test of Premorbid Functioning; VAS=visual analogue scale; WISC-V=Wechsler Intelligence Scale for Children® Fifth Edition

Table D.9.1. Risk of bias assessment for randomized controlled trials investigating benefits and harms of telehealth during COVID-19 (Key Question 2)

Author, Year	Domain 1: Randomization Process	Domain 2: Deviations Intended Interventions (Effect of Assignment to Intervention)	Domain 2: Deviations Intended Interventions (Effect of Adhering to Intervention)	Domain 3: Missing Outcome Data	Domain 4: Measurement of the Outcome	Domain 5: Selection of the Reported Result	Overall Risk of Bias
Albornoz-Cabello, 2021[17]	Some concerns	Low risk	NA	Low risk	High risk	Low risk	High risk
Helmes, 2022[56]	Some concerns	Low risk	NA	Some concerns	Low risk	Low risk	Some concerns
Hernando-Garijo, 2021[57]	Low risk	Low risk	NA	Low risk	Low risk	Low risk	Low risk
Malliaras, 2020[81]	Low risk	Some concerns	Low risk	Low risk	Low risk	Low risk	Low risk

NA=not appropriate

Table D.9.2. Risk of bias assessment for non-randomized trials investigating benefits and harms of telehealth during COVID-19 (Key Question 2)

Author, Year	Domain 1: Confounding	Domain 2: Patient Selection	Domain 3: Classifying Interventions	Domain 4: Deviations From Intended Interventions	Domain 5: Missing Data	Domain 6: Measurement of Outcomes	Domain 7: Selection of Reported Results	Overall Risk of Bias
Aazh, 2021[12]	Low	Moderate	Low	No information	Low	Moderate	Moderate	Moderate
Afonso Noguueria, 2021[13]	Critical	Low	Low	Low	Low	Low	Low	Critical
Aiken, 2021[14]	Moderate	Moderate	Low	Moderate	Low	Low	Low	Moderate
Akama-Garren, 2021[15]	Moderate	Low	Low	Low	Low	Low	Low	Moderate
Akerly, 2021[16]	Serious	Critical	Low	Low	Serious	Serious	Low	Critical
Alvarez, 2020[18]	Serious	Low	Low	Low	Low	Low	Low	Serious
Arias, 2022[19]	Low	Low	Low	Low	Low	Low	Low	Moderate
Barequet, 2021[20]	Serious	No information	Low	Low	Low	Low	Low	Serious
Baughman, 2021[21]	Low	Low	Low	Low	Moderate	Low	Low	Moderate
Bogin, 2022[22]	Low	Low	Low	Low	Low	Low	Low	Moderate
Boles, 2022[23]10805	Serious	Serious	Low	Low	Serious	Low	Low	Serious
Borgen, 2021[24]	Moderate	Low	Low	Low	Low	Low	Low	Moderate
Boscari, 2021[25]	Moderate	Moderate	Low	No information	Moderate	Low	Low	Moderate
Boshara, 2022[26]	Low	No information	Low	Low	Low	No information	Low	Moderate
Cancer, 2021[27]	Serious	Low	Low	Low	Low	Low	Low	Serious
Candel, 2020[28]	Serious	Low	Low	Low	Moderate	Serious	Low	Serious
Capozzo, 2021[29]	Moderate	Critical	Low	Low	Low	Serious	Low	Critical
Carlberg, 2020[30]	Serious	Low	Low	Low	Moderate	Low	Low	Serious
Casariego-Vales, 2021[31]	Serious	Serious	Low	Serious	Moderate	Moderate	Low	Serious
Chang, 2021[32]	Serious	Low	Low	Low	Low	Low	Low	Serious
Chesnel, 2021[33]	Serious	Low	Low	Low	Low	Serious	Low	Serious
Cobo-Calbo, 2022[34]	Critical	Moderate	Low	Low	Low	Low	Low	Serious

Author, Year	Domain 1: Confounding	Domain 2: Patient Selection	Domain 3: Classifying Interventions	Domain 4: Deviations From Intended Interventions	Domain 5: Missing Data	Domain 6: Measurement of Outcomes	Domain 7: Selection of Reported Results	Overall Risk of Bias
Compton, 2020[35]	Serious	Low	Low	Low	Low	Low	Low	Serious
Corden, 2020[36]	Serious	Low	Low	Low	Serious	Low	Low	Serious
Crawford, 2021[37]	Moderate	Low	Low	Low	Moderate	Low	Low	Moderate
Cunningham, 2022[38]	Critical	Low	Low	Moderate	No information	Low	Low	Serious
Cvietusa, 2022[39]	Low	Low	Low	Low	Low	Low	Low	Low
D'Anna, 2021[40]	Critical	Moderate	Low	Low	Low	Low	Low	Serious
Darr, 2020[41]	Serious	Serious	Low	Low	Serious	Serious	Low	Serious
Das, 2021[42]	Moderate	Moderate	Low	Serious	Low	Low	Moderate	Moderate
De Marchi, 2021[43]	Serious	Low	Low	Low	Moderate	Serious	Low	Serious
Duryea, 2021[44]	Moderate	Low	Low	Low	Low	Low	Low	Serious
Etherton, 2021[45]	Low	Moderate	Low	No information	Moderate	Low	Low	Moderate
Ferry, 2021[46]	Serious	Low	Low	Low	No information	Low	Low	Serious
Fortier, 2022[47]	Serious	Low	Low	Low	Low	Serious	Low	Serious
Francis, 2021[48]	Serious	Low	Low	Low	Low	Low	Low	Serious
Fredwall, 2021[49]	Serious	Low	Low	Low	Moderate	Low	Low	Serious
Gaetani, 2021[50]	Moderate	Moderate	Low	Moderate	Low	Moderate	Low	Moderate
Garmendia, 2021[51]	Moderate	Moderate	Low	Low	Low	Low	Low	Moderate
Grandizio, 2022[52]	Critical	Moderate	Low	Low	Low	Low	Low	Serious
Gross, 2021[53]	Serious	Serious	Low	Low	Serious	Critical	Low	Critical
Hameed, 2021[54]	Serious	Low	Serious	Serious	Moderate	Low	Moderate	Serious
Hamner, 2021[55]	Low	Low	Low	Low	Low	Moderate	Low	Moderate
Hatef, 2022[4]	Low	Low	Low	Low	Low	Low	Low	Low
Hughes, 2021[58]	Serious	Serious	Low	Low	Low	Low	Low	Serious
Hutchings, 2020[59]	Low	Serious	Low	No information	Low	Low	Low	Moderate
Irarrazaval, 2021[60]	Critical	Low	Low	Low	Low	Low	Low	Serious
Jaenisch, 2020[61]	Low	Low	Low	Moderate	Low	Moderate	Low	Moderate

Author, Year	Domain 1: Confounding	Domain 2: Patient Selection	Domain 3: Classifying Interventions	Domain 4: Deviations From Intended Interventions	Domain 5: Missing Data	Domain 6: Measurement of Outcomes	Domain 7: Selection of Reported Results	Overall Risk of Bias
Jansen, 2020[62]	Low	Low	Low	Low	Low	Moderate	Low	Moderate
Kablinger, 2022[63]	Low	No information	Low	Low	Low	Low	Low	Moderate
Kazi, 2021[64]	Serious	Low	Low	Low	Low	Low	Low	Serious
Kerestes, 2021[65]	Moderate	Low	Low	Low	Low	Low	Low	Moderate
Khosla, 2022[66]	Low	Low	Low	Low	Low	Low	Low	Moderate
Kim, 2021[67]	Serious	Low	Low	Low	Low	Low	Low	Serious
Klain, 2021[68]	Serious	Low	Low	Low	Low	Low	Low	Serious
Kolb, 2021[69]	Serious	Low	Serious	Low	Low	Low	Low	Serious
Korycinski, 2022[70]	Moderate	Low	Low	Low	No information	Low	Low	Moderate
Kronenberger, 2021[71]	Serious	Low	Low	Low	Low	Serious	Low	Serious
Levinson, 2021[72]	Serious	Serious	Low	Serious	Moderate	Low	Low	Serious
Li, 2021[73]	Serious	Serious	Moderate	Low	Low	Low	Low	Serious
Li, 2021[74]	Serious	Serious	Moderate	Low	Low	Moderate	Low	Serious
Lightsey, 2021[75]	Serious	Low	Serious	Low	Low	Low	Low	Serious
Lindhagen, 2022[76]	Critical	Low	Low	Low	Low	Low	Low	Serious
Liu, 2021[77]	Serious	Moderate	Low	Low	Critical	Low	Low	Serious
Loftus, 2022[78]	Critical	Serious	Low	Serious	Low	Moderate	Low	Serious
Longobardi, 2021[79]	Serious	Low	Low	Low	Moderate	Serious	Low	Serious
Mair, 2021[80]	Moderate	Moderate	Low	Low	Low	Low	Low	Moderate
Margolius, 2021[82]	Low	Low	Moderate	Low	Low	Low	Low	Moderate
Martin, 2021[83]	Serious	Low	Low	Low	Serious	Low	Low	Serious
Martinez0Garcia, 2020[84]	Critical	Serious	Low	Low	Critical	Critical	Low	Serious
McCoy, 2022[85]	Critical	Low	Low	Low	Low	Low	Low	Serious
McLachlan, 2021[86]	Serious	Moderate	Low	Low	Low	Moderate	Low	Serious

Author, Year	Domain 1: Confounding	Domain 2: Patient Selection	Domain 3: Classifying Interventions	Domain 4: Deviations From Intended Interventions	Domain 5: Missing Data	Domain 6: Measurement of Outcomes	Domain 7: Selection of Reported Results	Overall Risk of Bias
McNamara, 2021[87]	Low	Low	Low	Low	Low	Low	Low	Moderate
Mehtani, 2021[88]	Serious	Serious	Moderate	No information	Low	Low	Low	Serious
Miller, 2021[89]	Serious	Low	Low	Low	Low	Low	Low	Serious
Minsky, 2021[90]	Serious	Low	Low	Low	Serious	Low	Low	Serious
Offiah, 2022[91]	Serious	Low	Low	Low	Moderate	Low	Low	Serious
Okeefe, 2021[92]	Moderate	Low	Low	Low	Low	Low	Low	Moderate
Onishi, 2021[93]	Moderate	Low	Moderate	Low	Moderate	Low	Moderate	Moderate
Ostberg, 2022[94]	Low	Serious	Low	Low	Low	Low	Low	Serious
Parise, 2021[95]	Serious	Low	Low	Low	Serious	Low	Low	Serious
Phillips, 2021[96]	Moderate	Low	Serious	Low	Low	Moderate	Low	Serious
Pinsker, 2021[97]	Serious	Low	Low	Low	Low	Low	Moderate	Serious
Postorino, 2020[98]	Serious	Low	Low	Low	Low	Low	Low	Serious
Rachmeil, 2020[99]	Serious	Low	Low	Low	Serious	Low	Low	Serious
Ragheb, 2021[100]	Serious	Low	Low	Low	Low	Low	Low	Serious
Reddy, 2021[101]	Critical	Low	Low	Low	No information	Low	Low	Serious
Reider-Demer, 2022[102]	Serious	No information	Low	Low	Low	Low	Low	Serious
Reynolds-Wright, 2021[103]	Moderate	Moderate	Moderate	Low	No information	Low	Low	Moderate
Ripp, 2022[104]	Low	Low	Low	Low	Low	Low	Low	Moderate
Rizzoli, 2021[105]	Serious	Low	Low	Low	Moderate	Low	Low	Serious
Rohan, 2021[106]	Serious	Low	Low	Low	No information	Low	Low	Serious
Rowe, 2021[107]	Moderate	Low	Serious	Low	Low	Low	Low	Serious
Russo, 2021[108]	Serious	Low	Low	Serious	Moderate	Low	Low	Serious
Rysinka, 2021[109]	Moderate	Low	Moderate	Low	Low	Low	Low	Moderate
Sawka, 2021[110]	Critical	Low	Serious	Low	Low	Moderate	Low	Critical
Schafer, 2022[111]	Low	Low	Low	Low	Low	Low	Low	Moderate

Author, Year	Domain 1: Confounding	Domain 2: Patient Selection	Domain 3: Classifying Interventions	Domain 4: Deviations From Intended Interventions	Domain 5: Missing Data	Domain 6: Measurement of Outcomes	Domain 7: Selection of Reported Results	Overall Risk of Bias
Schweiberger, 2020[112]	Moderate	Low	Low	Low	Serious	Serious	Low	Serious
Seghezzo, 2021[113]	Low	Low	Low	Serious	Moderate	Serious	Low	Serious
Sevilis, 2022[114]	Critical	Low	Low	Low	Low	Low	Serious	Critical
Shabato, 2020[115]	Moderate	Moderate	Low	No information	Moderate	Low	Low	Moderate
Sharma, 2020[116]	Serious	Low	Serious	Low	Low	Low	Moderate	Serious
Sharma, 2020[117]	Serious	Serious	Low	Low	Low	Moderate	Low	Serious
Smith, 2021[118]	Serious	Low	Low	Low	Low	Low	Low	Serious
Tailby, 2021[119]	Serious	Low	Low	Low	Low	Low	Low	Serious
Tarn, 2021[120]	Serious	Low	Low	Low	Low	Low	Low	Serious
Taxonera, 2020[121]	Serious	Low	Low	Low	Moderate	Serious	Low	Serious
Tchang, 2022[122]	Critical	Low	Low	Low	Moderate	Low	Low	Serious
Uppal, 2022[123]	Moderate	Low	Low	Low	Low	Low	Low	Moderate
Wabe, 2022[124]	Low	Low	Low	Low	Low	Low	Low	Low
Watson, 2021[125]	Critical	Low	Low	Low	Low	Low	Low	Serious
Winkleman, 2020[126]	Low	Low	Low	Low	Low	Low	Moderate	Moderate
Wu, 2021[127]	Serious	Low	Low	Low	Moderate	Serious	Low	Serious
Ye, 2022[128]	Low	Low	Low	Low	Low	Low	Low	Moderate
Ye, 2022[129]	Low	Low	Low	Low	Low	Low	Low	Moderate
Zayde, 2021[130]	Serious	Low	Low	Low	Low	Low	Low	Serious
Zhang, 2021[131]	Serious	Low	Low	Low	Low	Low	Low	Serious
Zhao, 2021[132]	Low	Moderate	Low	Low	Low	Low	Low	Moderate
Zhu, 2021[133]	Serious	Low	Low	Low	Low	Low	Low	Serious
Zimmerman, 2021[134]	Serious	Low	Low	Low	Moderate	Serious	Low	Serious

Table D.10. Strength of evidence grading for main outcome categories by clinical area (Key Question 2)

Outcome	Clinical Area	Number of Studies, n Participants	Study Limit-ations	Direct -ness	Precis-ion	Consis-tency	Reporting Bias	Strength of Evidence
ED visit	General medical care - adults	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	2 cohorts, (N=608878)	Medium	Direct	Precise	Inconsistent	Undetected	Moderate
	Specialized – COVID	3 cohorts, (N=5462)	High	Direct	Precise	Inconsistent	Undetected	Low
	Specialized - Pregnancy/prenatal/gynecological	1 cohort, (N=287)	High	Direct	Imprecise	Unknown	Undetected	Low
	Specialized – Other conditions	4 cohorts 1 cross-sectional, (N=11546)	High	Direct	Precise	Consistent	Undetected	Low
	Surgical Care	1 cohort, (N=219)	High	Direct	Imprecise	Unknown	Undetected	Low
	General Behavioral/Mental Health	NA	NA	NA	NA	NA	NA	No conclusion
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Hospitalization	General medical care - adult	2 cohort, (N=17517)	High	Direct	Precise	Consistent	Undetected	Moderate
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	2 cohort, (N=608878)	Medium	Direct	Precise	Inconsistent	Undetected	Moderate
	Specialized care – COVID	2 cohort, (N=4677)	High	Direct	Precise	Inconsistent	Undetected	Low
	Specialized care - Pregnancy/prenatal/gynecological	2 cohort, (N=14186)	High	Direct	Precise	Consistent	Undetected	Low
	Specialized care – Other conditions	8 cohort 1 cross-sectional, (N=38484)	High	Direct	Precise	Inconsistent	Suspected	Low
	Surgical Care	1 cohort, (N=535)	High	Direct	Precise	Unknown	Undetected	Low
	General Behavioral/Mental Health	NA	NA	NA	NA	NA	NA	No conclusion
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion

Outcome	Clinical Area	Number of Studies, n Participants	Study Limit-ations	Direct -ness	Precis-ion	Consis-tency	Reporting Bias	Strength of Evidence
Readmission	General medical care - adult	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized – COVID	2 cohort, (N=992)	High	Direct	Precise	Consistent	Undetected	Low
	Specialized care - Pregnancy/prenatal/gynecological	1 cohort, (N=473)	High	Direct	Precise	Unknown	Undetected	Low
	Specialized care – Other conditions	NA	NA	NA	NA	NA	NA	No conclusion
	Surgical Care	1 cohort, (N=843)	High	Direct	Precise	Consistent	Undetected	Low
	General Behavioral/Mental Health	NA	NA	NA	NA	NA	NA	No conclusion
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Mortality	General medical care - adult	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized – COVID	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized - Pregnancy/prenatal/gynecological	1 cohort 1 cross-sectional, (N=53721)	High	Direct	Precise	Consistent	Undetected	Low
	Specialized – Other conditions	2 cohort 1 cross-sectional, (N=2009)	High	Direct	Precise	Consistent	Undetected	Low
	Surgical Care	2 cohort (N=754)	High	Direct	Precise	Inconsistent	Undetected	Low
	General Behavioral/Mental Health	NA	NA	NA	NA	NA	NA	No conclusion
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Patient-reported	General medical care - adult	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized – COVID	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized - Pregnancy/prenatal/gynecological	1 cohort, (N=1579)	High	Direct	Precise	Unknown	Undetected	Low

Outcome	Clinical Area	Number of Studies, n Participants	Study Limit-ations	Direct -ness	Precis-ion	Consis-tency	Reporting Bias	Strength of Evidence
	Specialized – Other conditions	1 cohort, (N=279)	High	Direct	Precise	Unknown	Undetected	Low
	Surgical Care	NA	NA	NA	NA	NA	NA	No conclusion
	General Behavioral/Mental Health	3 cohorts, (N=515)	High	Direct	Precise	Consistent	Undetected	Low
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Condition-specific	General medical care - adult	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized – COVID	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized care - Pregnancy/prenatal/gynecological	1 cohort 1 cross-sectional, (N=53721)	High	Direct	Imprecise	Inconsistent	Undetected	Low
	Specialized care – Other conditions	7 cohorts, (N=42172)	High	Direct	Precise	Inconsistent	Undetected	Low
	Surgical Care	1 cohort, (N=94)	High	Direct	Imprecise	Unknown	Undetected	Low
	General Behavioral/Mental Health	1 cohort, (N=93)	High	Direct	Imprecise	Unknown	Undetected	Low
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Adverse events	General medical care - adult	1 cohort, (N=492)	High	Direct	Precise	Unknown	Undetected	Low
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized – COVID	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized care - Pregnancy/prenatal/gynecological	3 cohort, (N=65036)	High	Direct	Precise	Consistent	Undetected	Low
	Specialized care – Other conditions	1 cohort, (N=23268)	High	Direct	Precise	Unknown	Undetected	Low
	Surgical Care	1 RCT 3 cohort, (N=65131)	High	Direct	Precise	Consistent	Undetected	Low
	General Behavioral/Mental Health	1 cohort, (N=74)	High	Direct	Imprecise	Unknown	Undetected	Low
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Missed visits	General medical care - adult	NA	NA	NA	NA	NA	NA	No conclusion

Outcome	Clinical Area	Number of Studies, n Participants	Study Limit-ations	Direct -ness	Precis-ion	Consis-tency	Reporting Bias	Strength of Evidence
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized – COVID	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized care - Pregnancy/prenatal/gynecological	1 cohort, (N=1579)	High	Direct	Precise	Unknown	Undetected	Low
	Specialized care – Other conditions	3 cohort 1 cross-sectional, (N=6108)	High	Direct	Precise	Inconsistent	Suspected	Low
	Surgical Care	1 cross-sectional, (N=8197)	High	Direct	Precise	Unknown	Undetected	Low
	General Behavioral/Mental Health	1 cohort, (N=12)	High	Direct	Imprecise	Unknown	Undetected	Low
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Case resolution/Duplication of services	General medical care - adult	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	1 cohort 1 cross-sectional, (N=607717)	Medium	Direct	Precise	Inconsistent	Undetected	Moderate
	Specialized care – COVID	1 cohort, (N=285)	High	Direct	Imprecise	Unknown	Undetected	Insufficient
	Specialized care - Pregnancy/prenatal/gynecological	1 cohort, (N=218)	High	Direct	Imprecise	Unknown	Undetected	Insufficient
	Specialized care – Other conditions	7 cohort, (N=8735)	High	Direct	Precise	Inconsistent	Suspected	Low
	Surgical Care	1 cohort, (N=285)	High	Direct	Imprecise	Unknown	Undetected	Low
	General Behavioral/Mental Health	NA	NA	NA	NA	NA	NA	No conclusion
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Change in therapy/medication	General medical care - adult	2 cohort, (N=13608708)	Medium	Direct	Precise	Consistent	Undetected	Moderate
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	NA	NA	NA	NA	NA	NA	No conclusion

Outcome	Clinical Area	Number of Studies, n Participants	Study Limit-ations	Direct -ness	Precis-ion	Consis-tency	Reporting Bias	Strength of Evidence
	Specialized care – COVID	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized care - Pregnancy/prenatal/gynecological	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized care – Other conditions	6 cohort, (N=6899)	High	Direct	Precise	Consistent	Suspected	Low
	Surgical Care	NA	NA	NA	NA	NA	NA	No conclusion
	General Behavioral/Mental Health	NA	NA	NA	NA	NA	NA	No conclusion
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Therapy/medication adherence	General medical care - adult	2 cohort, (N=906)	High	Direct	Precise	Inconsistent	Undetected	Low
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized care - Pregnancy/prenatal/gynecological	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized care – Other conditions	4 cohort, (N=144378)	High	Direct	Precise	Consistent	Undetected	Low
	Surgical Care	NA	NA	NA	NA	NA	NA	No conclusion
	General Behavioral/Mental Health	3 cohort, (N=1612)	High	Direct	Precise	Consistent	Undetected	Low
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion
Up-to-date labs	General medical care - adult	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - child	NA	NA	NA	NA	NA	NA	No conclusion
	General medical care - all ages	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized care – COVID	NA	NA	NA	NA	NA	NA	No conclusion
	Specialized care - Pregnancy/prenatal/gynecological	1 cohort, (N=104)	High	Direct	Imprecise	Unknown	Undetected	Low
	Specialized care – Other conditions	5 cohort 1 cross-sectional, (N=5661)	High	Direct	Precise	Inconsistent	Undetected	Low
	Surgical Care	NA	NA	NA	NA	NA	NA	No conclusion
	General Behavioral/Mental Health	NA	NA	NA	NA	NA	NA	No conclusion
	Physical rehabilitation/ Functional impairment	NA	NA	NA	NA	NA	NA	No conclusion

NA=not available

Table D.11. Study characteristics of qualitative studies addressing barriers and facilitators to, and satisfaction and dissatisfaction of telehealth (Key Question 3)

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Adams, 2021[137]	Telephone only	Open-ended survey	Early	Australia	Multiple site	Urban	Patient
Al Izzi, 2020[138]	NR	survey	Early	UK	Single site	NR	Provider or Healthcare system
Aleboyeh, 2021[139]	Video	observational	Compares pre-COVID to post-COVID	Canada	single site	NR	Both
Alkureeishi, 2021[140]	Video	open-ended questions (qual)	Later	US	Single site	Urban	Provider or Healthcare system
Allison, 2022[141]	telephone plus video	Mixed	Later	United States	Multiple site	Suburban	Patient
Alpert, 2022[142]	Telephone plus video	interviews, semi-structured	General COVID era	US	Single site	NR	Provider or Healthcare system
Anghelescu, 2021[143]	NR	semi-structured interview	Early	Canada	Single site	Urban	Patient
Antoun, 2021[144]	Telephone only	Semi-structured interview	Later	UK	Single site	Urban	Patient
Aschcroft, 2021[145]	Telephone only	Survey, open ended questions	General	Canada	Multiple site	NR	Provider or Healthcare system
Ashcroft, 2021[146]	Video	focus groups	General	Canada	NR	NR	Provider or Healthcare system
Atay, 2021[147]	NR	mixed methods	General	france	web-based	NR	patient
Baadjou, 2020[148]	Video	cross-sectional survey	General	The Netherlands	single site	NR	Provider or Healthcare system
Banks, 2021[149]	NR	Open ended survey	Compares pre-COVID to post-COVID	Ireland	Multiple site	NR	Both
Barba, 2021[150]	Telephone only	questionnaire	Early	Italy	Multiple site	NR	Patient
Barnett, 2021[151]	video	mixed methods	General	US	web-based	NR	Provider or Healthcare system
Barsom, 2021[152]	Video	Survey/open-ended questions	Early	The Netherlands	Single site	Urban	Patient
Barsom, 2021[152]	Video	Survey/open-ended questions	Early	The Netherlands	Single site	Urban	Provider or Healthcare system
Barth, 2021[153]	Video	Semi-structured interview	Early	Switzerland	Single site	Urban	Provider or Healthcare system
Barth, 2021[153]	Video	Survey	Early	Switzerland	Single site	Urban	Patient

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Barton, 2022[154]	Both	Semi-structured interviews, thematic analysis	Later	Australia	Multiple site	NR	Patient
Bate, 2021[155]	NR	prospective questionnaire	Compares pre-COVID to post-COVID	Australia	Single site	Urban	Both
Belcher, 2021[156]	NR	Retrospective review	General	US	Single site	NR	Provider or Healthcare system
Ben-Ayre, 2021[157]	NR	narrative assessment	General	Israel	single site	NR	both
Bennell, 2021[158]	Video	mixed methods study-qual	General	Australia	web-based survey	NR	Both
Bethel, 2021[159]	NR	qualitative	General	US	Single site	NR	Patient
Bhuva, 2020[160]	Video	Prospective cohort	General	US	single site	NR	Patient
Birkhoff, 2021[161]	Video	survey/interview, mixed	General	US	Single site	Suburban	Patient
Bommersbach, 2021[162]	NR	Mixed-methods	Later	US	single site	NR	Provider or Healthcare system
Bos, 2021[163]	Telephone only	Mixed methods open-ended survey	Early	The Netherlands	Multiple site	NR	Provider or Healthcare system
Boyarsky, 2020[164]	NR	Survey	Early	US	national survey	NR	Provider or Healthcare system
Boydell, 2021[165]	Telephone only	interview	General	UK	Single site	Urban	Patient
Bradfield, 2021[166]	NR	cross-sectional; interview and survey	Early	Australia	web-based	NR	Provider or Healthcare system
Brown-Johnson, 2021[167]	Video	Semi-structured phone interviews	Early	US	Single site	Urban	Both
Brunton, 2021[168]	Video	Survey/free text (qual)	Later	US	Multiple site	urban/suburban/rural	Provider or Healthcare system
Bryne, 2021[169]	Telephone only plus video	questionnaire	General	UK	Multiple site	NR	Both
Burton, 2022[170]	Both	Focus group	Compares pre-COVID to post-COVID	Canada	Single site	Rural	Provider or Healthcare system

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Butt, 2022[171]	Both	interviews, semi-structured	General	Australia	NR	NR	Provider or Healthcare system
Byrnes, 2020[172]	NR	in-depth interview	Early	US	Single site	NR	Provider or Healthcare system
Campbell-Yeo, 2021[173]	NR	co-design process	Later	Canada	single site	NR	patient
Cartledge, 2021[174]	Both	On-line chat	Later	Australia	Multiple site	Mixed, primarily urban	Provider or Healthcare system
Cavagna, 2020[175]	NR	survey	Early	Italy	single site	urban	Patient
Champion, 2021[176]	NR	survey	Later	US	single site	NR	patient
Chang, 2021[177]	Both	interviews, semi-structured	General	US	Multiple site	mixed	Provider or Healthcare system
Chen, 2021[178]	NR	survey	Early	US	Single site	Urban	Both
Clair, 2021[179]	Video	focus group	Early	US	Single site	Urban	Patient
Cole, 2021[180]	NR	cross-sectional survey	Later	Canada, US	web-based	NR	Provider or Healthcare system
Collins, 2020[181]	NR	qualitative	Later	US	Multiple site	NR	Provider or Healthcare system
Cook, 2021[182]	NR	qualitative	General	Australia	single site	NR	Both
Cooper, 2021[183]	Video	qualitative	General	UK	Multiple site	NR	patient
Cormi, 2021[184]	NR	Mixed-methods	General	France	Single site	NR	Provider or Healthcare system
Costa, 2021[185]	NR	survey	General	US	web-based	NR	patient
Courtney, 2021[186]	NR	Interview	General	UK	Single site	NR	Provider or Healthcare system
Cronin, 2020[187]	Video	free-text	Early	UK	Single site	Urban	Both
Cronin, 2020[187]	Telephone only plus video	Survey	Early	UK	Single site	Urban	Patient
Dahl-Popolizio, 2020[188]	NR	cross-sectional survey	Early	US	web-based	NR	Provider or Healthcare system
Dainty, 2022[189]	Both	Interview	Later	Canada	Multiple site	NR	Patient
Datta, 2021[190]	Video	Survey	Early	US	Single site	NR	Patient
Davoodi, 2021[191]	Not stated	interviews, semi-structured	Later	US	Multiple site	NR	Provider or Healthcare system
Dennett, 2021[192]	Both	interviews, structured (some open questions)	General	Australia	NR	NR	Patient

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
DePuccio, 2022[193]	Not stated	interviews, semi-structured	Later	US	Multiple site	NR	Provider or Healthcare system
Di Lalla, 2021[194]	NR	questionnaire	Early	Canada	Single site	NR	Patient
Di Lorito, 2021[195]	Video	Semi-structured interview	Later	UK	Single site	Urban	Both
DiGiovanni, 2021[196]	NR	qualitative	General	US	web-based	NR	Provider or Healthcare system
Dinuzzi, 2021[197]	NR	Survey	Early	Italy	Single site	NR	Patient
Donovan, 2021[198]	Video	semi-structured interview	Compares pre-COVID to post-COVID	US	Multiple site	one rural center and one urban center	Patient
Dozieres-Puyravel, 2021[199]	Video	Survey/free-text	Early	France	Single site	Urban	Caregiver
Dramburg, 2021[200]	NR	survey	Later	Germany	web-based	NR	Provider or Healthcare system
Due, 2021[201]	Video	interview	General	Denmark	NR	NR	Provider or Healthcare system
Edge, 2021[202]	Both	Survey, open ended questions	Later	Australia	Multiple site	NR	Patient
Edge, 2021[202]	Both	Survey, open ended questions	Later	Australia	Multiple site	NR	Provider or Healthcare system
Erben, 2021[203]	NR	Retrospective cohort	General	US	Multiple site	NR	Patient
Evans, 2021[204]	NR	open-ended questions	Later	Australia	NR	NR	Patient
Feijt, 2020[205]	NR	Survey/open ended Questions	Early	The Netherlands	NR	NR	Provider or Healthcare system
Fieux, 2020[206]	NR	prospective	Early	France	Single site	NR	Both
Filippi, 2021[207]	Video	open-ended question	Early	US	national network survey	NR	Provider or Healthcare system
Finn, 2021[208]	NR	Mixed-methods	General	US	Single site	Urban	Both
Fisher, 2020[209]	Video	Survey	Early	US	online national survey	NR	Patient
Fonseca, 2020[210]	Telephone only	Survey	Early	Spain	Single site	Urban	Patient
Franzosa, 2021[211]	NR	qualitative	Early	US	Multiple site	5 urban; 1 suburuban	Provider or Healthcare system
Franzosa, 2021[212]	Video	qualitative	General	US	Multiple site	Urban	Provider or Healthcare system
Frayn, 2021[213]	Video	Semi-structured interviews	Later	US	Single site	NR	Patient

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Freiman, 2021[214]	NR	Cross sectional survey	Early	US	Single site	NR	Patient
Frey, 2021[215]	Not stated	Interviews, structured	Later	New Zealand, Scotland	Multiple site	NR	Provider or Healthcare system
Futterman, 2021[216]	NR	cross-sectional	Early	US	single site	urban	patient
Gabe-Walters, 2021[217]	NR	survey	Later	UK	web-based survey	NR	Provider or Healthcare system
Gately, 2021[218]	Video	Survey	Later	US	Single site	Urban	Combination
Gava, 2021[219]	NR	Survey	Early	NR	a web-based survey sent nationwide by an NGO	NR	Patient
Gefen, 2021[220]	Video	Focus groups	Early	Israel	Single site	Urban	Provider or Healthcare system
Gefen, 2021[220]	Video	Focus groups	Early	Israel	Single site	Urban	Patient
Gergerich, 2020[221]	NR	open-ended question	Early	US	online national survey	NR	Provider or Healthcare system
Ghazala, 2021[222]	Video	Survey	Early	UK	Multiple site	NR	Both
Gilbert, 2021[223]	NR	Cross-sectional survey	Later	UK	web-based survey	NR	Provider or Healthcare system
Goddard, 2020[224]	NR	on-line seminar/focus group	General	US	Multiple site	NR	Provider or Healthcare system
Godfrey, 2021[225]	NR	semi-structured, in-depth interviews	Later	US	Multiple site	Urban, rural, and suburban	Provider or Healthcare system
Goh, 2021[226]	Video	Survey	Early	US and Canada	Multiple site	NR	Provider or Healthcare system
Goldberg, 2021[227]	Video	Semi-structured interviews	Later	US	national survey	urban/suburban/rural	Provider or Healthcare system
Gomez, 2021[228]	NR	interviews	Early	US	Multiple site	NR	Provider or Healthcare system
Granberg, 2021[229]	Video	Semi-structured interviews	Early	US	Single site	Urban	Patient
Greven, 2021[230]	Video	Retrospective cohort	Early	US	Single site	NR	Patient
Gullslett, 2021[231]	Video	qualitative	Early	Norway	single site	NR	Provider or Healthcare system
Guzman, 2022[232]	Both	interviews, semi-structured	General	Australia	Multiple site	NR	Provider or Healthcare system
Haase, 2021[233]	NR	interview	Later	Canada	NR	NR	Patient

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Hall-Mills, 2022[234]	Not stated	Focus group	Later	US	Multiple site	NR	Provider or Healthcare system
Hamad, 2021[235]	NR	cross-sectional survey	Early	US	single site	NR	patient
Handley, 2022[236]	Both	interviews, semi-structured	Later	US	Single site	NR	Provider or Healthcare system
Hao, 2021[237]	Not stated	interviews	Later	US	Multiple site	NR	Provider or Healthcare system
Hardy, 2021[238]	video	mixed methods	Early	US	web-based	NR	Provider or Healthcare system
Hasson, 2021[239]	NR	survey	Early	Israel	single site	Urban	Patient
Heiskanen, 2021[240]	Video	open-ended questions	Early	Finland	national survey	NR	Provider or Healthcare system
Hentati, 2021[241]	Video	Survey	General	US	NR	NR	Patient
Hersch, 2022[242]	Not stated	Mixed, IDIs	Later	US	Multiple site	NR	Provider or Healthcare system
Hertling, 2021[243]	Video	Survey	General	Germany	NR	NR	Provider or Healthcare system
Hlubocky, 2021[244]	NR	focus groups	Later	US	web-based	NR	Provider or Healthcare system
Holcomb, 2020[245]	Telephone only	cross-sectional	Early	US	single site	NR	patient
Humer, 2020[246]	Video	survey	Early	Austria	web-based survey	NR	Provider or Healthcare system
Hunter, 2021[247]	NR	qualitative	Early	UK, Greece, US	NR	NR	patient
Hunter, 2021[248]	NR	Interview	Early	US	Multiple site	NR	Provider or Healthcare system
Hyung, 2021[249]	NR	Cross sectional survey	General	US	Single site	NR	Provider or Healthcare system
Iacopi, 2021[250]	Telephone only	Survey	Early	Multi	Single site	Urban	Patient
Imlach, 2020[251]	Video	Interview	General	New Zealand	NR	NR	Patient
Isautier, 2020[252]	Video	Survey/free text (qual)	Later	Australia	NR	Other (define)	Patient
Israilov, 2020[253]	NR	survey	General	US	Multiple site	Urban	Provider or Healthcare system
Itamura, 2021[254]	Video	Survey	Compares pre-COVID to post-COVID	US	Single site	Urban	Patient

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Iyer, 2021[255]	Video	Open-ended survey questions	Early	US	single site	NR	Both
Iyer, 2021[255]	Video	Survey	Early	US	single site	NR	Patient
Iyer, 2021[255]	Video	Survey	Early	US	single site	NR	Provider or Healthcare system
Jaclyn, 2021[256]	Video	Survey	Early	US	Multiple site	NR	Patient
Jang, 2021[257]	Telephone only	not described (records review)	General	Korea (South)	Multiple site	NR	Patient
Jassil, 2022[258]	Telephone plus video	interviews, semi-structured	General	UK	Multiple site	NR	Patient
Javanparast, 2021[259]	Video	interview	Early	Australia	Multiple site	urban	patient
Javanparast, 2021[260]	NR	Interview	Early	Australia	Multiple site	NR	Patient
Jimenez-Rodriguez, 2020[261]	NR	descriptive observational study	Early	Spain	Multiple site	NR	Provider or Healthcare system
Johnsen, 2021[262]	Video	survey	Early	Norway	NR	NR	Provider or Healthcare system
Johnson, 2021[263]	NR	mixed methods	General	UK	web-based	NR	Provider or Healthcare system
Joughin, 2021[264]	Video	Survey/free-text	General	UK	Single site	Urban	Provider or Healthcare system
Joughin, 2021[264]	Video	Survey	General	UK	Single site	Urban	Patient
Joyce, 2021[265]	Video	not stated (case study)	General	US	single site	NR	patient
Kang, 2020[266]	Video	NR	Early	UK	Single site	Urban	Provider or Healthcare system
Kang, 2020[266]	Video	Survey	Early	UK	Single site	Urban	Patient
Kang, 2021[267]	Telephone only	open-ended survey	General	US	Multiple site	NR	patient
Kasturi, 2021[268]	NR	prospective	Later	US	Multiple site	Urban	patient
Kaufman, 2021[269]	Video	Cross-sectional survey	Early	Israel	web-based survey	NR	Provider or Healthcare system
Kayser, 2021[270]	Video	Retrospective analysis	Early	Germany	Single site	NR	Patient
Kazi, 2021[64]	Video	Cohort	Early	US	NR	NR	Both
Kenney, 2021[271]	Video	Survey	Early	US	Single site	Urban	Provider or Healthcare system
Kenney, 2021[271]	Video	Survey	Early	US	Single site	Urban	Patient

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Kippen, 2020[272]	NR	Survey	Early	Australia	online	NR	Provider or Healthcare system
Klamroth-Marganska, 2021[273]	Video	open-ended questions	Early	Switzerland	national survey	NR	Provider or Healthcare system
Kolin, 2021[274]	NR	Survey	General	US	NR	NR	Provider or Healthcare system
Korecka, 2020[275]	Video	Cross-sectional survey	Early	Austria, Germany	NR	NR	Provider or Healthcare system
Koziatek, 2020[276]	video	retrospective cohort	Early	US	single site	urban	patient
Krawczyk, 2021[277]	NR	qualitative	Early	Reddit survey	web-based	NR	Patient
Krok-Schoen, 2021[278]	NR	survey	General	US, Canada, Mexico, Africa, Europe, Australia, Asia	web-based	NR	Provider or Healthcare system
Kronenberger, 2021[71]	Video	Prospective cohort	General	US	NR	NR	Patient
Kryszak, 2022[279]	Both	interviews, semi-structured	Later	US and Canada	Multiple site	NR	Provider or Healthcare system
Kursite, 2022[280]	Not stated	interviews, semi-structured	General	Latvia	Multiple site	NR	Provider or Healthcare system
Laden, 2021[281]	Not stated	Semi-structured interviews, thematic analysis	Later	United States	Multiple site	NR	Patient
Lapadula, 2021[282]	Video	Survey	General	US	Single site	Urban	Patient
Lapadula, 2021[282]	Video	Survey	General	US	Single site	Urban	Provider or Healthcare system
LaRoche, 2021[283]	NR	web-based survey	General	US	web-based survey	NR	Patient
Lau, 2021[284]	Video	Survey	Early	US	national network survey	NR	Provider or Healthcare system
LeBrun, 2021[285]	NR	cross-sectional	Early	US	single site	urban	patient
Lee, 2021[286]	NR	Cross sectional survey	Compares pre-COVID to post-COVID	US	NR	NR	Provider or Healthcare system

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Lee, 2022[287]	Telephone only	Survey, open-ended questions	Later	not stated, maybe UK, and Canada	NR	NR	Patient
Lee, 2022[287]	Telephone only	Survey, open-ended questions	Later COVID era (June 2020 and later)	Multi	NR	NR	Provider or Healthcare system
Li, 2021[288]	NR	Survey	Early	US	Single site	Urban	Patient
Lin, 2021[289]	Video	focus groups	General	US	Multiple site	NR	Provider or Healthcare system
Luckett, 2021[290]	NR	Cross-Sectional Survey	General	Australia	Web-based, non-site specific	NR	Provider or Healthcare system
Ludwig, 2021[291]	NR	observational cross-sectional	Early	France	single site	NR	patient
Lun, 2020[292]	Video	prospective	Early	Canada	Single site	NR	Both
Lynch, 2021[293]	NR	Interviews	General	US	Single site	NR	Provider or Healthcare system
Lynch, 2021[293]	NR	survey	General	US	Single site	NR	Patient
Macchi, 2021[294]	NR	qualitative	General	US	Multiple site	NR	Patient
Madden, 2020[295]	NR	Prospective cohort	Early	US	Multiple site	Urban	Provider or Healthcare system
Malden, 2021[296]	NR	interview	General	US and UK	Multiple site	NR	Provider or Healthcare system
Manz, 2021[297]	NR	Survey	Early	US	Single site	NR	Patient
Margolin, 2021[298]	Video	Survey	Later	US	Single site	Urban	Patient
Margolin, 2021[298]	Video	Survey	Later	US	Single site	Urban	Provider or Healthcare system
Mark, 2022[299]	Not stated	Interviews	Later	US	Multiple site	NR	Provider or Healthcare system
Marshall, 2021[300]	NR	semi-structured interview	General	US	web-based	NR	Provider or Healthcare system
Martin, 2021[301]	Telephone only	Mixed-methods	Later	US	Multiple site	NR	Provider or Healthcare system
Masi, 2021[302]	NR	Survey	General	Australia	NR	NR	Caregiver
McKee, 2021[303]	Video	Survey	Early	US	online national survey	NR	Provider or Healthcare system
Melian, 2021[304]	Telephone only	prospective	General	New Zealand	single site	NR	patient
Meno, 2021[305]	Video	Survey	Early	US	Single site	NR	Patient

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Mertz, 2021[306]	Telephone only	Survey	Early	Italy	Single site	Urban	Patient
Miller, 2021[307]	NR	Survey	Early	US	Single site	Urban	Patient
Mohammed, 2021[308]	NR	web-based survey	Later	Canada	web-based survey	NR	Provider or Healthcare system
Mozes, 2022[309]	Both	Focus group	General	Israel	Multiple site	NR	Patient
Mrugala, 2021[310]	NR	survey	Early	US, Europe, Asia (roughly half from US)	web-based	NR	Provider or Healthcare system
Murphy, 2021[311]	Video	interview	General	UK	Multiple site	NR	Provider or Healthcare system
Mustafa, 2020[312]	Video	prospective	Early	US	single site	NR	Patient
Mustafa, 2021[313]	Video	prospective	Later	US	single site	NR	patient
Myers, 2020[314]	Video	qualitative	Early	US	single site	NR	Provider or Healthcare system
Nagra, 2021[315]	NR	cross-sectional survey	Early	UK	web-based	NR	Provider or Healthcare system
Negi, 2022[316]	Not stated	Survey, open ended questions	General	US	Multiple site	NR	Provider or Healthcare system
Neumann-Podczaska, 2021[317]	NR	experimental education project	Early	Poland	single site	NR	Both
Newman-Casey, 2021[318]	Video	Survey/open-ended questions (qual)	Early	US	Single site	Urban	Patient
Ng, 2021[319]	NR	Cross sectional survey	Later	US	Multiple site	NR	Patient
Nguyen, 2022[320]	both	Semi-structured interviews, thematic analysis	General	United States	Multiple site	Urban	Patient
Orlowski, 2022	Not stated	interviews, semi-structured	General	US, Span, Australia	Multiple site	NR	Provider or Healthcare system
Orrange, 2021[321]	Video	Survey	Early	US	Single site	Urban	Patient
Padala, 2020[322]	Video	Cross-sectional survey	General	US	Multiple site	Rural	Patient
Pagano, 2021[323]	NR	semi-structured interviews	Early	US	Multiple site	NR	Provider or Healthcare system
Parikh, 2021[324]	Video	Qualitative survey	Later	US	Single site	NR	Provider or Healthcare system
Park, 2021[325]	Telephone only	Survey	Early	Korea (South)	Single site	Urban	Patient

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Park, 2021[325]	Telephone only	Survey	Early	Korea (South)	Single site	Urban	Provider or Healthcare system
Parkinson, 2021[326]	NR	qualitative	Later	Australia	NR	NR	Patient
Parsons, 2021[327]	Video	Survey/free text (qual)	General	US	Single site	Urban	combination (define)
Parsons, 2021[327]	Video	Survey/free text (qual)	General	US	Single site	Urban	Provider or Healthcare system
Patt, 2021[328]	NR	Multifaceted education and coordination initiatives	General	US	Multiple site	NR	Provider or Healthcare system
Peahl, 2021[329]	NR	Survey	Early	US	Single site	Suburban	Patient
Peahl, 2021[329]	NR	Survey	Early	US	Single site	Suburban	Provider or Healthcare system
Philip, 2020[330]	Telephone only plus video	Qualitative interviews	Compares pre-COVID to post-COVID	UK	Single site	Urban	Patient
Pogorzelska-Maziarz, 2021[331]	NR	qualitative	Early	US	single site	NR	Both
Pooni, 2021[332]	NR	survey	Later	US and Canada	web-based survey	NR	Provider or Healthcare system
Popova, 2021[333]	Video	retrospective cohort	Early	UK	single site	NR	patient
Puteikis, 2021[334]	NR	Cross-sectional survey	Later	Lithuania	web-based survey	NR	Provider or Healthcare system
Rahman, 2021[335]	Telephone only	questionnaire	Early	UK	NR	NR	patient
Rametta, 2020[336]	NR	Cohort with retrospective comparison	Compares pre-COVID to post-COVID	US	Single site	Urban	Patient
Reicher, 2021[337]	NR	Cross-Sectional, descriptive, correlational study	Early	Israel	Web-based, non-site specific	NR	Patient
Reid, 2020[338]	NR	Survey	Early	Canada	Multiple site	NR	Patient
Reynolds, 2021[339]	Not stated	Mixed, survey with free text	General	Ireland	Multiple site	NR	Provider or Healthcare system
Rezich, 2021[340]	Telephone plus video	Survey, open ended questions	General	United States	Single site	Distance from Clinic	Patient
Ritchie, 2021[341]	Video	Survey/open-ended questions	Early	US	national survey	NR	Provider or Healthcare system

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Rizzi, 2020[342]	Video	survey	Early	US	Single site	Urban	Both
Roach, 2021[343]	NR	in-depth interviews	Early	Canada	Single site	NR	Patient
Robinson, 2021[344]	Video	qualitative	Early	UK	single site	NR	patient
Rodda, 2022[345]	Not stated	Mixed, survey with free text	General	New Zealand	Multiple site	Urban	Provider or Healthcare system
Rosengard, 2021[346]	Video	Survey	Early	US	Single site	Urban	Patient
Rosenthal-2021[347]	Video	Interviews	Later	US	Single site	Urban	Provider or Healthcare system
Ross, 2021[348]	Video	focus groups	Early	US	Single site	Urban	Provider or Healthcare system
Ross, 2021[349]	NR	Cross sectional survey	General	US	Multiple site	NR	Patient
Rush, 2021[350]	Video	Survey	General	Canada	NR	Rural	Patient
Saad, 2021[351]	Telephone plus video	Semi-structured interviews, thematic analysis	General	Canada	Single site	NR	Patient
Sagar, 2021[352]	Telephone only	Survey	Later	UK	Single site	Urban	Patient
Sagar, 2021[352]	Telephone only	Survey	Later	UK	Single site	Urban	Provider or Healthcare system
Salehi, 2020[353]	Video	Qualitative survey	Later	US	Single site	NR	Provider or Healthcare system
Saliba-Gustafsson, 2020[354]	NR	Interviews	Early	US	Single site	NR	Provider or Healthcare system
San Juan, 2021[355]	Both	Interviews, semi-structured	Later	UK	Multiple site	Urban	Patient
Sathiyaraj, 2021[356]	video	survey	General	US	single site	suburban	patient
Scherrenberg, 2021[357]	Video	Survey	Later	Belgium	Single site	Urban	Patient
Schindler-Ruwisch, 2021[358]	NR	Cross sectional	General	US	NR	NR	Provider or Healthcare system
Schoebel, 2021[359]	Video	Semi-structured interviews	Later	US	Multiple site	urban/rural	Provider or Healthcare system

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Schrag, 2022[360]	Not stated	Semi-structured interviews, thematic analysis	Later	US	Multiple site	NR	Provider or Healthcare system
Searby, 2021[361]	NR	semi-structured interview	Later	Australia and New Zealand	web-based	NR	Provider or Healthcare system
Serafini, 2021[362]	Telephone only	Survey	Early	US	Single site	Urban	Patient
Severe, 2020[363]	Video	survey	Later	US	single site	NR	patient
Sezgin, 2020[364]	Video	document analysis	Early	US	Single site	Urban	Patient
Shah, 2021[365]	Video	interview	Early	Canada	Single site	Urban	Both
Shah, 2021[366]	NR	survey	Early	Australia	Single site	NR	Patient
Sharma, 2022[367]	telephone plus video	Semi-structured interviews, thematic analysis	General	United States	Multiple site	NR	Patient
Shivkumar, 2021[368]	NR	Qualitative survey	Early	US	NR	NR	Provider or Healthcare system
Shklarski, 2021[369]	video	mixed methods	Later	US	web-based	NR	Provider or Healthcare system
Shklarski, 2021[370]	NR	mixed methods	Later	US	web-based	NR	Provider or Healthcare system
Silver, 2021[371]	Video	questionnaire	Early	US	single site	Urban	Provider or Healthcare system
Silverio, 2021[372]	Not stated	Semi-structured interviews, thematic analysis	General	UK	Multiple site	NR	Patient
Singh, 2021[373]	Video	cross-sectional	Early	US	Multiple site	NR	Provider or Healthcare system
Singh, 2021[374]	Video	Survey/free text (qual)	Early	US	online national survey	NR	Provider or Healthcare system
Singla, 2022[375]	Telephone plus video	interviews, semi-structured	General	Canada, US	Multiple site	NR	Patient
Sklar, 2021[376]	Video	Survey/open-ended questions (qual)	Early	US	Multiple site	NR	Provider or Healthcare system
Sloan, 2021[377]	Both	Interviews, in-depth	Later	UK	NR	NR	Patient
Sloan, 2021[377]	Both	Interviews, in-depth	Later	UK	NR	NR	Provider or Healthcare system

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Sloan, 2022[378]	NR	interview	General	UK, N Ireland, US, Canada, other-Europe, other	NR	NR	Patient
Smith, 2021[379]	Video	Cross-sectional survey	Later	Canada	web-based survey	NR	Provider or Healthcare system
Smith-MacDonald, 2021[380]		Mixed	Later	Canada	Multiple site	NR	Patient
Smithson, 2021[381]	Video	focus groups	Early	Australia	single site	NR	both
Smrke, 2020[382]	Telephone only	Survey	Early	UK	Single site	Urban	Patient
Smrke, 2020[382]	Telephone only	Survey	Early	UK	Single site	Urban	Provider or Healthcare system
Snyder, 2021[383]	Video	case study (specific methodology is NR)	Early	US	Single site	NR	Patient
Srinivasan, 2020[384]	Video	Qualitative interviews	Early	US	Multiple site	NR	Provider or Healthcare system
Stanhope, 2022[385]	Telephone only	Mixed, IDIs	Later	United States	Single site	NR	Patient
Stewart, 2020[386]	NR	Survey/free text (qual)	Early	US	Multiple site	NR	Provider or Healthcare system
Stewart, 2021[387]	NR	phenomological approach (online forum)	Later	UK	web-based	NR	Patient
Stifani, 2021[388]	Video	Interviews	Early	US	Single site	Urban	Patient
Subotic, 2020[389]	Video	Interview	Early	Canada	NR	NR	Patient
Sullivan, 2022[390]	Not stated	Interviews, semi-structured	Later	UK	Multiple site	Urban/suburban	Provider or Healthcare system
Taylor, 2021[391]	NR	online survey; thematic analysis	Later	Australia	web-based survey	NR	Provider or Healthcare system
Tejera-Perez, 2021[392]	Video	Cross-Sectional Survey	Early	Spain	Web-based, non-site specific	NR	Patient
Treitler, 2021[393]	NR	semi-structured interviews	General	US	NR	NR	Provider or Healthcare system
Triantafillou, 2021[394]	Video	Qualitative interviews	Early	US	Single site	NR	Patient
Tse, 2021[395]	NR	Survey	Early	US	Single site	Urban	Patient

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Tuijt, 2021[396]	NR	qualitative	General	UK	Multiple site	NR	patient
Turchetti, 2021[397]	Video	interview	Early	Italy	single site	urban	Provider or Healthcare system
Tyler, 2021[398]	NR	Survey	Later	UK	Multiple site	NR	Patient
Uscher-Pines, 2020[399]	NR	Interview	Early	US	NR	NR	Provider or Healthcare system
Uscher-Pines, 2020[400]	Video	Qualitative interviews	Early	US	Multiple site	NR	Provider or Healthcare system
Uscher-Pines, 2021[401]	Video	interview	Later	US	national survey	NR	Provider or Healthcare system
Van Citters, 2021[402]	both	FGs and Semi-structured interviews, thematic analysis	Later	US	Multiple site	NR	Provider or Healthcare system
Van Dam, 2021[403]	Both	Semi-structured interviews, thematic analysis	General	Australia	NR	NR	Patient
van de Poll-Franse, 2021[404]	Video	Survey	Early	The Netherlands	NR	NR	Patient
van Gelder, 2021[405]	NR	semi-structured interview	Later	The Netherlands	Multiple site	NR	Provider or Healthcare system
Venville, 2021[406]	Video	qualitative	Later	Australia	Single site	NR	Both
Walters, 2022[407]	Not stated	interviews, semi-structured	General	United States	Multiple site	NR	Patient
Walters, 2022[407]	Not stated	interviews, semi-structured	General	US	Multiple site	NR	Provider or Healthcare system
Wang, 2021[408]	NR	Survey	Early	US	NR	NR	Provider or Healthcare system
Waterland, 2021[409]	NR	impact evaluation	Early	Australia	single site	NR	Patient
Webb, 2022[410]	Not stated	Semi-structured interviews, thematic analysis	General	UK	Multiple site	NR	Provider or Healthcare system
Wiebe, 2021[411]	Video	Semi-structured interview	Early	Canada	national survey	urban/rural/mixed	Provider or Healthcare system
Wilhite, 2021[412]	Video	Survey/open-ended questions (qual)	Early	US	Multiple site	Urban	Provider or Healthcare system

Author, Year	Type of Intervention	Study Design*	Study Period†	Country	Single or Multiple Sites	Geographic Location	Patient or Provider/ Healthcare System
Wilson, 2021[413]	Video	online survey; thematic analysis	General	New Zealand	web-based survey	70% urban, 20% rural, 10% other	Provider or Healthcare system
Wolthers 2020[414]	Telephone only	Survey	Early	Denmark	Single site	Urban	Patient
Wood, 2021[415]	NR	not stated (case study)	General	US	single site	NR	patient
Yelverton, 2021[416]	NR	in-depth interviews	Later	US	Multiple site	NR	Provider or Healthcare system
Yoon, 2020[417]	NR	Survey	General	US	Single site	NR	Patient
Zeghari, 2021[418]	Video	Observational crossover	General	France	mobile van	NR	Patient
Zhang, 2020[419]	NR	mixed methods study	Early	US	single site	Urban	Provider or Healthcare system
Zhu, 2021[420]	video	retrospective cohort-qual	Early	US	single site	urban	both
Zimmerman, 2021[134]	Video	Prospective cohort	General	US	Single site	NR	Patient
Zimmerman, 2021[421]	Video	Survey	Later	US	Single site	Urban	Patient
Zingone, 2020[422]	NR	survey	Early	Italy	Multiple site	NR	Patient
Zorron, 2021[423]	Video	prospective	Later	Australia	Multiple site	NR	both

* as defined by study authors
† Early=Early COVID-19 era (March-June 2020); General= General COVID-19 era; Later= Later COVID-19 era (June 2020 and later)

NGO = non-governmental organization; NR = not reported; UK = United Kingdom; US = United States

Table D.12. Patient participant characteristics of studies addressing barriers and facilitators to, and satisfaction and dissatisfaction of telehealth in qualitative studies (Key Question 3)

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. N (%)
Adams, 2021137	Full group		127	rheumatic disease	Adults (18+)	88 (69.8)	NR
Allison, 2022141	Full group	patients	48	primary care	15	22(46%)	Asian 2 (4) Black or African-American 8 (17) White 29 (60) American Indian or Alaska Native 1 (2) Multiracial 1 (2) Missing 7 (15)
Anghelescu, 2021143	Full group		22	Parkinson's Disease	70.5 [51-79]	6 (27.3)	NR
Antoun, 2021144	Full group		10	end-stage renal disease	65.4	4 (40)	NR
Banks, 2021149	Arm 2	Patients	93	Epilepsy	not reported	NR	NR
Barsom, 2021152	Full group		1027	Not reported	NR	NR	NR
Barton, 2022154	Full group	patients	19	Physical therapy	Adult, NS	11.4(60%)	NR
Ben-Ayre, 2021157	arm 2	patients	30	oncology	61	27 (90)	NR
Bennell, 2021158	Arm 3	Patients	401	Physiotherapy	[18-80]	305 (76)	NR
Bethel, 2021159	Full group		9	Palliative care	Not reported	NR	NR
Birkhoff, 2021161	Full group		34	heart failure	75 [59-98]	18 (53)	27 (79) White. 7 (21) Black
Boydell, 2021165	Full group		20	abortion	[18-39]	20 (100)	19 White, 1 British Asian
Campbell-Yeo, 2021173	Full group	Inter-disciplinary research team	20	NICU	not reported	NR	NR
Clair, 2021179	Full group		9	Substance Use Disorders	NR	NR	NR
Cook, 2021182	Arm 2	Patients	6	mental illness during pregnancy	Not reported	NR	NR
Cooper, 2021183	Full group		10	dementia	74.3 (8.6)	9 (90)	White (30); Asian (60); Mixed (10)
Costa, 2021185	Full group		381	mental health	not reported	NR	NR
Dainty, 2022189	Full group	patients	18	Specialty	Over half over 65	11 (61)	NR
Dennett, 2021192	Full group	patients	379	community health, mental health, multidisciplinary, allied health	Adult, NS	222 (59)	NR
Di Lalla, 2021194	Full group		53	Cancer	[18-75+]	36 (67.92)	NR
Donovan, 2021198	Full group		35	Sleep	61.8 (13.8)	5 (14.30	White: (88.6); Black: (2.9); Asian: (8.6)

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. N (%)
Edge, 2021202	Full group	patients	852	Cancer	Adult, NS	613 (71.90)	NR
Evans, 2021204	Full group		162	Endometriosis	30.8 [18-50]	162 (100)	NR
Finn, 2021208	Arm 3	Patients	180	Integrative Medicine	46.98 (16.74)	(24.7)	White (87.6); Black (7.9); Asian (1.3); American Indian/Alaskan Native (0.5); Pacific Islander (0.2); Other (2.4)
Frayn, 2021213	Full group		11	binge eating spectrum disorders	42.8	7 (63.6)	White (81.8)
Gefen, 2021220	Full group	Young patients and their parents	8	patients receiving out-patient sessions of physical therapy, occupational therapy, speech and language therapy and psychology	NR	NR	NR
Granberg, 2021229	Full group		20	oncology	60.5	13 (65)	White (75)
Haase, 2021233	Full group		30	Cancer	72.1 [63-83]	17 (56.7)	White 28 (93.3)
Hunter, 2021247	Full group		12	anorexia	31.8 [21-63]	11 (92)	NR
Imlach, 2020251	Arm 3	Interview	38	General	[18-65+]	(63)	Maori (16) Pacific peoples (8) Asian (11) NZ/Euro/other (66)
Isautier, 2020252	Full group		1369	general/chronic health conditions	44.7 +/-16.7	911 (66.5)	NR
Jassil, 2022258	Full group	patients	12	Exercise rehab post bariatric surgery	Adult, NS	8 (66.7)	Asian: 3 (25) Black: 2 (16.7) White: 7 (58.3)
Javanparast, 2021259	Full group		30	chronic conditions	[54-88]	17 (56)	NR
Javanparast, 2021260	Full group		30	general	[54-88]	17(56.7)	NR
Kang, 2021267	Full group		237	mental health	41.7 (10.2)	105 (52)	White (81); Black (4); Hispanic (10); unk (5)
Krawczyk, 2021277	Full group		1000	opiates	not reported	NR	NR
Laden, 2021281	Full group	patients	30	kidney disease	Adult, NS	20 (67%) were women	(21 White, 11 Black, 2 biracial, and 2 Asian)

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. N (%)
LaRoche, 2021283	Full group		711	N/A	48.26	340 (51.5)	White: 523; Hispanic: 67; Black: 65; Other: 56
Lee, 2022287	Full group	patients	234	Nephrilogy	Adult, NS	(40)	White: (92) Black: (8)
Macchi, 2021294	Arm 2	Patients	108	Parkinson's, Alzheimer's, or related disorders	73.3 (17.3)	64 (59.3)	White (91.7); Asian (4.6); American Native (3.7); Other (2.8); Prefer not to answer (0.9)
Macchi, 2021294	Arm 3	Caregivers	90	Parkinson's, Alzheimer's, or related disorders	66.6 (12.1)	23 (25.6)	White (93.3); Asian (2.2); Other (3.3); Prefer not to answer (1.1)
Mozes, 2022309	Full group	patients	24	NS	40	13 (54.2)	NR
Neumann-Podczaska, 2021317	Arm 2	Patients	42	primary care	not reported	NR	NR
Newman-Casey, 2021318	Arm 2	Phone visits	320	eye disease	62.6	186 (58.1)	White (77.8)
Newman-Casey, 2021318	Arm 3	Video visits	95	eye disease	59.8	57 (60.0)	White (78.9)
Nguyen, 2022320	Full group	patients	25	mixed	42	68%	Race or Ethnicity, n (%) Asian or Pacifc Islander, or other 6 (24) Black 5 (20) Hispanic/ Latino (a) 11 (44) White 3 (12)
Orrange, 2021321	Full group		368	NR	55.8 IQR: 43-68	239 (66)	White (70)
Parkinson, 2021326	Full group		8	Multiple Sclerosis	[30-59]	6 (75)	NR
Philip, 2020330	Arm 1	Usual care	9	Long-term respiratory conditions	69.89	6 (66)	NR
Philip, 2020330	Arm 2	Singing for lung health	9	Long-term respiratory conditions	72.1	3 (33)	NR
Pogorzelska-Maziarz, 2021331	Arm 2	Patients	15	chronic disease	70 [57-87]	10 (67)	White: (93); Black: (7)

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. N (%)
Rezich, 2021340	Full group	patients	142	Genetic medicine	Adults and children	120 (85.7)	Black: 2 Latino/Hisp: 7 SE Asian: 2 Middle east, north affrica, west asian: 1 White: 131 Other: 1
Roach, 2021343	Full group	dyads of caregivers and patients	20	dementia	69 (8.3)	10 (50)	NR
Robinson, 2021344	Full group		18	orthopedic surgery	52 (16.7)	7 (38)	NR
Saad, 2021351	Full group	patients	15	obstetrics	not abstractable	15 (100%)	NR
San Juan, 2021355	Full group	patients	44	Mental health	Adult, NS	28 (63)	white: 28 (63) Black: 6 (14) Asian: 6 (14)
Sezgin, 2020364	Full group		122	behavioral health and speech language pathology	[0-18+]	69 (57)	White: (45). Black: (33). Multiracial: (11). Other: (3)
Sharma, 2022367	Full group	patients	36	general	60 (SD 14.31) years	44.44%	White: n=20; 87%
Silverio, 2021372	Full group	patients	23	obstetrics	34.83	23(100%)	White/Caucasian 8 (53%) South Asian 1 (7%) African 1 (7%) Portuguese 1 (7%) Arab 1 (7%) Unknown 3 (20%)
Singla, 2022375	Full group	patients	23	Perinatal: with depressive or anxiety conditions	32 (20 to 40)	23 (100)	White: 12 (52.2) Black: 2 (8.7) Hispanic: 2 (8.7) Multi: 2 (8.7) no answer: 2 (8.7) other: 1 (4.3)
Sloan, 2021377	Full group	patients	31	inflammatory conditions (rheumatology)	Adult, NS	27 (87)	NR
Sloan, 2022378	Full group	patients	41	rheumatology	Adult, NS	36 (88)	NR
Smith-MacDonald, 2021380	Full group	patients	31	mental health	Adult, NS	(45.8)	NR
Snyder, 2021383	Arm 2	Dyad: caregiver + patient	5	Cancer	[55-76]	1	White

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. N (%)
Snyder, 2021383	Arm 3	Individual caregiver	1	Cancer	41	1	White
Stanhope, 2022385	Full group	patients	16	obstetrics	between 20 and 35 years old (85.7% (42))	100%	The majority of respondents were non-Hispanic Black (85.1% (57))
Stewart, 2021387	Full group	caregivers	109	children with fistula	[<2-12]	58 (89)	White 61 (94) Asian or British Asian 1 (2) Did not respond 3 (5)
Stifani, 2021388	Full group		23	contraception	18+	NR	Black: (39). White: (9). Other: (48)
Subotic, 2020389	Full group	Interviews	18	Neuro/epilepsy	37.2 [23-87]	(50)	NR
Triantafillou, 2021394	Full group	Overall	56	Otolaryngology ambulatory	61	60.7	NR
Van Dam, 2021403	Full group	patients	12	not reported, mixed	54.33	7 (63.63%)	NR
Venville, 2021406	Arm 2	patients	20	mental health	[17-68]	16 (75)	NR
Walters, 2022407	Full group	patients	37	Opiod use disorder	NR	NR	NR
Wood, 2021415	Full group	patients	7	psychosis	26.9 (4.8)	4 (57)	NR

CI=confidence interval; IQR=interquartile range; N=sample size; NICU=neonatal intensive care unit; NR=not reported

Table D.13. Provider participant characteristics of studies addressing barriers and facilitators to, and satisfaction and dissatisfaction of telehealth in qualitative studies (Key Question 3)

Author, Year	Arm/Group	Define Arm/Group	N	Type of HC System	Specialty/Clinical Focus
Alkureeishi, 2021[140]	Full group	NA	200	NR	Physician and Advanced practice provider
Alpert, 2022[142]	Full group	NA	21	Not reported	Oncology
Aschcroft, 2021[145]	Full group	NA	92	Nationally representative	Family health care organizations
Ashcroft, 2021[146]	Full group	NA	48	NR	Primary care (wide, full-range care)
Baadjou, 2020[148]	Full group	NA	12	Representative of a single large facility or organization	Rehab/PT/OT/etc.
Barnett, 2021[151]	Full group	NA	223	NR	mental health
Barsom, 2021[152]	Full group	NA	87	NR	Medical specialist, Paramedic, Psychosocial worker, Resident, Specialized nurse
Barth, 2021[153]	Full group	NA	9	NR	treatment providers
Bennell, 2021[158]	Arm 2	providers	207	NR	Physiotherapy
Bommersbach, 2021[162]	Arm 3	Focus Groups	17	Representative of a single large facility or organization	Mental health
Bos, 2021[163]	Full group	NA	67	NR	Rheumatology
Bradfield, 2021[166]	Full group	NA	620	NR	maternity (midwives)
Brunton, 2021[168]	Full group	NA	22	NR	Registered Dietitian Nutritionists
Burton, 2022[170]	Full group	NA	2	Nationally representative	Primary care
Butt, 2022[171]	Full group	NA	22	public and private healthcare system	psycho-oncology (psychologicsts, psychiatrists, social workers)
Byrnes, 2020[172]	Full group	NA	58	NR	colorectal surgeons
Cartledge, 2021[174]	Full group	NA	30 (only 17 completed demo profile)	public, private, and community health	cardiac rehab
Chang, 2021[177]	Full group	NA	25	Limited study of less than above	Primary care and mental health
Cole, 2021[180]	Full group	NA	69	NR	neurologic music therapists
Collins, 2020[181]	Full group	NA	14	NR	Emergency
Cormi, 2021[184]	Full group	NA	4	Representative of a single large facility or organization	neurology, pneumology, urology, anesthesiology
Courtney, 2021[186]	Full group	Interview	23	Representative of a single large facility or organization	Neurology
Dahl-Popolizio, 2020[188]	Full group	NA	230	NR	Rehab/PT/OT/etc.
Davoodi, 2021[191]	Full group	NA	15	Not reported	emergency medicine
DePuccio, 2022[193]	Full group	NA	42	Not reported	Primary Care
DiGiovanni, 2021[196]	Full group	NA	24	NR	children
Due, 2021[201]	Full group	NA	13	NR	General practitioners
Edge, 2021[202]	Full group	NA	150	Nationally representative	Cancer

Author, Year	Arm/Group	Define Arm/Group	N	Type of HC System	Specialty/Clinical Focus
Feijt, 2020[205]	Full group	NA	51	NR	Mental health
Filippi, 2021[207]	Full group	NA	461	NR	primary care, Behavioral health, emergency medicine, and internal medicine,
Franzosa, 2021[211]	Full group	NA	13	NR	geriatrics
Franzosa, 2021[212]	Full group	NA	13	NR	Primary care (wide, full-range care)
Frey, 2021[215]	Full group	NA	18	Not reported	Hospice/Palliative care services
Gabe-Walters, 2021[217]	Full group	NA	68	NR	lymphoedema
Gefen, 2021[220]	Full group	NA	12	Representative of a single large facility or organization	Rehab/PT/OT/etc.
Gergerich, 2020[221]	Full group	NA	20	NR	hospice social worker
Gilbert, 2021[223]	Full group	NA	290	NR	Orthopedics, physiotherapy
Goddard, 2020[224]	Full group	NA	308	NR	Neurology
Godfrey, 2021[225]	Full group	NA	21	NR	Abortion
Goldberg, 2021[227]		NA	48	NR	geriatricians, primary care physician, emergency physician
Gomez, 2021[228]	Full group	Interview	15	Representative of a single large facility or organization	Primary care (wide, full-range care)
Gullslett, 2021[231]	Full group	NA	14	Representative of a single large facility or organization	mental health
Guzman, 2022[232]	Full group	NA	14	Nationally representative	Primary Care
Hall-Mills, 2022[234]	Full group	NA	22	Not reported	Speech/language therapists--school based
Handley, 2022[236]	Full group	NA	25	Not reported	Oncology
Hao, 2021[237]	Full group	NA	10	Not reported	Speech/language pathology
Hardy, 2021[238]	Full group	NA	58	NR	couples' therapy
Heiskanen, 2021[240]	Full group	NA	676	NR	Rehab/PT/OT/etc.
Hersch, 2022[242]	Full group	NA	30	6 college counseling centers	Participants held a variety of job titles, including psychologists (60%), social workers (20%), psychiatrists (3.3%), and “other” job titles (16.70%). Job titles listed under “other” included “clinical counselor” and “crisis Journal of American College Health 3 manager.”
Hlubocky, 2021[244]	Full group	NA	25	NR	oncology
Hunter, 2021[248]	Full group	NA	20	NR	Opioid treatment
Jimenez-Rodriguez, 2020[261]	Full group	NA	53	Large/Regionally representative	Not reported
Johnson, 2021[263]	Full group	NA	2180	NR	mental health
Joughin, 2021[264]	Full group	NA	53	NR	geriatric clinicians

Author, Year	Arm/Group	Define Arm/Group	N	Type of HC System	Specialty/Clinical Focus
Kang, 2020[266]	Full group	NA	3	NR	two oculoplastic consultants and one fellow
Klamroth-Marganska, 2021[273]	Full group	NA	1129	NR	occupational therapists and midwives
Kolin, 2021[274]	Full group	NA	328	NR	attending orthopedic physicians
Krok-Schoen, 2021[278]	Full group	NA	274	NR	oncology (older adults)
Kryszak, 2022[279]	Full group	NA	35	Not reported	psychologists, devel and beh physisicnas, psychiatrists, Ots, NPs, speech-language path
Kursite, 2022[280]	Full group	NA	34	Nationally representative	Primary care and specialty (cariology, oncology, internist, endocrinology, pulmonology)
Lau, 2021[284]	Full group	NA	104	NR	Surgical
Lee, 2022[287]	Full group	NA	11	Not reported	Nephro
Lin, 2021[289]	Full group	NA	61	NR	substance abuse
Luckett, 2021[290]	Full group	participants self-identify as being involved in planning the response to COVID of one or more specialist palliative care services	28	NR	Palliative Care
Lynch, 2021[293]	Full group	overall	6	Limited size	Mental health
Madden, 2020[295]	Full group	Overall	36	Representative of a single large facility or organization	Prenatal care facilities
Malden, 2021[296]	Full group	NA	44	NR	Medical informatics
Mark, 2022[299]	Full group	NA	12	Mixed	Opioid use
Marshall, 2021[300]	Full group	NA	30	NR	cancer
Martin, 2021[301]	Full group	NA	42	NR	opioid use disorder
McKee, 2021[303]	Full group	NA	2619	NR	Mental health
Murphy, 2021[311]	Full group	NA	41	NR	21 GPs, 11 practice managers, and nine senior nurses and/ or advanced nurse practitioners
Myers, 2020[314]	Full group	NA	8	Representative of a single large facility or organization	mental health
Nagra, 2021[315]	Full group	NA	1250	NR	Optometry
Negi, 2022[316]	Full group	NA	41	Not reported	Social services
Orlowski, 2022	Full group	NA	12	Not reported	Therapists

Author, Year	Arm/Group	Define Arm/Group	N	Type of HC System	Specialty/Clinical Focus
Pagano, 2021[323]	Full group	NA	17	NR	substance use
Parsons, 2021[327]	Full group	NA	134	NR	neuropsychologists
Reynolds, 2021[339]	Full group	NA	205	Not reported	Rehab/PT/OT/etc.
Ritchie, 2021[341]	Full group	NA	79	Large/Regionally representative	Home-based primary care providers
Rodda, 2022[345]	Full group	NA	93	Not reported	Mental health
Rosenthal-2021[347]	Full group	NA	16	NR	physician, nurse, and medical staff
Ross, 2021[348]	Full group	NA	55	Representative of a single large facility or organization	Social workers
Saliba-Gustafsson, 2020[354]	Full group	First 50 C19 positive patients	48	Representative of a single large facility or organization	Neuro
Schindler-Ruwisch, 2021[358]	Full group	Overall	61	NR	Lactation professionals serving WIC recipients
Schoebel, 2021[359]	Full group	NA	31	NR	Behavioral health
Schrag, 2022[360]	Full group	NA	33	Not reported	Mental health
Searby, 2021[361]	Full group	NA	19	NR	Alcohol/Drugs
Shklarski, 2021[369]	Full group	NA	169	NR	mental health
Shklarski, 2021[370]	Full group	NA	92	NR	mental health
Singh, 2021[374]	Full group	NA	117	NR	registered dietitian
Sklar, 2021[376]	Full group	NA	93	NR	Behavioral health
Sloan, 2021[377]	Full group	NA	29	Not reported	rheumatology
Srinivasan, 2020[384]	Full group	Overall	53	Representative of a single large facility or organization	Primary care (wide, full-range care)
Stewart, 2020[386]	Full group	NA	113	NR	dermatology
Sullivan, 2022[390]	Full group	NA	22	Nationally representative	Primary care
Taylor, 2021[391]	Full group	NA	91	Limited size	combined both non-clinical and clinical HCWs
Treitler, 2021[393]	Full group	NA	20	NR	opioid use
Turchetti, 2021[397]	Full group	NA	13	Representative of a single large facility or organization	genetic counseling
Uscher-Pines, 2020[399]	Full group	Interviews	20	NR	Mental health
Uscher-Pines, 2020[400]	Full group	Overall	18	Nationally representative	Clinicians waivered to prescribe buprenorphine
Uscher-Pines, 2021[401]	Full group	NA	15	NR	emergency department leader

Author, Year	Arm/Group	Define Arm/Group	N	Type of HC System	Specialty/Clinical Focus
Van Citters, 2021[402]	Full group	NA	22	Not reported	Twelve programs (5 adult, 6 pediatric, and 1 affiliate) participated in focus groups/interviews on telehealth quality and implementation (cohort 1) and eight programs (4 adult, 4 pediatric) participated in focus groups/interviews on reimbursement (cohort 2). Programs served PwCF from different U.S. regions and varied in size (Table 1). P
van Gelder, 2021[405]	Full group	NA	16	NR	domestic violence/abuse
Walters, 2022[407]	Full group	NA	18	Not reported	Opioid use disorder
Webb, 2022[410]	Full group	NA	21	We interviewed twenty-one clinicians who, during the pandemic, delivered intensive treatments (IP and/or DP) to individuals with severe AN across four specialist National Health Service (NHS) ED Services in the United Kingdom (UK) (n=17 from London-based services; n=2 from a South-East England based service; n=2 from a Scottish based service).	Clinicians represented a purposive sample that sought diversity of professional background, years of experience in EDs, and ED setting (although participation was informed by clinician interest and availability), from selected specialist ED Services involved in the DAISIES trial [9].
Wiebe, 2021[411]	Full group	NA	16	NR	medical assistance in dying providers
Wilhite, 2021[412]	Full group	NA	195	NR	Not reported
Wilson, 2021[413]	Full group	NA	164	NR	Primary care (wide, full-range care)
Yelverton, 2021[416]	Full group	NA	11	NR	HIV

PT=physical therapy; OT=occupational therapy; HC=healthcare=sample size; NA = not applicable, no arm group; NR=not reported

Table D.14. Other population participant characteristics of studies addressing barriers and facilitators to, and satisfaction and dissatisfaction of telehealth in qualitative studies

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI)	Female Sex, n (%)	Race/Ethnicity. n (%)
Ben-Ayre, 2021[157]	arm 3	providers	NR	NR	NR	NR	NR
Brown-Johnson, 2021[167]	Full group		20	plastic surgery consultation	[20+]	11 (55)	White (55)
Cook, 2021[182]	Arm 3	Facilitator/Supervisor	NR	NR	NR	NR	NR
Cronin, 2020[187]	Full group		177	teleconsultation in oral and maxillofacial surgery	NR	NR	NR
Di Lorito, 2021[195]	Full group		10	dementia	NR	NR	NR
Dozieres-Puyravel, 2021[199]	Full group		105	rare pediatric epilepsy	NR	NR	NR
Iyer, 2021[255]	comb	pt/prov	43	geriatric	85.7 (6.8) [72-100]	4 (9.3)	White (81.4); Asian (16.3); Black (2.3)
Parsons, 2021[327]	Full group	patients and caregivers and parents/guardians	72	cognitive problems	[0-70]	NR	NR
Shah, 2021[365]	Full group		16	Cardiac Care	54.5 [23-78]	8 (50)	10 White, 1 Black, 3 Asian, 1 not declared
Smithson, 2021[381]	arm 3	providers	NR	NR	NR	NR	NR
Zhu, 2021[420]	arm 3	Patient/providers	187	surgery	[18-100]	97 (51.95)	American Indian or Alaska Native 1 (0.5) Asian 2 (1.1) Black or African American 42 (22.5) Native Hawaiian or other Pacific Islander 1 (0.5) White 119 (63.6) Not documented 24 (12.8)

CI=confidence interval; IQR=interquartile range; N=sample size; NR=not reported

Table D.15. Patient participant characteristics of studies addressing barriers and facilitators to, and satisfaction and dissatisfaction of telehealth in quantitative studies (Key Question 3)

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. n (%)
Adams, 2021[137]	Arm 1	Gp2	23	rheumatic disease	[40+]	(65.2)	NR
Adams, 2021[137]	Arm 2	Gp1	104	rheumatic disease	[18+]	(71.2)	NR
Aleboyeh, 2021[139]	Arm 2	NA	50	Epilepsy	[19-76]	(66)	NR
Atay, 2021[147]	Full group	NA	769	abortion	29 (11)	769 (100)	NR
Banks, 2021[149]	Arm 2	NA	93	Epilepsy	NR	NR	NR
Barba, 2021[150]	Full group	NA	53	urogynecology	65.5 (9.3)	53 (100)	NR
Barsom, 2021[152]	Full group	NA	1027	NR	NR	NR	NR
Barth, 2021[153]	Full group	NA	68	Nearly half of the patients (48.8%) received supportive cancer care, 7.3% got complementary treatments for Irritable Bowel Disease, 4.9% for Irritable Bowel Syndrome, and 4.9% for endometriosis (other disease 26%)	54 [24-90]	(68.4)	NR
Bate, 2021[155]	Arm 2	NA	875	NR	NR	NR	NR
Bhuva, 2020[160]	Full group	NA	172	physical med and rehab	64.47 (12.42)	92 (53.4)	NR
Cavagna, 2020[175]	Full group	NA	175	CTD/rheumatology	62.5 IQR: 53-73	147 (84)	NR
Champion, 2021[176]	Full group	NA	47	dental surgery	NR	37 (78.7)	NR
Chen, 2021[178]	Arm 2	NA	68	arthroplasty of hip or knee	64.3 (9.64)	43 (63.2)	White: (69.1); Black: (17.6); Unk: (11.8); Asian: (1.5)
Cronin, 2020[187]	Full group	NA	337	teleconsultation in oral and maxillofacial surgery	NR	NR	NR
Datta, 2021[190]	Full group	NA	223	epilepsy	35 (IQR: 26-49)	132 (59.2)	NR
Dinuzzi, 2021[197]	Full group	Survey	99	Gastro	44.8 (+/- 12.3)	NR	NR
Erben, 2021[203]	Full group	Overall	6262	Vascular surgery	NR	NR	NR
Fieux, 2020[206]	Arm 2	NA	100	ENT	51 [18-78]	60(60)	NR

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. n (%)
Finn, 2021[208]	Arm 3	NA	180	Integrative Medicine	46.98 (16.74)	(75.3)	White (87.6); Black (7.9); Asian 1.3); American Indian/Alaskan Native (0.5); Pacific Islander (0.2); Other (2.4)
Fisher, 2020[209]	Arm 2	type 1 diabetes	763	type 1 diabetes	53.37	546 (72.5)	White (94.3)
Fisher, 2020[209]	Arm 3	type 2 diabetes	619	type 2 diabetes	64.90	408 (67)	White (77.1)
Fonseca, 2020[210]	Full group	NA	225	Epilepsy	48.2 [17-94]	121 (47.5)	NR
Freiman, 2021[214]	Full group	Overall	189	Hip and knee arthroplasty	62.9	104 (55)	White, Black, Hispanic, Native American
Futterman, 2021[216]	Full group	NA	104	prenatal	31.1 (6.28)	104 (100)	White (9)) Black (13)) Hispanic (74))
Gava, 2021[219]	Full group	NA	108	transgender/on gender affirming hormonal treatment	34.3 [18-61]	79 (73.1)	NR
Ghazala, 2021[222]	Arm 2	NA	6	Ophthalmology	NR	NR	NR
Greven, 2021[230]	Full group	Overall	346	Neurological spine surgery	60	53	NR
Hamad, 2021[235]	Full group	NA	184	dermatology	37.8 (18.3)	134 (72.8)	White (62); Black (23.9); Hispanic (6.5); Asian/PI (5.4); Other 2.2)
Hasson, 2021[239]	Full group	NA	172	Cancer	63	73 (46)	NR
Hentati, 2021[241]	Full group	NA	45	Rhinology	51.2 +/-16	31 (68.9)	NR
Holcomb, 2020[245]	Full group	NA	283	prenatal	NR	NR	NR
Iacopi, 2021[250]	Full group	NA	206	diabetic foot	72	(35.4)	NR
Imlach, 2020[251]	Arm 2	Survey	1010	General	[18-65+]	(84.5)	Māori (10.2) Pacific peoples (1.8) Asian (3.4) NZ/Euro/other (84.5)
Itamura, 2021[254]	Full group	NA	221	NR	NR	NR	NR
Iyer, 2021[255]	arm 2	patients	43	geriatric	85.7 (6.8) [71-100]	4 (9.3)	White (81.4); Asian (16.3); Black (2.3)

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. n (%)
Jaclyn, 2021[256]	Arm 3	Parents/guardians of pediatric patients	141	cystic fibrosis	[0-18]	NR	NR
Jaclyn, 2021[256]	Arm 2	Adult patients	120	cystic fibrosis	[18+]	NR	NR
Jang, 2021[257]	Full group	NA	2324	COVID-19	[19-60+]	1755 (75.5)	NR
Joughin, 2021[264]	Full group	NA	53	surgical pathology (vascular 88.1%, colorectal 10.4%, urological 1.5%)	NR	NR	NR
Joyce, 2021[265]	Full group	NA	21	liver transplant	NR	NR	NR
Kang, 2020[266]	Full group	NA	66	The most common was thyroid eye disease (34.8%), followed by eyelid lesions (16.7%), other orbital pathologies (15.2%) and lid pathologies (12.1%)	50.7 [18-88]	NR	NR
Kasturi, 2021[268]	Full group	NA	63	lupus	42.5 (13.5) [21-78]	62 (98.4)	White (49.2); Black (23.8); Asian (14.3); More than one (7.9); NR (4.8)
Kayser, 2021[270]	Full group	NA	37	Lung transplant patients	54	26 (49)	NR
Kenney, 2021[271]	Full group	NA	38	childhood cancer survivors	[<18 - 30 +]	24 (63)	NR
Koziatek, 2020[276]	Full group	NA	2668	emergency care	[19-80+]	10952 (61.8)	Asian 1312 7.4 Black 2056 11.6 Hispanic/Other 5664 31.9 White 8698 49.0
Kronenberger, 2021[71]	Arm 1	Normal hearing	38	Cochlear implants	14.6	21	NR
Kronenberger, 2021[71]	Arm 2	Cochlear implant	28	Cochlear implants	14.8	13	NR
Lapadula, 2021[282]	Full group	NA	35	prenatally diagnosed fetal anomalies	NR	100	NR
LeBrun, 2021[285]	Full group	NA	164	arthroplasty	[18-80+]	NR	NR
Li, 2021[288]	Full group	NA	75	myasthenia gravis	IQR: 58-75	35 (45)	White
Ludwig, 2021[291]	Full group	NA	870	diabetes	65 [57 – 72]	350 (40.2)	NR
Lun, 2020[292]	Arm 2	NA	118	interventional neuroradiology	NR	NR	NR
Lynch, 2021[293]	Full group	overall	64	mental health/recovery services	28.1 (SD, 10)	20 (31.25)	NR

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. n (%)
Manz, 2021[297]	Full group	Survey	216	prtho (foot and ankle)	50.6 [19-84]	(73.6)	NR
Margolin, 2021[298]	Full group	NA	96	genitourinary malignancies	IQR:61-76	18 (9)	White (77)
Melian, 2021[304]	Full group	NA	807	orthopedic	NR	NR	NR
Meno, 2021[305]	Full group	NA	212	cancer: Gastrointestinal, Hematopoietic, Genitourinary, Breast, Lung and other	NR	138 (65.1)	Asian: (61.3). Native Hawaiian or Pacific Islander: (15.1). White: (23.6)
Meno, 2021[305]	Arm 2	audio only	73	cancer: Gastrointestinal, Hematopoietic, Genitourinary, Breast, Lung and other	NR	42 (57.5)	Asian: (69.9). Native Hawaiian or Pacific Islander: (9.6). White: (20.5)
Meno, 2021[305]	Arm 3	audio and video	139	cancer: Gastrointestinal, Hematopoietic, Genitourinary, Breast, Lung and other	NR	96 (69.1)	Asian:(56.8). Native Hawaiian or Pacific Islander: (18). White: 25.2)
Mertz, 2021[306]	Full group	NA	137	breast cancer survivors	[34-86]	136 (99.2)	NR
Miller, 2021[307]	Full group	overall	307	physical therapy	[18+]	(65)	White: (52-55) Black: (6) Asian: (16-21) Hisp/Lat: (9-10) unknown: (12-13)
Mustafa, 2020[312]	Full group	NA	177	allergy/immunology	33 (IQR: 9 - 55)	115 (64.9)	NR
Mustafa, 2021[313]	Full group	NA	251	allergy/immunology	Video: 29; Phone: 48	Video: 57 (58.1); Phone: 33 (71.7)	NR
Ng, 2021[319]	Full group	Overall	6712	Medicare	[65+]	1329 (19.8)	White, Black, Hispanic, Other
Padala, 2020[322]	Full group	NA	118	Veterans	72.6 SD 8.3	10(8)	(68.6) White; (29.7) African American
Park, 2021[325]	Full group	NA	906	NR	[10+]	511 (56.4)	NR
Peahl, 2021[329]	Full group	overall	253	Ob/Gyn	31.2 (sd, 6.7)	253 (100)	White: (71.1) ANAI: (0.8) Asian: (4) Black: (5.5) Hap/Lat: (2)

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. n (%)
Popova, 2021[333]	Full group	NA	60	hand trauma	35 [17-82]	47 (78.3)	NR
Rahman, 2021[335]	Full group	NA	98	gastro-entrology	56.98 [26-95]	47 (51.6)	NR
Rametta, 2020[336]	Arm 1	In-person encounters (2019)	14780	Child neurology outpatient	11.6	7498 (50.7)	White, Black, Asian, Other, Multiple
Rametta, 2020[336]	Arm 2	Telehealth encounters (2020)	2589	Child neurology outpatient	11.4	1308 (50.5)	White, Black, Asian, Other, Multiple
Reicher, 2021[337]	Full group	general population - survey ads were largely placed on older persons/chronic disease websites	693	Non-specific	64.21 [20-90]	398 (57.4)	NR
Reid, 2020[338]	Full group	NA	179	Pediatric ED	NR	NR	NR
Rizzi, 2020[342]	Arm 2	NA	299	Orthopedics	NR	NR	NR
Rosengard, 2021[346]	Full group	NA	177	epilepsy	[21-79]	120 (67.8)	Hispanic: (42.4). African American: (20.3). White: (9.6). Other: (14.1). Asian: (1.1)
Ross, 2021[349]	Full group	Overall	44	NR	NR	NR	NR
Rush, 2021[350]	Full group	Survey	185	general/mental health	49.45 (sd,14.66)	(70.6)	Caucasian: (75.3) first nation (6.1) Metis (2.5) Asian (3.2) first nation/metis/caus (4.3) Other (6.5) missing (2.2)
Sagar, 2021[352]	Full group	NA	117	colorectal surgery	56	54	NR
Sathiyaraj, 2021[356]	Full group	NA	70	chemotherapy	NR	67.6	NR
Scherrenberg, 2021[357]	Full group	NA	55	cardiac rehabilitation	65.4	21 (37)	NR

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. n (%)
Serafini, 2021[362]		Full group	32	Depressive Disorder, Anxiety Disorder, Post-traumatic Stress Disorder, Alcohol Use Disorder, Adjustment Disorder	[20-69]	24 (75)	Hispanic or Latino
Severe, 2020[363]	Full group	NA	244	mental health	[18-65+]	167 (68.4)	White (77.5); Black (10.7); Asian (4.5)
Shah, 2021[366]	Full group	NA	135	IBD	NR	NR	NR
Smithson, 2021[381]	arm 2	NA	24	chronic conditions	[55-70+]	NR	NR
Smrke, 2020[382]	Full group	NA	108	sarcoma	[19-86]	56 (52)	White
Stifani, 2021[388]	Full group	NA	86	contraception	[18+]	NR	Black: (33). White: (12). Other: (55)
Tejera-Perez, 2021[392]	Full group	people with any type of diabetes (type 1 diabetes, type 2 diabetes, MODY, LADA, gestational diabetes, diabetes secondary to pancreatic insufficiency) or those caring for a person with any type of diabetes	769	Diabetes	[18-75+]	NR	NR
Tejera-Perez, 2021[392]	Arm 2	Caregivers	603	Diabetes	[18-75+]	NR	NR
Tejera-Perez, 2021[392]	Arm 3	Patients	166	Diabetes	[18-75+]	NR	NR
Tse, 2021[395]	Full group	NA	1482	NR	NR	NR	NR
Tse, 2021[395]	Arm 1	treatment	363	in mental health clinics and Intensive Mobile Treatment programs	NR	NR	NR
Tse, 2021[395]	Arm 2	outreach	225	in care coordination and several small program types	NR	NR	NR
Tse, 2021[395]	Arm 3	housing	894	in Treatment Apartment Program and supported housing programs	NR	NR	NR

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. n (%)
Tse, 2021[395]	Arm 1	Distressed	889	Staff reported that clients were distressed (very mildly to severely) by the COVID-19 pandemic	NR	NR	NR
Tse, 2021[395]	Arm 2	Not distressed	593	Staff reported that clients were not distressed by the COVID-19 pandemic	NR	NR	NR
Tuijt, 2021[396]	arm 2	patients	30	dementia	82 [68-100]	17 (56)	White 19; Asian 4; Black 4; White Other 3
Tuijt, 2021[396]	arm 3	caregivers	31	dementia	spouses: 76; children: 57	20 (64)	White 18; Asian 5; Black 4; White Other 4
Tyler, 2021[398]	Full group	NA	2998	general	NR	NR	NR
van de Poll-Franse, 2021[404]	Full group	NA	394	cancer	NR	NR	NR
Waterland, 2021[409]	Full group	NA	35	cancer	59 (9)	19(54)	NR
Wolthers 2020[414]	Full group	NA	103	87 (84.5%) children with atopic diseases and 16 (15.5%) with other conditions	7.9 [0.3-19.7]	35 (39.8)	NR
Yoon, 2020[417]	Full group	NA	310	neurosurgery outpatient	60.89 +/- 13.6	183 (59)	NR
Zeghari, 2021[418]		NA	8	Mental health	76.7 (sd: 6.12) [69-86]	4 (50)	NR
Zhu, 2021[420]	arm 2	NA	187	surgery	[18-100]	97 (51.95)	American Indian or Alaska Native 1 (0.5) Asian 2 (1.1) Black or African American 42 (22.5) Native Hawaiian or other Pacific Islander 1 (0.5) White 119 (63.6) Not documented 24 (12.8)
Zimmerman, 2021[134]	Arm 1	In-person	207	General	38.16	145 (70)	White 146 (70.5)
Zimmerman, 2021[134]	Arm 2	Telehealth	207	General	35.88	152 (73.4)	White 156 (75.2)

Author, Year	Arm/Group	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI) [Range]	Female Sex, n (%)	Race/Ethnicity. n (%)
Zimmerman, 2021[421]	Full group	NA	240	Mood Disorders, Anxiety Disorders, Substance Use Disorders or other mental disorders	36.23	162 (67.5)	White (74.2)
Zingone, 2020[422]	Arm 2	Veneto	167	IBD/IBS	39.1 (13.5)	76 (45.5)	NR
Zingone, 2020[422]	Arm 3	Campania	83	IBD/IBS	39.1 (14.8)	40 (42.2)	NR

CI=confidence interval; CTD=connective tissue disease; ED=emergency department; ENT=ear, nose, throat; Gp1=group1; Gp2=group2; Gyn=gynecology; IBD=irritable bowel disease; IBS=irritable bowel syndrome; IQR=interquartile range; N=sample size; NA = Not applicable, no arm or group; NR=not reported; Ob=obstetrics

Table D.16. Provider participant characteristics of studies addressing barriers and facilitators to, and satisfaction and dissatisfaction of telehealth in quantitative studies (Key Question 3)

Author, Year	Arm/Group	Define Arm/Group	N	Type of HC System	*Specialty/Clinical Focus*
Al Izzi, 2020[138]	Full group	NA	9	Representative of a single large facility or organization	oral and maxillofacial
Aleboyeh, 2021[139]	Arm 3	NA	53	Representative of a single large facility or organization	epilepsy
Alkureeishi, 2021[140]	Department of Pediatrics	Department of Pediatrics	65	NR	Physician and Advanced practice provider
Alkureeishi, 2021[140]	Department of Medicine	Department of Medicine	135	NR	Physician and Advanced practice provider
Banks, 2021[149]	Arm 3	NA	146	Nationally representative	epilepsy
Barsom, 2021[152]	Full group	NA	87	NR	Medical specialist, Paramedic, Psychosocial worker, Resident, Specialized nurse
Barth, 2021[153]	Arm 2	Physicians	8	NR	physician
Barth, 2021[153]	Therapists	Therapists	6	NR	therapist
Bate, 2021[155]	Arm 4	NA	62	Representative of a single large facility or organization	NR
Bate, 2021[155]	Arm 5	NA	188	Representative of a single large facility or organization	NR
Bate, 2021[155]	Arm 6	NA	161	Representative of a single large facility or organization	NR
Belcher, 2021[156]	Full group	Overall	16	NR	Tertiary pediatric otolaryngology practice
Bennell, 2021[158]	Arm 2	NA	207	NR	Physiotherapy
Bommersbach, 2021[162]	Survey	Survey	99	Representative of a single large facility or organization	Mental health
Bos, 2021[163]	Full group	NA	75	NR	Rheumatology
Boyarsky, 2020[164]	Full group	NA	69	NR	transplant surgeons and physicians
Bryne, 2021[169]	Arm 3	NA	62	Representative of a single large facility or organization	Orthodontics
Chen, 2021[178]	Arm 3	NA	8	Representative of a single large facility or organization	Arthroplasty
Dramburg, 2021[200]	Full group	NA	71	NR	neuro-oncology
Fieux, 2020[206]	Arm 3	NA	4	Representative of a single large facility or organization	ENT
Finn, 2021[208]	Arm 2	NA	26	Representative of a single large facility or organization	Integrative Medicine
Ghazala, 2021[222]	Arm 3	NA	NR	Large/Regionally representative	Ophthalmology
Goh, 2021[226]	Full group	NA	18	NR	NR
Hertling, 2021[243]	Full group	Survey	702	NR	Sports medicine

Author, Year	Arm/Group	Define Arm/Group	N	Type of HC System	*Specialty/Clinical Focus*
Humer, 2020[246]	Full group	NA	1547	NR	Mental health
Hyung, 2021[249]	Full group	Overall	14	NR	Neurosurgical care
Israilov, 2020[253]	Full group		20	Representative of a single large facility or organization	Palliative care
Iyer, 2021[255]	providers	providers	12	Representative of a single large facility or organization	geriatrics
Johnsen, 2021[262]	Full group	NA	1237	NR	Rhinologists
Kaufman, 2021[269]	Full group	NA	300	NR	Nutrition
Kenney, 2021[271]	Full group	NA	81	NR	providers for childhood cancer survivors
Kippen, 2020[272]	Full group	NA	572	NR	general practitioners
Klamroth-Marganska, 2021[273]	occupational therapists	occupational therapists	432	NR	occupational therapists
Klamroth-Marganska, 2021[273]	midwives	midwives	501	NR	midwives
Korecka, 2020[275]	Full group	NA	237	NR	Neurology
Lapadula, 2021[282]	Full group	NA	8	NR	neonatologists
Lee, 2021[286]	Full group	Overall	160	NR	Pediatric gastroenterology
Lun, 2020[292]	Arm 3	NA	6	Representative of a single large facility or organization	interventional neuroradiology
Margolin, 2021[298]	Full group	NA	46	NR	urologists and oncologists
Mohammed, 2021[308]	Full group	NA	207	NR	Primary care (wide, full-range care)
Mrugala, 2021[310]	Full group	NA	582	NR	Parkinson’s Study Group
Parikh, 2021[324]	Full group	Overall	89	Limited study of less than above	Psychologists
Park, 2021[325]	Nurses	Nurses	100	NR	medical (46%) and surgical (54%)
Park, 2021[325]	Doctors	Doctors	55	NR	medical (43.6%) and surgical (56.4%)
Patt, 2021[328]	Full group	NA	NR	Large/Regionally representative	General
Peahl, 2021[329]	Full group	NA	77	Representative of a single large facility or organization	OB/gyn
Pogorzelska-Maziarz, 2021[331]	Arm 3	NA	10	Representative of a single large facility or organization	home based care
Pooni, 2021[332]	Full group	NA	223	NR	Rheumatologists
Puteikis, 2021[334]	Adult neurologists	Adult neurologists	74	NR	Neurology
Puteikis, 2021[334]	Pediatric neurologists	Pediatric neurologists	30	NR	Neurology
Puteikis, 2021[334]	Full group	NA	104	NR	Neurology
Rizzi, 2020[342]	Arm 3	NA	12	Representative of a single large facility or organization	Orthopedic surgery
Sagar, 2021[352]	Full group	NA	15	NR	Surgical
Salehi, 2020[353]	Full group	Overall	100	NR	Plastic surgery

Author, Year	Arm/Group	Define Arm/Group	N	Type of HC System	*Specialty/Clinical Focus*
Saliba-Gustafsson, 2020[354]	First 50 C19 positive patients	First 50 C19 positive patients	30	Representative of a single large facility or organization	Neuro
Shivkumar, 2021[368]	Full group	Overall	133	Nationally representative	General practitioners
Silver, 2021[371]	Full group	NA	22	representative of a single large facility or organization	Primary care (wide, full-range care)
Singh, 2021[373]	Full group	NA	103	Large/Regionally representative	rheumatology
Smith, 2021[379]	Full group	NA	43	NR	allergists
Smrke, 2020[382]	Full group	NA	18	NR	(4 consultants, 4 clinical research fellows, 4 residents), and the remainder were nurses (2 nurse specialists, 4 research nurses)
Venville, 2021[406]	Arm 3	NA	8	Representative of a single large facility or organization	mental health
Wang, 2021[408]	US practitioners	US practitioners	165	NR	Mental health
Wang, 2021[408]	Chinese practitioners	Chinese practitioners	164	NR	Mental health
Wilhite, 2021[412]	Public facility	Public facility	58	NR	allergists
Wilhite, 2021[412]	Private facility	Private facility	64	NR	NR
Zhang, 2020[419]	Full group	NA	51	Representative of a single large facility or organization	Cancer/Radiation oncologists

HC=healthcare=sample size; N=sample size; NA + not applicable, no arm or group; NR=not reported

Table D.17. Other population participant characteristics of studies addressing barriers and facilitators to, and satisfaction and dissatisfaction of telehealth in quantitative studies (Key Question 3)

Author, Year	*Arm/Group*	Define Arm/Group	N	Patient Health Concern/Clinical Condition	Age, Mean (95% CI)	Female Sex, n (%)	Race/Ethnicity. n (%)
Bate, 2021[155]	Arm 3		685	Children (<18)	NR		Not reported
Bryne, 2021[169]	Arm 2		59	Orthodontics	NR	37 (63)	Not reported
Gately, 2021[218]	Full group	patients-caregiver dyads	14	cognitive impairment	77.5 [70-98]	0 (0)	White
Kazi, 2021[64]	Full group	Overall	Number of visits: 2632	Dermatology patients	39.4	1789 (67.9)	Not reported
Kazi, 2021[64]	Arm 2	Asynchronous visits	Number of visits: 951	Dermatology patients	35.3	651 (69.5)	Not reported
Kazi, 2021[64]	Arm 3	Synchronous visits	Number of visits: 1672	Dermatology patients	41.8	1129 (67.5)	Not reported
Masi, 2021[302]	Full group	NA	302	neurodevelopmental disabilities	NR	NR	Not reported
Pogorzelska-Maziarz, 2021[331]	Arm 4	Caregivers	5	chronic disease	60 [44-81]	4 (80%)	White (100)
Zorron, 2021[423]	arm 2	phone	217	endoscopy	IQR: 51-71	131 (60.4)	not reported
Zorron, 2021[423]	arm 3	video	94	endoscopy	IQR: 48-67	43 (45.7)	not reported
Zorron, 2021[423]	arm 4	doctors		NR		NR	NR

CI=confidence interval; IQR=interquartile range; NA = not applicable, no arm or group; N=sample size

Table D.18. Author defined barriers and facilitators identified in qualitative studies (Key Question 3)

Author, Year	Author Defined Theme
Adams, 2021[137]	Method of telehealth delivery Availability of services during COVID-19 pandemic Mixed model clinic structure (telehealth and face-to-face clinic simultaneously run) Physical examination requirements Logistics Difficulty communicating Relationship between patient and clinician Disease progression Privacy Vulnerable populations Patients living with a disability
Alkureeishi, 2021[140]	Provide technical support for patients Provide technology access for patients Provide clinic staff support to prepare patients for visits Streamline scheduling processes and video visit workflows Establish learner workflows Video visit limitations and utility for certain types of appointments Provide teaching training for preceptors Provide more time within telehealth teaching schedules Video visit experiences have been positive, and are useful for many clinicians and patients.
Alpert, 2022[142]	reducing patients' travel time and expenses, Challenge to Meet Expectations About Appointment Times
Anghelescu, 2021[143]	Virtual Medicine: Facilitators Virtual Medicine: Barriers Absence of Motor Examination Worsening of Motor Symptoms Worsening of Non-Motor Symptoms Health Care Uncertainty Health Care Limitations Virtual Medicine: Recommendations
Antoun, 2021[144]	the use of video conferencing would be more beneficial than a telephone call, as it allows the use of nonverbal communication expressed dislike for the formality of telephone appointments and the lost elements of nonverbal communication when utilizing telemedicine expressed support for the use of telemedicine and described positive experiences they have had utilizing remote medicine within their clinical care
Ashcroft, 2021[146]	Limited access to technology Challenges in rural and remote communities Rapid transformation to virtual care Impact on quality care

Author, Year	Author Defined Theme
Ashcroft, 2022[145]	i) virtual care will continue for some patients and for some types of appointments and ii) virtual care will change practice; iii) virtual care is dependent on provider preferences; iv) the advancements in virtual care requires continuation of physician billing code
Baadjou, 2020[148]	The prerequisites for proper use of videoconferencing methods affect experiences The compulsory context created by the COVID-19 pandemic The changes experienced in specific components of pain rehabilitation The overarching changes experienced, including both opportunities and limitations.
Banks, 2021[149]	Stability of condition.
Banks, 2021[149]	Convenience. Concentration and appointment flow. Similarities to face- to-face appointments. Video appointments. Preference for face-to-face.
Barnett, 2021[151]	increasing access and engagement for some families. limited resources, such as Internet access or equipment (headsets, toys) the benefit of applying the treatment skills within the home setting challenges with delivering the treatment protocol via telehealth
Barsom, 2021[152]	the inability of elderly people to use a VC and the dependence on an appropriate internet connection the use of VC might be difficult for specific patient groups such as patients with low digital literacy, the elderly, patients with low socio-economic status and non-native speakers. Related concerns included the inability to perform physical examination and the impact on the patient-healthcare provider relationship by the lack of physical contact when using VC for psycho-social purposes, such as psychiatric care, it should first be considered if the home environment can be considered a safe place for patients Considering the use of technology, the usability is considered high. The most frequently mentioned concerns were the lack of digital literacy in patients and lack of physical contact. The absence of wanted functionalities such as a virtual waiting room or a chat function leads to challenges in the workflow. Residents specifically reported wanting the option for supervisors to dial-in to allow direct supervision during the VC. VC can be a valuable supplement to care, but the value was dependent on the reason for consultation considering the additional value of visual cues and the ability to use inspection and read emotions, healthcare providers are satisfied with the use of VC

Author, Year	Author Defined Theme
Barth, 2021[153]	Limited possibilities to prevent technical difficulties on both sides Challenge to set up the camera framing the whole body Independence of location allows to offer Complementary and Integrative Medicine (CIM) consultations to COVID-19-risk patients and patients being unable to travel Time flexibility Increased chances that relatives can be involved in a consultation Patients can directly set up a place of relaxation at home Some patients are generally more relaxed in their familiar environment than in the clinic Space for implementation of movement exercises can be directly checked and discussed at patients' homes Time saving and independence of location when informing about medicinal plants, teas, etc. Patients' eating environment and food (products) used can be directly checked and discussed at patients' homes Restricted assessment of the patients' overall presence possible More preparation and time required because of the limited access to the body language of the conversational partner Therapeutic touch is impossible Challenge to transfer group treatments into the digital space, especially regarding group exchange and dynamics Disturbances at home Risk that patients have difficulties coming back from deep trance an emergency protocol must be set up before the treatment for Patients with specific mental health problems (e.g., trauma, dissociation) Complex movement sequences are almost impossible to demonstrate and execute Assessment of execution of exercises is difficult Hands-on alignment of postures is impossible Instruction of acupressure techniques is challenging Application of naturopathic poultice and pads impossible, instruction is difficult The nutritional advice kit normally used in face-to-face consultation cannot be used in the digital setting
Ben-Ayre, 2021[157]	Many patients were concerned that online technological aspects would be too difficult The narratives of IO practitioners addressed barriers to and challenges facing the provision of guidance during the online treatment process Patients were also worried about not being able to discuss the treatment with the IO practitioner in person They were also worried about creating a quiet treatment setting in their home without distractions, or other factors preventing them from learning or performing the self-administered treatments Despite the many challenges which online IO treatment presents, many patients reported a beneficial effect These non-specific effects of treatment became more apparent as patients became actively involved by learning and self administering the treatments at home Despite these difficulties, many IO practitioners described a sense of creativity in their ability to design what they referred to as a new “online integrative toolbox.” IO practitioners also described how patients unfamiliar with or wary of the online process eventually became interested, even enthusiastic, about the process One of the barriers identified by practitioners was the difficulty inmoving treatments from the in-person clinical setting in the oncology department to the patients’ home

Author, Year	Author Defined Theme
Bennell, 2021[158]	What things helped you the most to deliver physiotherapy care via telehealth? Good technology set up What barriers did you experience delivering physiotherapy care via telehealth? Technology issues What things helped you the most to deliver physiotherapy care via telehealth? Using patient resources What things helped you the most to deliver physiotherapy care via telehealth? Preparing ahead of the appt What things helped you the most to deliver physiotherapy care via telehealth? Patient willingness and engagement What safety issues did you experience delivering care via telehealth? Unsupervised exercise/incorrect technique What barriers did you experience delivering physiotherapy care via telehealth? Lack of physical touch What safety issues did you experience delivering care via telehealth? Difficult to assess thoroughly What barriers did you experience delivering physiotherapy care via telehealth? Poor room setup What safety issues did you experience delivering care via telehealth? Falls risk
Bethel, 2021[159]	Ways to Improve Timing in Terms of How Long the Visit Was Privacy and Confidentiality Continuum of Acceptance of Telehealth Benefits or Detractors
Birkhoff, 2021[161]	Those who did not prefer the VNV to in-person visits mentioned difficulties using technology, taking their own vitals, feeling like it was hard to hear during the VNV, or an overall preference for in-person encounters perceived safety with virtual nurse visit (VNV) during COVID-19 Trialability, complexity, and compatibility it would be helpful if the complexity of connecting to the virtual platform and Wi-Fi connectivity issues could be resolved. Another area of satisfaction among participants was the ability to discuss their concerns with their telehealth nurse. The consistency of having the same telehealth nurse at each VNV was also appreciated Participants emphasized that they liked being able to see the nurse and perceived greater accessibility regarding scheduling visits
Bommersbach, 2021[162]	While current technology is not perceived as adequate to fully satisfy patient care needs, staff are finding new clinical applications for technology Telehealth and teleconferencing provides benefits to both staff and patients but some patients are not served well by it

Author, Year	Author Defined Theme
Bos, 2021[163]	Flexibility in consultations No physical examination Difficult to estimate disease activity No personal interaction with patients No crowded waiting rooms Not suitable for all patients Through apps possible to draw attention to important aspects of disease or treatment Poor availability of patients by phone No difference in payment of remote and physical consultations Many decision moments while insufficient information available Continued willingness of organization to speed up ehealth More often use of telephone consultations, replacing physical contacts Eye-opener for patients Patient-friendly, no travel time, no need to mobilize family for travels Combination of telephone consultations and electronic PROM Full day telephone or video consultations is exhausting
Boydell, 2021[165]	The 'step-by-step' approach staff took in explaining the process was valued; participants emphasized that information was presented clearly, without use of medicalized language, and that ample time was provided to ask questions Several benefits of the telemedicine service relating to access were articulated: ease of access, timeliness, and convenience and flexibility Some participants noted that the telephone consultation allowed them to write notes, without concerns about being observed. The benefits of the consultation taking place at 'home', a familiar space where many participants felt more comfortable and 'at ease', were highlighted. Conducting the consultation by telephone alleviated concerns about 'visibility' and being judged by others, or about breaches of anonymity and confidentiality. some participants noted privacy challenges with the telephone consultation When asked hypothetically about the option of having a video consultation, participants reported a preference for a telephone consultation. For some, this was linked to the issue of visibility described earlier; not wanting to be visible to those providing the service. All participants described their experience of the telephone consultation as positive, and as good as in-person care, with regard to communication, building rapport and information sharing.
Burton, 2022[170]	Some changes to the practice model were prompted by patient feedback, including negatively perceived online reviews: Providers learned to be proactive and anticipate future challenges and difficulties so they could plan accordingly to remediate them or reduce their negative impact.
Butt, 2022[171]	flexible models of delivery
Bradfield, 2021[166]	changes to midwifery practice
Brown Johnson, 2021[167]	The virtual physical examination The patient-surgeon relationship: Connection and Trust Satisfaction: travel and Access - scheduling

Author, Year	Author Defined Theme
Brunton, 2021[168]	Not all patients have access to technology needed for telehealth Lack of information technology (IT) departments' support for high-quality RDN visits; technical issues with video/audio connections Care involves extra work to check each patient's health plan coverage Solution suggested: Designate one person to validate coverage/billing codes for all nutrition telehealth visits Inability to conduct complete NFPE * via telehealth, especially if limited to audio-only consultation Inability to have direct patient contact, see patients face-to-face, or physically assess nutrition status Telehealth nutrition payment guidelines remain unclear Telehealth services may require additional staff Solution suggested: Pre-screen patients to determine if good candidate for telehealth visit Solution suggested: Create guiding "scripts" for RDNs for optimal telehealth visits Solution suggested: Send patient educational materials ahead of time to facilitate review during telehealth visit Solution suggested: With patient's permission, engage family members to help with scheduling, technical issues, nutrition education, and patient adherence to recommendations Lack of connectivity and/or patient-user skills limit care for some Solution suggested: Schedule call ahead of telehealth visit to walk patient through navigating portal (which IT can also support) Positive Perceptions: Provides RDNs with an opportunity to "look into" a patient's refrigerator/pantry to better understand home environment and diet Positive Perceptions: Patients more likely to keep appointments Positive Perceptions: Patients do not have to travel, find parking, or sit in waiting rooms Positive Perceptions: Staff members able to continue seeing full caseload of outpatients during pandemic quarantine Positive Perceptions: Allows Registered Dietitian Nutritionists (RDNs) to provide timely patient services while patients remain safe at home
Byrnes, 2020[172]	Expressions about the use of virtual visits with patients
Campbell-Yeo, 2021[173]	awareness of resources building and maintaining relationships between family and healthcare providers. standardized COVID-19 messaging
Cartledge, 2022[174]	resuming in-person programmes Capacity for multi-modal delivery Telehealth capacity: Staff time Telehealth capacity: Physical space Continuation of telehealth model of CR and to continue telehealth to sustain increased rea
Change, 2021[177]	to remain reimbursable for providersto be able to provide ongoing support and care topatients without compromising thefinancial stabilityof health care organizations. providers desired changes to telemedicine platform Second, providers cited a need forfinancial assis-tance for organizations to obtain the technologiesnecessary to implement telemedicine successfully. city- and commu-nity-level initiatives
Clair, 2021[179]	

Author, Year	Author Defined Theme
Clair, 2021[179]	Participants suggested providing technical instruction or assistance to improve adoption of virtual care for elderly clients and others who struggled with this technology and training for staff so they could provide such support. there remains a “digital divide” across socioeconomic strata (i.e., homeless-experienced veterans are less likely to use health information technology) and disparities in virtual care use plague certain under-resourced groups. Respondents had mixed feelings about the virtual care offered by the medical center The abrupt transition from in-person SUD groups to virtual or small-group meetings also proved difficult for participants.
Cole, 2021[180]	technology issues
	safety concerns pandemic-related goals benefits of telehealth drawbacks to telehealth
Collins, 2020[181]	Transitions to Telehealth
Cook, 2021[182]	The attendance was higher than any previous group and all parents stated that they would recommend the online group to a friend Parents commented on the benefits of the program, including the immediacy of applying the model During the post-group interviews parents described the positive improvements in their relationship with their children The facilitator experienced online delivery as more challenging than in-person, with some unanticipated issues. Although a smaller group may make a difference, the facilitator thought that this was not likely because of the constraints imposed by the technology on the spontaneity and flow of conversation. The facilitator also found it difficult to monitor the facial expressions and body language of individual participants when the video material was being shared on screen because of the minimized screens (and thus the size of participants’ faces). During weekly supervision, the therapist expressed her sense that she may not be getting the key messages through to specific participants. The facilitator reflected that the online format mitigated the tendency for participants to look to the leader as an expert and seek opinions on what to do in particular situations. This result was better than our attendance rates for face-to-face groups, as illness in children and participants is the main cause of missed sessions
Cooper, 2021[183]	Retaining independence and social connectedness Adapting social connectedness in the face of the pandemic Managing social connections within and through the group intervention
Cormi, 2021[184]	Teleconsultation as a tool to limit follow-up interruptions. Specific feedback from the anesthesiology department. Improvements of an existing outpatient teleconsultations program.
Costa, 2021[185]	accessibility to care

Author, Year	Author Defined Theme
Courtney, 2021[186]	Technical issues Administrative points Non-verbal communication Telephone conversations Difficult consultations Improved patient experience Triage Lack of examination Unconfident clinicians Efficiency Clinician satisfaction Added value of video Utilization of tele-neurology Sustainability
Cronin, 2020[187]	Hearing difficulties, language barriers and technical issues were reported as potential or actual concerns Diagnostic accuracy was highlighted as a concern for both clinicians and patients due to inherent inability to conduct a traditional clinical examination, Individual needs and circumstance The logistics of an appointment
Dahl-Popolizio, 2020[188]	technical issues increases access to care lack of personal contact parent/caregiver involvement improves effectiveness not effective with all populations effective for occupational therapy delivery telehealth should be a permanent option for patients/caregivers
Davoodi, 2021[191]	Emergency medicine physicians shared that telehealth should continue to have a place in emergency care as a supplement, rather than a replacement, for in-person care Most emergency medicine physicians did not report that telehealth platforms were difficult to use despite varying degrees of training received, technological literacy, and prior experience
DeGuzman, 2022[232]	Existence of business and financial pressures in general practice COVID-19 as a driver for telehealth reimbursement and adoption
DePuccio, 2022[193]	Interviewees elaborated on the new responsibilities of MAs and nurses in preparing patients for virtual visits, which prior to the COVID-19 pandemic, r Repurposed: Physicians describing the changing roles and responsibilities of staff to support telemedicine
DerMartirosian, 2021[424]	implementation of teleheath services Telehealth Scheduling

Author, Year	Author Defined Theme
Di Lalla, 2021[194]	Staff Clinic Organization Health Concerns Emotional State Communication Treatment Procedures Waiting Other Specialists Generic Sentiments
Di Lorito, 2021[195]	using tele-rehabilitation would depend on assessment of a person's physical, as well as digital ability there might be risks in progressing exercises or activities through video consultation for clients who might be at risk of falling: tele-rehabilitation worked better with the presence/support of someone in the home during the video calling the caregiver was key for successful video coaching, as they would facilitate the set-up and help to operate the system To be able to work more effectively through tele-rehabilitation, another requirement was having previously established good rapport with the client therapists could not challenge participants who lived independently to the same extent they would normally during home visits impossibility to progress participants towards goals which required their physical presence that tele-rehabilitation could be an integrated part of a hybrid delivery package, after the initial visits are (ideally) made through home visits the digital divide between older and younger generations makes older participants with dementia less able to learn and interact through digital media when the team were trying to explain to the participants how to install the programme or how to operate it, they would get very frustrated if they could not do it proposed ideas for making the platform more dementia-friendly The majority of participants felt that video calling was more valuable than no support at all or phone consultations.
DiGiovanni, 2021[196]	operational adjustments affordances and limitations of virtual work
Donovan, 2021[198]	improved access to care Unmet needs security and privacy Personalization of care Patient empowerment
Dozieres-Puyravel, 2021[199]	absence of physical examination or the absence of possibility to perform some investigations gain of time absence of travel to the hospital absence of concern related to their child (missing school, stress or worsening of the behavior difficulties at the hospital) TC is particularly adapted to the COVID-19 situation

Author, Year	Author Defined Theme
Due, 2021[201]	Reorganizing consultations Consultation content and form Relational and nonverbal limitations The clinical assessment and treatment Technical limitations Choice between video and telephone consultation Choice between face-to-face and video/telephone consultations
Edge, 2021[202]	the most frequently cited difficulties were concerns about whether telehealth would deliver the same quality of care as a physical examination. concerns about privacy
Evans, 2021[204]	telehealth was associated with convenience it substantially compromised their healthcare, resulting in their care 'falling through the cracks', less thorough exams, missed diagnoses, and discomfort in discussing symptoms over the phone Telehealth suited some needs (e.g., prescriptions), but was a poor substitute when physical interaction was necessary
Feijt, 2020[205]	Insufficient technological infrastructure Lacking organizational and procedural support Convenience and efficiency Improved client contact Additional information home environment Client (un)suitability Sufficient technological resources Supplementary software features Technological and procedural support Mediated communication issues
Filippi, 2021[207]	Financial Strain: lost telehealth reimbursements and revenue challenges with telehealth start-up
Finn, 2021[208]	technology difficulties telehealth as a means to improve equity/expand access Telehealth impact on interpersonal connection improved ease of completing visits telehealth improves comfort telehealth as acceptable Perspectives on the translation to telehealth of movement/manual work and group classes
Franzosa, 2021[211]	emotional support for staff outreach and assessment maintaining trusting patient-provider relationships building team connection balancing virtual and in-person care
Franzosa, 2021[212]	Flexibility of Telehealth Platforms Was Necessary for Success Use of video telehealth is limited by patient, clinical, and technological factors Video telehealth is a substitute for human touch—but only temporarily Benefits of Video Visits: Improving Efficiency, Capacity, and Collaboration

Author, Year	Author Defined Theme
Frayn, 2021[213]	Tele-therapy may be hindered by logistical or technical concerns Tele-therapy is perceived as more impersonal than in-person therapy Tele-therapy makes treatment accessible for those who would be otherwise unable to attend Tele-therapy is convenient and facilitates attendance and engagement Tele-therapy was positively perceived by the majority of participants
Frey, 2022[425]	Cost Adaptations
Gabe-Walters, 2021[217]	Quality of assessment (information and self–report) Minimizing the risk of COVID-19 transmission Supporting timely lymphoedema care. Complexity of lymphoedema promoting value based healthcare Patient-centered care.
Gefen 2021[220]	Technical issues (e.g., regarding ease of use, learning curve of therapists and patients) Collaboration with other therapists/parents/young people (e.g., lack of “water fountain” time) Continuity of rehabilitation process (e.g., challenges in developing rapport compared to in-person sessions) Physical setting of focusing on available resources and where therapist or child were (home or hospital) (e.g., safety of setting, available therapy modalities) Boundaries (between patients and therapists, between work hours and non-work hours) Technical issues (e.g., regarding ease of use, learning curve of therapists and patients) Collaboration with other therapists/parents/young people (e.g., lack of “water fountain” time) Continuity of rehabilitation process (e.g., challenges in developing rapport compared to in-person sessions) Physical setting of focusing on available resources and when therapist at home or hospital (e.g., safety of setting, available therapy modalities) Boundaries (between patients and therapists, between work hours and non-work hours)
Gergerich, 2020[221]	barriers to accessing telehealth services in hospice care
Gilbert, 2021[223]	risks to the patient and clinician resulting from the VC interaction the process of protecting individuals for whom we care risks resulting from data loss or data breaches because of the VC interaction relating to indemnification between the patient and the clinician potentially resulting from their VC interaction
Goddard, 2020[224]	Satisfaction (general) Altering Telehealth Delivery Launching Telehealth
Godfrey, 2021[225]	Implementation factors outside the clinic site Implementation factors from inside the clinic site Characteristics of clinic site champions
Goldberg, 2021[227]	Use cases and the mix of telehealth and in-person visits were physician- and specialty-specific Physician reported challenges to using telehealth with older adult patients and strategies to overcome barriers Telehealth uptake was rapid, disorganized, and iterative Physicians embraced telehealth use as a safe work-around during COVID-19

Author, Year	Author Defined Theme
Gomez, 2021[228]	Telemedicine Improves Patient Access to Care but Leaves Out Some Groups Seeing Patient Homes and Families during Telemedicine Visits Enhances Patient Care Physicians Believe Many Visits Are Well Suited for Telemedicine Physicians Lament the Lack of "Personal Connections" and Touch during Telemedicine Visits Physicians Feel More Comfortable Refusing Patient Requests during Telemedicine Visits Insurer Reimbursement for Telemedicine Can Reduce Physician Burden Lack of Physical Examination Can Be Problematic for Diagnosis and Treatment of Certain Conditions Telemedicine Visits Tend to Be Shorter than inPerson Visits Careful Consideration of Physician Workflows Is Needed to Avoid Burnout
Granberg, 2021[229]	Technology-related challenges COVID-19 considerations (e.g., Reduced exposure) Less thorough and more rushed Limitations of video visits Decreased human connection Lack of patient privacy Improved patient convenience and experience
Gullslett, 2021[231]	VC affects therapists 'work situation—opportunities and challenges in working conditions challenges of VC when performing professional assessment and therapy on the screen VC—"it's better than nothing"
Haase, 2021[233]	Greater technology integration and support
Hall-Mills, 2022[234]	patient/student/family engagement
Handley, 2022[236]	Provider Comfort and Willingness to Engage in Video Visits
Hao, 2021[237]	Despite the challenges of telepractice, nine out of the ten clinicians hoped that telepractice would continue to be an option for future speech-language services However, they noted various issues, such as insurance coverage and child client engagement, that need to be addressed to advance telepractice development. Moreover, they perceived telepractice to increase access to speech-language services for underserved populations, such as people residing in rural communities.
Hardy, 2021[238]	Challenges related to conducting teletherapy with couples Recommendations from participants Rewards and unforeseen advantages
Heiskanen, 2021[240]	The findings show that TR may not be appropriate for clients with complex diseases and health situations that require a great variety of health services. the lack of motivation Shared challenges were use and distribution of materials and physical exercises and activities and working with emotions Initiating Tele-Rehabilitation Lack of support and lack of interpretation services flexible schedules also as a challenge, as longer workdays and changing schedules caused burden and mixing home and work affairs The professionals' well-being at work during TR Interaction during TR TR in the everyday life environment
Heiskanen, 2021[240]	
Hersch, 2022[242]	concerns about privacy
Heyck Lee, 2022[287]	Cost

Author, Year	Author Defined Theme
Hlubocky, 2021[244]	Financial concerns, compensations, practice health, and telemedicine
Hunter, 2021[247]	Risks of tele-health
Hunter, 2021[248]	Theme: urine toxicology screening procedures varied substantially and changed over time Theme: telemedicine modality (i.e., phone or video) varied depending on patient and clinician factors Theme: OTPs initially faced logistical challenges with telemedicine use Theme: methadone dispensing procedures changed at most OTPs; some OTPs expressed concern about patient risk and liability Theme: most OTPs offered telemedicine services either for medication management and/or psychosocial services Theme: most clinicians thought service delivery changes—primarily telemedicine—are desired and sustainable, but there are financial limitations Theme: most OTPs offered telemedicine services either for medication management and/or psychosocial services Theme: despite perceived negative impacts on quality, some participants noted benefits of the new service delivery changes Theme: clinicians perceived that patients generally found telemedicine acceptable Theme: most clinicians thought that changes in service delivery had a negative impact of the quality of care
Imlach, 2020[251]	Technological barriers Need to be seen in person Views on value convenience Relationships Patient preferences
Isautier, 2020[252]	issues with obtaining Rx and pathology results inability to be physically examined communication not as effective as face to face Limitations with Tech additional burden of complex care reduced confidence in docs
Iyer, 2021[255]	Technology set-up and usability Satisfaction with visit
James, 2021[426]	preparedness
Jassil, 2022[258]	having a device with larger screen (e.g., desktop, laptop or tablet), a minimum internet bandwidth and instruction for them to follow. As a result, these participants felt that having access to the tele-exercise classes provided them with the much-needed support to engage in physical activity and helped to increase their motivation to keep active during this challenging period The tele-exercise classes gave them something to look forward to and enabled them to interact with others, as well as expand their social networks, which appeared to help them cope with the social isolation caused by the pandemic One of the advantages of tele-exercise classes that was reported by a few participants was feeling less self-conscious and intimidated by their peers, compared to attending in-person classes at the gym. These participants did not feel they were being judged because of their physical limitations or feel they were in competition with others in the tele-exercise classes
Javanparast, 2021[259]	GP services specialist services allied health services dental care services pharmacy services

Author, Year	Author Defined Theme
Javanparast, 2021[260]	Access to general practice services and management of health conditions Experience of telehealth services Opportunity for face-to-face consultations Continuation of telehealth services
Jimenez-Rodriguez, 2020[261]	Difficulties in the Implementation of Video Consultations Skills Needed to Hold a Video Consultation and Training is Needed Benefits of Video Consultations Negative Aspects
Johnson, 2021[263]	inadequate resources digital exclusion impacts on communication and therapeutic relationships efficiency of remote working best alternative for now benefits for some clients service user preferences
Joughin, 2021[264]	barriers to adequate assessment: need for examination barriers to adequate assessment: hearing impairment barriers to adequate assessment: cognitive impairment positive comments: saved trips and gained all information and developed rapport
Kang, 2020[266]	Video consultations were found to be less effective for new orbital patients who require comprehensive assessment in order to reach a provisional diagnosis. video consultations were particularly useful to see follow-up and post-operative patients, and to more accurately triage and consult new referrals The resolution of the video image was satisfactory to assess eyelid position and movement, periocular swelling, and hue, chemosis, ocular motility (including eliciting gaze-evoked pain), gross diplopia, facial asymmetry, and function, and to perform assessment of reasonably sized eyelid lesions.
Kang, 2021[267]	therapeutic relationship factors person-level factors

Author, Year	Author Defined Theme
Klamroth-Marganska, 2021[273]	Other advantages often named were the reduction in the (unpaid) workload through the simpler clarification of low-level questions from clients and through the elimination of the largely unpaid travel time (18.7%), as well as the fact that HCD gave certain clients easier access to health care (16.7%). clients with mental health and anxiety problems, clients who lack technical proficiency, clients without sufficient language skills, and/or who have a shy and inhibited demeanor were being disadvantaged most frequently mentioned (39.3%) advantage of HCD is the possibility to maintain the relationship with clients and to carry out consultations under extraordinary circumstances such as the COVID-19 pandemic. OTs and midwives saw themselves as considerably restricted in their ability to recognize and assess the complexity of the situation as a whole due to the lack of physical presence for OTs and midwives, a large number of examinations, interventions, and therapies were hardly possible at a distance due to absence of direct physical interaction
Krawczyk, 2021[277]	transition to telehealth and virtual care
Krok-Schoen, 2021[278]	telehealth access for staff, patients, and caregivers missed appointments due to tech issues inadequate IT support rural locations with limited tech access communication difficulties dissatisfaction with limited face to face contact
Kryszak, 2022[279]	Possible benefits and costs of completing services by telehealth to those experiencing health disparities and for non-native English speakers are also outlined Institutional and Workplace Factors Related to Transitioning to a Telehealth Model
Kursite, 2022[280]	Sacrifce and loss of privacy
LaRoche, 2021[283]	Perceptions of safety are closely tied with attitudes about using telemedicine for abortion Respondents had apprehension about the legitimacy of telemedicine
Lee, 2022[287]	participants were more willing to meet in-person when their symptoms become more severe or a change in medical needs was warranted lack of the physical examination
Lin, 2021[289]	The most prominent barrier to telemedicine was related to inaccessibility of online technology.
Luckett, 2021[290]	Telehealth was reportedly used for almost all aspects of care views were mixed on the quality of care delivered via telehealth vs. face-to-face Respondents also identified several technical barriers to telehealth Respondents reported leveraging existing systems Respondents reported greater efficiencies from telehealth over face-to-face contact mixed reports regarding acceptance of telehealth among staff and clients
Lynch, 2021[293]	Skepticism about telehealth Client care challenges Virtual etiquette Managing group dynamics Communication challenges ZOOM fatigue
Macchi, 2021[294]	Limitations of telecommunications when compared to in-person contact

Author, Year	Author Defined Theme
Madden, 2020[295]	For patients, Appreciation of continued care (facilitators of telehealth) For patients, Access to required technology and devices (i.e., smart phones, tablet, e-mail) (facilitators of telehealth) For providers, Access to colleagues with prior telehealth experience (facilitators of telehealth) For providers, Accessible EMR data to plan telehealth care encounters in advance of visit (facilitators of telehealth) For clinic/office, Assistance for office staff in telehealth scheduling and administration (facilitators of telehealth) For patients, Technical difficulties with logging on and maintaining continuous Wi-Fi or data connection through visit (barriers of telehealth) For patients, Need for home monitoring devices (i.e., fetal heart tone Doppler's, blood pressure cuffs) (barriers of telehealth) For providers, Limited data on the use of telehealth in routine obstetrics (barriers of telehealth) For patients, Concerns of COVID-19 exposure (facilitators of telehealth) For clinic/office, Protection of patients and staff (facilitators of telehealth) For the department, Development of guidelines regarding which antenatal visits are appropriate for telehealth (facilitators of telehealth) For the department, Development of guidelines regarding frequency and interval of ultrasound monitoring (facilitators of telehealth) For patients, Discomfort/hesitation/anxiety with telehealth visits and technology (barriers of telehealth) For providers, Language barriers/translation services more difficult to use during telehealth visits (barriers of telehealth) For clinics/office, Rapidity of integration (barriers of telehealth) For clinics/office, Recent transition to EMR/unfamiliarity with telehealth administration and scheduling (barriers of telehealth) For clinics/office, Lack of up-to-date patient contact information (barriers of telehealth) For clinics/office, Additional support staff required numbers (barriers of telehealth) For the department, Rapid implementation precluded small scale testing (barriers of telehealth) For clinic/office, Centralized patient call center to facilitate patient technological troubleshooting and scheduling (facilitators of telehealth) For the department, Compliance/billing issues (barriers of telehealth) For providers, Ease of use of telehealth technology (facilitators of telehealth) For providers, Technical difficulties with logging on (barriers of telehealth) For patients Limits COVID-19 exposure For patients Ensures continued access to care For patients Convenience for patients with increased childcare responsibilities For providers Limits COVID-19 exposure For providers Ensures continued access to care For clinic/office, Limits COVID-19 exposure For clinics/office, Challenges with patient scheduling (barriers of telehealth) For providers, Online modules/work-flow documents on how to use telehealth software and interface (facilitators of telehealth) For clinic/office, Online modules for support staff (facilitators of telehealth) For patients, Initial set-up technically difficult (barriers of telehealth)
Malden, 2021[296]	Improving treatment accuracy and effectiveness Negating infection risk in hospital Managing time and resources
Mark, 2022[299]	Use of telehealth to improve access.

Author, Year	Author Defined Theme
Marshall, 2021[300]	rapid implementation was challenging telehealth revealed geographic, aging, and racial/ethnic disparities and digital illiteracy advantages brought about convenience and inclusion of family caregivers telehealth provided continuity of cancer care and used to decrease the risk of COVID-19 exposure
Martin, 2021[301]	technology advocacy lost access to EMR when working remotely patient lack of access to technology lack of privacy Facilitates Conversations increased patient engagement impersonal experience reduced patient engagement telephone counseling lacks communication/connection with clients Convenience Good for Work Schedule Greater availability Greater flexibility lack of availability tedious Greater comfort Greater compliance Improved therapeutic relationship increased accountability increased safety reduced accountability Increased access to client no difference
Murphy, 2021[311]	Remote consulting carries additional clinical risk Total triage draining for GPs and poor use of reception time Video less useful than phone as lockdown eased Universal consensus that remote consulting is necessary to reduce risk for staff/patients Staff and patients bought-in to remote consulting as necessary to reduce infection Triage systems successful in reducing footfall Telephone suitable for most problems Video useful for social distancing
Myers, 2020[314]	technology interference Emergency procedures concerns about high-risk status therapeutic boundaries measurement-based care limitations
Nagra, 2021[315]	Adapting to change Referral pathways Remote services

Author, Year	Author Defined Theme
Negri, 2022[316]	cost Organizational barriers to implementation including cost of telehealth software Increased work-related stress due to COVID-19 High levels of satisfaction in work with Latinx immigrants
Neumann-Podczaska, 2021[317]	Acknowledging the initiative Expectations and motivation toward the initiative Attitude toward online consultations performed by medical and pharmacy students Attitude toward interdisciplinary characteristics of performed consultations Post-pandemic perspective of the initiative and suggestions for expansion
Newman-Casey, 2021[318]	feeling that the care was convenient expressing a negative perception of the quality of care expressing a positive perception of the quality of care feeling that the technology worked well feeling like the care was appropriate given their disease severity expressing a negative perception of the quality of care expressing a positive perception of the quality of care feeling indifferent to the modality of care feeling like the care was appropriate given their disease severity feeling that the care was appropriate given the risk of exposure
Nguyen, 221[320]	participants expressed visit type preferences (particularly for in person visits) that were driven by anxiety related to monitoring and managing their own health without undergoing a physical evaluation by a trained medical professional participants had concerns about accessibility issues related to Internet/data access and technology experience participants felt more comfortable with and expressed preference for telemedicine visits with providers they already knew
Orlowski, 2022[427]	concerns about privacy adjustment was needed gaining comfort over time learning to use technology changes in work-life balance different orientation of clients
Pagano, 2021[323]	Other interviewees stated that older and economically disadvantaged clients often struggled to use laptops and tablets that the program provided for telehealth visits Many described challenges of using telehealth Two directors described positive experiences with telehealth,

Author, Year	Author Defined Theme
Parkinson, 2021[326]	better access and greater convenience participants were supportive of telehealth consultations during COVID-19 as they offered a safe and contact-free option some negative aspects were raised about consultations Video consultations were thought to be better than telephone consultations Some participants indicated that they saw particular value in having a video consultation for an initial meeting Participants viewed face-to- face consultations as the best environment for discussions about personal health issues the health issue of concern also influenced whether they preferred a video or telephone consultation, Most participants felt telehealth was suitable for many, but not all, consultations and would consider incorporating telehealth consultations into their future usual health-care routine where appropriate.
Parsons, 2021[327]	negative feedback included technical difficulties limitations on the testing imposed by the virtual modality technical issues technical assistance for patients taking extra time to manage the evaluation poor engagement distraction, or fatigue on the part of the patient delays in the examination Positive comments related to the examiner the convenience of being able to complete testing from home
Philip, 2020[330]	Joining online Physical space Session content Keep up to date Safety Ethical Issues Sound Informing participants Feedback Maintaining/building relationships
Pogorzelska-Maziarz, 2021[331]	Barriers to using telehealth Benefits of telehealth Usability and acceptability
Ritchie, 2021[341]	challenges in patient-provider communication due to lack of patient digital literacy
Roach, 2021[343]	Virtual medicine: Barriers and facilitators
Reynolds, 2021[339]	difficult to ensure privacy and confidentiality Organisational resources and considerations
Rezich, 2021[340]	Participants also highlighted that safety, ability to include others, limited wait time, no childcare needed, and no work or school missed for appointments were additional benefits of this virtual healthcare platform that supported their desire to have future genetic appointments by telehealth

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Robinson, 2021[344]	incorporating interactive, user centered features delivering general and specific surgical advice in a timely manner directing a descriptive and structured recovery enabling customizable patient-controlled settings
Rodda, 2022[345]	concerns about privacy
Rosenthal-2021[347]	Promoting Video Visits in a Way That Reaches All Patient Families Offering Video Visits to All Patient Families Engaging and Empowering Health System Personnel to Expand Video Visit Access Mitigating Digital Literacy Barriers Expanding Health System Resources to Support Families' Specific Needs
Ross, 2021[348]	Increased acuity of needs coupled with exacerbation of existing inequities Access to technology There was also broad consensus that an adequate pandemic response required an expansion of role and responsibilities beyond the typical scope of practice Impediments to social work and interprofessional practice Lack of understanding of the social work role expansion of patient care activities Disruption to practice and interprofessional teamwork Institutional facilitators to social work and interprofessional practice Acknowledgment both of circumstances and of social work Mixed messaging Recognizing the critical role of social work in hospital pandemic preparedness and response Supporting colleagues Intersections among self, identity, and professional role Overwhelm, overextension, and powerlessness Safety and security Boundary erosion Telehealth is here to stay Social determinants, social justice, and social work
Saad, 2021[351]	Participants perceived that virtual care facilitated comfort and convenience which included the ability to stay at home to conduct the call and to work around the schedule of the participants. Many participants perceived that virtual care could be a useful modality as it provided patients an opportunity to receive care while balancing the domestic tasks of new mothers. Participants perceived that virtual care could be a useful modality to relieve financial and emotional stress related to attending the hospital.

Author, Year	Author Defined Theme
Saliba-Gustafsson, 2020[354]	Adoption Perceived Sustainability Technology Appropriateness: suitability, usefulness, and practicability of video visits Benefits and Barriers of Video Visits for Patients and Families/Caregivers Virtual Physical Examinations Promoting Continuity of Care Acceptability Workflow efficiency
Samuels-Kalow, 2022[428]	Recommendations included phone and technical support, including detailed instruction on the use of the platform via phone call with video tutorials and step-by-step instructions Suggested solutions included providing detailed training and technical support for families accessing telehealth ser- vices, with video options Some Spanish-speaking families suggested that the clinic assist families without resources by allowing them to borrow technology similarly to what is being done by some schooling systems Several participants commented on how older individuals may struggle more with virtual visits
San Juan, 2021[355]	a hybrid model of care delivery could combine the advantages of face-to-face care, including developing the therapeutic relationship, with the advantages of remote care, such as flexibility and reduced need for travel A blend of face-to-face and digital support groups was also identified as beneficial to balance the advantages of both methods, with face-to-face perceived as facilitating stronger interpersonal connections, whereas online groups provided greater flexibility and anonymity, which was sometimes preferred One person additionally stated that NHS crisis helplines did not offer support in different languages despite being promoted in several languages Several participants identified aspects of telemental health that they would like to see incorporated into their care in the future Overall, however, many participants expressed a preference to return to face-to-face for relational appointments such as psychological therapy in the future Needs not being met by helplines which were thought to be available 24/7 was perceived as a risk to personal safety There were also reports of people feeling that non-verbal signals of escalating distress and agitation were being missed by clinicians, particularly over the telephone, potentially leading to safety concerns Some people described feeling unsafe during remote consultations either due to a lack of privacy and safety at home, and this sometimes led to a pause in treatment
Schindler-Ruwisch, 2021[358]	Weakness: Difficulty assisting with latch and positioning Weakness: Technical difficulties Weakness: Logistical challenges Weakness: Rapport and body language limitations Weakness: Unable to get accurate weights /growths and assist with diagnostic issues Strengths: Safety Strengths: Reduces travel time/ convenience Strengths: Increased comfort in patients own home Strengths: New communication strategies Strengths: Flexible, immediate, continuous support available

Author, Year	Author Defined Theme
Schoebel, 2021[359]	Increased access to care Maintained or improved quality of care Privacy concerns Client and provider satisfaction "A lot of Indigenous people don't like the FaceTiming and all that:" Challenges to delivery of services through telehealth
Searby, 2021[361]	"All our face-to-face contact ceased with clients:" Changing service delivery "How do I do my job when I can't see you?" An anxious shift in service delivery "All our face-to-face contact ceased with clients:" Changing service delivery
Sezgin, 2020[364]	Technicality: having problems with accessing the service due to technical problems Engagement issues: patients who were not in a state to engage during telehealth visit due to sleeping, having personal issues, or physically and emotionally not available. Scheduling issues: patient/caregivers who had other scheduled or unscheduled events, or their work was ongoing or forgot the appointment (conflicts).
Shah, 2021[365]	The Inequity Paradox Patient Safety as a Catalyst for Virtual Care Adoption A piecemeal approach to virtual care allowed clinicians to act rapidly, as it provided the flexibility needed to select technologies based on their needs and backup options when technical challenges occurred Confronting New Roles and Workloads Missing Pieces in Virtual Care
Sharma, 2022[367]	Lack of skill in operating technology prevented them from feeling comfortable utilizing video appointments Many participants who themselves felt comfortable with technology expressed concern that elderly family members would struggle Most participants used the portal and found it to be mostly user-friendly Of participants who expressed they had low digital literacy nearly all struggled with the portal or did not use it. A few participants had trouble accessing the teleconferencing application required for video appointments from the portal. Many participants believed that, although their medical concerns could be addressed virtually, seeing their provider f2f would confer a diagnostic and therapeutic benefit fear of who might be listening in on either end of a video appointment fear of who otherwise might have access to the content of a video appointment
Shklarski, 2021[369]	While the participants were conflicted about seeing clients in person, they also had some mixed feelings about working remotely from their domestic spaces. The client's preference to be seen in person was associated with the decision to get back to the office.
Shklarski, 2021[370]	lack of privacy negotiating physical and relational boundaries psychotherapy with children zoom fatigue psychotherapy with new clients

Author, Year	Author Defined Theme
Silviero, 2021[372]	many women recognised the importance of mental health as well as physical health during pregnancy, childbirth, the post-natal period, and during the COVID-19 pandemic Whilst many women understood why appointments were changing so rapidly, concern often arose about the lack of in-person care, in re- lation to the growth and wellbeing of the baby during pregnancy or of their newborn infant Many women expressed they had less postnatal care than expected, and often felt mental health care was lacking virtual care was often discussed as an inappropriate medium through which to conduct health checks, especially postnatally, during which time both newborns and new mothers required attention
Singh, 2021[374]	Patient Access Technology Issues increased communication with teenage patients as they talk more on telemedicine visits than in-person and increased insight into how patients/families manage their disorders at home when discussing food-related questions, patients can show the RD the food item they are asking about. Insurance Coverage and Billing Issues Limitations of Virtual Visits Patient Preferences Time-Consuming Institutional Resources and Policies Patient Knowledge
Sklar, 2021[376]	Patient/client and provider interactions Productivity expectations Work-life balance Modality specific challenges Confidentiality Challenge with children clients
Sloan, 2022[377]	Clinicians significantly over-estimated the convenience for patients compared with patient views and many patients reported that they weren't given appointment times for telemedicine in the same way as for face-to-face, leading to greater inconvenience for some. Administrative staff triaging and 'gate-keeping' was particularly disliked; and there were reports of being made to feel 'like I was making a fuss' or being refused access, sometimes with life-threatening consequences Cost-cutting, clinical need or choice?
Smithson, 2021[381]	In most cases, staff and patients chose the telephone as an easy and accessible platform for communicating, and did not consider that there was any added benefit from having a video function Technology challenges were experienced by many staff and patients Conversely, staff had concerns regarding the cost burden on patients Despite several challenges with virtual appointments, most staff felt that a mix of face-to-face and virtual appointments would be feasible in the future
Snyder, 2021[383]	Technology-Related Issues Teaching and Safety-Related Issues Location and Setting-Related Issues Overall Acceptability of Videoconference Delivery

Author, Year	Author Defined Theme
Srinivasan, 2020[384]	Pandemic as catalyst Growing pains Equitable access for all Discovering the new normal Is this conversation private? Joy in medicine Is this sustainable? Doubt about my video examination and decision making My role, redefined Collaborating together, with meaning Safety in medicine Slipping through the cracks
Stanhope, 2022[385]	Despite the noted convenience of phone visits and noted inconveniences of in-person visits, the majority of women preferred inperson visits for the opportunity to be physically checked. one patient who did not want phone visits to be part of care for a future pregnancy Another described missing the reassurance of ultrasounds. another patient described frustration after coming to her doctor with pain and being assumed to have a sexually transmitted disease (STD)
Stewart, 2020[386]	Difficulties of telemedicine Delays in patient care Concerns prescribing certain medications Concerns for patient/provider safety Personal impact
Stewart, 2021[387]	limitations resulting in uncertainty organizational difficulties good communication and care benefits of telehealth
Stifani, 2021[388]	having the opportunity receive counseling and then take the time to reflect on the information telemedicine visits are easier to schedule around childcare commitments. Concern about privacy during visit quality of communication achieved during telehealth visits Should keep telemedicine for contraception after Covid-19 convenience of televisits Satisfaction with telemedicine visit Telemedicine visit met needs Likelihood of choosing telemedicine over in-person visit
Subotic, 2020[389]	Virtual care: facilitators and barriers Virtual care: facilitators and barriers Healthcare support: opinions on healthcare response and concerns about the unknown Virtual care: facilitators and barriers
Sullivan, 2022[390]	Respondents found that telemedicine

Author, Year	Author Defined Theme
Taylor, 2021[429]	Legitimization of Services Building Confidence in Practice Supportive Relationships Resourcing Services Changes in Healthcare Delivery Organizational Adaptation Professional Adaptation
Treitler, 2021[393]	switch to telehealth continued flexibility for take-home doses and remote induction continued option to use telehealth
Triantafillou, 2021[394]	Convenience: Travel and costs saved Mitigating the impact of COVID-19 Relief/comfort Increased accessibility Alternative to exposure Telemedicine as triage Ease of use Technical difficulties Device choice Platform features Video adds credibility The human touch Physical examination Anxiety regarding telemedicine and setup Skepticism regarding telemedicine Telemedicine as triage Preferences: telemedicine vs in-person office visits Appropriateness of telemedicine Established vs new patient status Patient/visit needs and mutual agreement Patient centeredness
Tuijt, 2021[396]	difficulties with remote healthcare encounters avoidance of healthcare settings and services proactive care at the onset of COVID-19 restrictions
Turchetti, 2021[397]	technical/logistical issues emotion/communication content and outcome of the session
Uscher-Pines, 2020[399]	Minimal Use of Telemedicine Before COVID-19 Extensive Use of Telemedicine in March 2020 Sustainability of the Telemedicine Model Impacts of Telemedicine on Psychiatrist-Patient Interactions Plans for Telemedicine After COVID-19 Positive Patient Response

Author, Year	Author Defined Theme
Uscher-Pines, 2020[400]	Less structure and accountability Less information to inform clinical decision-making More difficult to connect/establish connection Technological challenges Shorter visits Increased access and convenience Reduced anxiety Video visits in home can facilitate better emotional connection
Uscher-Pines, 2021[401]	The leading barriers to telehealth implementation during the pandemic included technology challenges and the need for "hands-on" implementation support in the ED One threat to long-term sustainability was that several new and expanded programs did not have long-term staffing plans New telehealth applications that were sustained for a prolonged period were both operationally successful and had a clear business case or external funding source. Several EDs reported hardware shortages in the early months of the pandemic that prevented them from implementing telehealth as they had originally envisioned. Another challenge is that to effectively implement telehealth in an ED, you need staff who are physically on site. This need for hands-on support to wheel in telehealth carts, set up connections, and troubleshoot problems is challenging Participants noted a variety of policy factors that facilitated implementation of telehealth during the COVID-19 pandemic.
van Gelder, 2021[405]	All professionals mentioned difficulties and disadvantages of using online tools / eHealth There were also advantages of online contact according to all professionals However, all professionals stated that online tools and eHealth cannot and should not replace face-to-face contact, although some think this depends on personal preferences. According to professionals, prerequisites, and stimuli for getting people to use eHealth or online tools in the context of DVA or IPVA are present at multiple levels
Van Citters, 2021	Programs were more likely to experience neutral or minimal financial impact from implementing telehealth ("Cost").
Van Dam, 2022[403]	Most participants expressed that telehealth can be a very good service and most preferred telehealth over face-to- face consultations. Participants largely preferred the convenience of telehealth for routine consultations, but many indicated that a consultation to discuss a new diagnosis or one requiring a physical examination was better face to face. Appropriate telehealth also related to being comfortable at home, as this led to more robust conversations with health care professionals. Most participants reported having to wait for their consultation, but observed it was often for less time than for a face-to- face consultation and it was more convenient because it was in the comfort of their own homes. Some participants expressed concerns that being on the phone could lead to losing the personal and practical connection with their health care professional, who may not understand the context surrounding the participant's illness/es. Some participants mentioned that the social interactions with their health care professionals had been diminished and this created a further sense of disconnection. Most participants expressed that they felt that their privacy was protected through telehealth methods. Most participants did not think that maintaining confidentiality was a concern. It was mentioned that protecting patient privacy could be a problem if the participant engaged in a telehealth consultation in a public space.
Venville, 2021[406]	creating safety and comfort a whole new way of working

Author, Year	Author Defined Theme
Voth Schrag, 2022[360]	privacy and safety
Walters, 2022[407]	Many participants noted that the COVID-19 contact-limiting protocols shepherded in new policies that patients benefited from, with the most well-received change being decreased requirements for in-person treatment and increased daily doses of medication to take home In addition to increasing medication take-homes, some New York City participants discussed how methadone clinics instituted a medication delivery system The most well-received changes were increased medication take-home dosages, medication home deliveries, and telehealth.
Webb, 2022[410]	having private settings
Wiebe, 2021[411]	Increased challenges in establishing rapport when conducting telemedicine assessments, and being unable to have physical contact
Wilhite, 2021[412]	Technology challenge: Computers, phones, connections themselves. Patient or physician's lack of skill with technology. Patient access to technology. Use of interpreters. Benefits: Holistic view of patient Benefits: Easier connectivity to patients Communication challenge: Setting of calls/privacy issues. Differing patient and physician expectations. Systems challenge: Physical examination challenges. No protocol for team functioning in place. Team preparation and workload.
Wilson, 2021[413]	Limitations of telehealth Paying for telehealth Key benefits of telehealth during COVID-19 Changes in use of telehealth over time during the pandemic Perceived future use of telehealth
Wood, 2021[415]	challenges meeting others group leadership group format and content
Yelverton, 2021[416]	Barriers to Telehealth in HIV Care Strategies to Facilitate Telehealth Organizational Context Strategies Client-Related Strategies Economic and Political Context Strategies Utilization of Telehealth in HIV Care
Zhu, 2021[420]	vital signs and physical exam may be limited visual limitations can make an adequate physical examination difficult over telemedicine a clinic visit may be preferred after a major surgery in certain settings, telemedicine is more efficient of time and space than office visits
Saad, 2021[351]	Participants perceived that virtual care facilitated comfort and convenience which included the ability to stay at home to conduct the call and to work around the schedule of the participants. Many participants perceived that virtual care could be a useful modality as it provided patients an opportunity to receive care while balancing the domestic tasks of new mothers. Participants perceived that virtual care could be a useful modality to relieve financial and emotional stress related to attending the hospital.

Author, Year	Author Defined Theme
Silviero, 2021[372]	many women recognised the importance of mental health as well as physical health during pregnancy, childbirth, the post-natal period, and during the COVID-19 pandemic
Van Dam, 2022[403]	Most participants expressed that telehealth can be a very good service and most preferred telehealth over face-to- face consultations. Participants largely preferred the convenience of telehealth for routine consultations, but many indicated that a consultation to discuss a new diagnosis or one requiring a physical examination was better face to face. Appropriate telehealth also related to being comfortable at home, as this led to more robust conversations with health care professionals. Most participants reported having to wait for their consultation, but observed it was often for less time than for a face-to-face consultation and it was more convenient because it was in the comfort of their own homes. Some participants expressed concerns that being on the phone could lead to losing the personal and practical connection with their health care professional, who may not understand the context surrounding the participant's illness/es. Some participants mentioned that the social interactions with their health care professionals had been diminished and this created a further sense of disconnection.
Nguyen, 2021[320]	participants expressed visit type preferences (particularly for in-person visits) that were driven by anxiety related to monitoring and managing their own health without undergoing a physical evaluation by a trained medical professional participants had concerns about accessibility issues related to Internet/data access and technology experience
Stanhope, 2022[385]	Despite the noted convenience of phone visits and noted inconveniences of in-person visits, the majority of women preferred inperson visits for the opportunity to be physically checked. one patient who did not want phone visits to be part of care for a future pregnancy
Rezich, 2021[340]	Participants also highlighted that safety, ability to include others, limited wait time, no childcare needed, and no work or school missed for appointments were additional benefits of this virtual healthcare platform that supported their desire to have future genetic appointments by telehealth
San Juan, 2021[355]	a hybrid model of care delivery could combine the advantages of face-to-face care, including developing the therapeutic relationship, with the advantages of remote care, such as flexibility and reduced need for travel A blend of face-to-face and digital support groups was also identified as beneficial to balance the advantages of both methods, with face-to-face perceived as facilitating stronger interpersonal connections, whereas online groups provided greater flexibility and anonymity, which was sometimes preferred One person additionally stated that NHS crisis helplines did not offer support in different languages despite being promoted in several languages Several participants identified aspects of telemental health that they would like to see incorporated into their care in the future Overall, however, many participants expressed a preference to return to face-to-face for relational appointments such as psychological therapy in the future
Edge, 2021[202]	the most frequently cited difficulties were concerns about whether telehealth would deliver the same quality of care as a physical examination.
Jassil, 2022[258]	having a device with larger screen (e.g., desktop, laptop or tablet), a minimum internet bandwidth and instruction for them to follow.

Author, Year	Author Defined Theme
Samuels-Kalow, 2022[428]	Recommendations included phone and technical support, including detailed instruction on the use of the platform via phone call with video tutorials and step-by-step instructions Suggested solutions included providing detailed training and technical support for families accessing telehealth ser- vices, with video options Some Spanish-speaking families suggested that the clinic assist families without resources by allowing them to borrow technology similarly to what is being done by some schooling systems Several participants commented on how older individuals may struggle more with virtual visits
Walters, 2022[407]	Many participants noted that the COVID-19 contact-limiting protocols shepherded in new policies that patients benefited from, with the most well-received change being decreased requirements for in-person treatment and increased daily doses of medication to take home In addition to increasing medication take-homes, some New York City participants discussed how methadone clinics instituted a medication delivery system
Sharma, 2022[367]	Lack of skill in operating technology prevented them from feeling comfortable utilizing video appointments Many participants who themselves felt comfortable with technology expressed concern that elderly family members would struggle Most participants used the portal and found it to be mostly user-friendly Of participants who expressed they had low digital literacy nearly all struggled with the portal or did not use it. A few participants had trouble accessing the teleconferencing application required for video appointments from the portal.
Dennet, 2021[192]	Some acknowledged that the current arrangement was an acceptable alternative given the COVID-19 pandemic, but did not see it as a substitution in the future
Harris, 2021[430]	Compared to care provided in the clinic, autistic adults felt more comfortable during virtual visits because they were in their own homes Without the commute, autistic adults can avoid these added stressors and may be better able to engage in the visit.
Lee, 2022[287]	participants were more willing to meet in-person when their symptoms become more severe or a change in medical needs was warranted lack of the physical examination
Reynolds, 2021[339]	difficult to ensure privacy and confidentiality Organisational resources and considerations
James, 2021[431]	preparedness
Van Citters, 2021	Programs were more likely to experience neutral or minimal financial impact from implementing telehealth ("Cost").
Nguyen, 2021[320]	participants felt more comfortable with and expressed preference for telemedicine visits with providers they already knew
Sullivan, 2022[390]	Respondents found that telemedicine increased their work-life balance
Handley, 2022[236]	Provider Comfort and Willingness to Engage in Video Visits
Change, 2021[177]	to remain reimbursable for providersto be able to provide ongoing support and care topatients without compromising thefinancial stabilityof health care organizations. providers desired changes to telemedicine platform Second, providers cited a need forfinancial assis-tance for organizations to obtain the technologiesnecessary to implement telemedicine successfully. city- and commu-nity-level initiatives

Author, Year	Author Defined Theme
Hao, 2021[237]	Despite the challenges of telepractice, nine out of the ten clinicians hoped that telepractice would continue to be an option for future speech-language services However, they noted various issues, such as insurance coverage and child client engagement, that need to be addressed to advance telepractice development. Moreover, they perceived telepractice to increase access to speech-language services for underserved populations, such as people residing in rural communities.
Kursite, 2022[280]	Sacrifce and loss of privacy
Hall-Mills, 2022[234]	patient/student/family engagement
Davoodi, 2021[191]	Emergency medicine physicians shared that telehealth should continue to have a place in emergency care as a supplement, rather than a replacement, for in-person care Most emergency medicine physicians did not report that telehealth platforms were difficult to use despite varying degrees of training received, technological literacy, and prior experience
Ashcroft, 2021[145]	i) virtual care will continue for some patients and for some types of appointments and ii) virtual care will change practice; iii) virtual care is dependent on provider preferences; iv) the advancements in virtual care requires continuation of physician billing code
Edge, 2021[202]	concerns about privacy
De Guzman, 2022[232]	Existence of business and financial pressures in general practice COVID-19 as a driver for telehealth reimbursement and adoption
Burton, 2022[170]	Some changes to the practice model were prompted by patient feedback, including negatively perceived online reviews: Providers learned to be proactive and anticipate future challenges and difficulties so they could plan accordingly to remediate them or reduce their negative impact.
Alpert, 2022[142]	reducing patients' travel time and expenses, Challenge to Meet Expectations About Appointment Times
Butt, 2022[171]	flexible models of delivery
Der-Martirosian, 2021[424] Der-Martirosian, 2021[424]	flexible models of delivery implementation of teleheath services Telehealth Scheduling
DePuccio, 2022[193]	Interviewees elaborated on the new responsibilities of MAs and nurses in preparing patients for virtual visits, which prior to the COVID-19 pandemic, r
Walters, 2022[407]	Repurposed: Physicians describing the changing roles and responsibilities of staff to support telemedicine The most well-received changes were increased medication take-home dosages, medication home deliveries, and telehealth.
Kryszak, 2022[279]	Possible benefts and costs of completing services by telehealth to those experiencing health disparities and for non-native English speakers are also outlined Institutional and Workplace Factors Related to Transitioning to a Telehealth Model
Sloan, 2021[377]	Cost-cutting, clinical need or choice?
Mark, 2022[299]	Use of telehealth to improve access.
Dennet, 2021[192]	telehealth offered a quick and convenient option when a simple conversation or general advice with a health professional is all that was required.
Negi, 2022[316]	cost Organizational barriers to implementation including cost of telehealth software Increased work-related stress due to COVID-19 High levels of satisfaction in work with Latinx immigrants

Author, Year	Author Defined Theme
Orlowski, 2022[427]	concerns about privacy adjustment was needed gaining comfort over time learning to use technology changes in work-life balance different orientation of clients
Rosen, 2022[432]	not having a lifestyle that accommodates a remote call-back service Those who did attempt to access care were sometimes unsuccessful (risk 1C), for a variety of reasons relating to digital exclusion, including inability to use the required technology; blocked phone lines due to the high call volumes (and unwillingness to persist in attempts to connect); limitations on patients' telephone data package (lack of phone minutes or bandwidth for video consultation) For some, video consultations were not available at all. In others, video infrastructure was in place but if a glitch occurred, some staff struggled to cope and created work-arounds, causing stress for patients and staff alike
Cartledge, 2021[174]	resuming in-person programmes Capacity for multi-modal delivery Telehealth capacity: Staff time Telehealth capacity: Physical space Continuation of telehealth model of CR and to continue telehealth to sustain increased rea
Frey, 2022[425]	Cost Adaptations
Heyck Lee, 2022[287]	Cost
Hersch, 2022[242]	concerns about privacy
Rodda, 2022[345]	concerns about privacy
Voth Schrag, 2022[360]	privacy and safety
Webb, 2022[410]	having private settings

Table D.19. Author defined barriers and facilitators identified in quantitative studies (Key Question 3)

Author, Year	Survey Questions
Adams, 2021[137]	The lack of physical examination is not a problem The lack of physical examination is not a problem The lack of physical examination is not a problem It is easier to contact my clinician It saves me time The equipment is easy to use It is easier to contact my clinician It saves me time The equipment is easy to use It is easier to contact my clinician It saves me time The equipment is easy to use
Aleboyeh, 2021[139]	technical difficulties during visit

Author, Year	Survey Questions
Alkureeishi, 2021[140]	Training needs: Billing aspects Barriers to conducting video visits: Inadequate scheduling staff support Barriers to conducting video visits: Inadequate staff support during visits Training needs: Integrating residents/fellows into visit workflows Barriers to conducting video visits: Patient reluctance Training needs: Performing a video visit exam Barriers to conducting video visits: Patient lack of technical knowledge Barriers to conducting video visits: Patient access to necessary technology Training needs: Technical aspects Training needs: Communication strategies Barriers to conducting video visits with residents/fellows: Concerns about integrating them into video visit workflows Barriers to conducting video visits with medical students: Concerns about integrating them into video visit workflows Barriers to conducting video visits with medical students: Patient reluctance to having medical students involved Barriers to conducting video visits with residents/fellows: Uncertainty about documentation rules Barriers to conducting video visits with medical students: Uncertainty about documentation rules Barriers to conducting video visits with medical students: Unsure how to give performance feedback Barriers to conducting video visits with residents/fellows: Other Barriers to conducting video visits with medical students: other Training needs: Billing aspects Barriers to conducting video visits with residents/fellows: Concerns about integrating them into video visit workflows Barriers to conducting video visits with medical students: Concerns about integrating them into video visit workflows Barriers to conducting video visits: Inadequate scheduling staff support Barriers to conducting video visits: Inadequate staff support during visits Training needs: Integrating residents/fellows into visit workflows Barriers to conducting video visits: Patient reluctance Barriers to conducting video visits with medical students: Patient reluctance to having medical students involved Training needs: Performing a video visit exam Barriers to conducting video visits with residents/fellows: Uncertainty about documentation rules Barriers to conducting video visits with medical students: Uncertainty about documentation rules Barriers to conducting video visits with medical students: Unsure how to give performance feedback Barriers to conducting video visits with residents/fellows: Other Barriers to conducting video visits with medical students: other Barriers to conducting video visits: Patient lack of technical knowledge Barriers to conducting video visits: Patient access to necessary technology Training needs: Technical aspects Training needs: Communication strategies Converting in-person visits to video visits has resulted in feeling more overwhelmed
Atay, 2021[147]	prefer TM: It is hard to access abortion due to work or school commitments prefer TM: It is hard to access abortion because of legal restrictions prefer TM: it is hard to access abortion because of distance prefer TM: it is hard to access abortion because of the costs

Author, Year	Survey Questions
Baadjou, 2020[148]	Relatively few problems were experienced with the information technology (IT) even if experienced, IT barely affected the experience with videoconferencing
Banks, 2021[149]	technical difficulties pre-COVID technical difficulties post-COVID
Barth, 2021[153]	Possible challenges: Technical difficulties before consultation Possible advantages: Time saving Possible advantages: Location independence Possible advantages: Home setting: involvement Possible advantages: Practicing exercises in home setting Possible advantages: Home setting: integration of exercises in daily life Possible challenges: Difficulties in doing the exercises Possible challenges: Perceived distance Possible challenges: Issues with therapeutic approach Possible challenges: Issues with patient's concern Possible advantages: Time saving Possible advantages: Location independence Possible advantages: Home setting: involvement Possible advantages: Practicing exercises in home setting Possible challenges: Difficulties in doing the exercises Possible challenges: Perceived distance Possible challenges: Issues with therapeutic approach Possible challenges: Issues with patient's concern Overall judgment: New therapeutic potential Overall judgment: Therapeutic limitations Possible advantages: Time saving Possible advantages: Location independence Possible advantages: Home setting: involvement Possible advantages: Practicing exercises in home setting Possible challenges: Difficulties in doing the exercises Possible challenges: Perceived distance Possible challenges: Issues with therapeutic approach Possible challenges: Issues with patient's concern Overall judgment: New therapeutic potential Overall judgment: Therapeutic limitations
Bate, 2021[155]	confidence in using technology Time saved: set up/connection Cost saved: travel Cost saved: accommodation Cost saved: loss of income Cost saved: other Cost saved: overall

Author, Year	Survey Questions
Belcher, 2021[156]	1 to 3 visits to become comfortable with the technology and billing aspect 4 to 8 visits to become comfortable with the technology and billing aspect 9 to 15 visits to become comfortable with the technology and billing aspect Preferred completing their telehealth visits at the hospital or office Preferred completing their telehealth visits at home improved patient access to the care they needed ability for patients and providers to avoid COVID-19 exposure improved relationships and time with the patient families flexibility in being able to care for patients in the comfort of their home Likelihood that telehealth would be a part of their clinical practice in the future
Bennell, 2021[158]	VC would cost the business more VC and in-person would cost the same amount in-person would cost the business more Most valued about video consult: cost savings Most valued about video consult: privacy
Bhuva, 2020[160]	did not have any technical issue
	had video issues had audio issues
Birkhoff, 2021[161]	I think that I would need the support of a technical person to be able to use this system. I thought the system was easy to use. I found the system very cumbersome to use. I found the system unnecessarily complex I found the various functions in this system well integrated. I thought there was too much inconsistency with this system. I felt very confident to use this system. I would imagine that most people would learn to use this system very quickly. I need to learn a lot of things before I could get going with this system.

Author, Year	Survey Questions
Bos, 2021[163]	Difficulty estimating how the patient is doing Impossibility to perform physical exam Impossibility to conduct additional testing on a short term Limited organizational support to convert consultation from in-person to telephone visit Delayed diagnostic or therapeutic trajectory I found TCs easy to learn Less travel time for patients Ease of use Shorter waiting time for patients Familiarity with telephone system Facilitative support from organization Lower workload Difficulty in reaching patients (i.e., phone not being answered) Preference for in-person consultation by patients Language barrier by patients Less access to care Age of the patients Technical issues (i.e., insufficient sound quality) Less patient attention for the consultation (distracting factors at home/on the road)
Boyarsky, 2020[164]	Challenges to implementing telemedicine: Equipment for staff Challenges to implementing telemedicine: Hospital infrastructure not set-up Challenges to implementing telemedicine: Limited number of staff Challenges to implementing telemedicine: Patient availability Challenges to implementing telemedicine: Redeployed staff Challenges to implementing telemedicine: Software Challenges to implementing telemedicine: Training staff Challenges to implementing telemedicine: Patient access to technology Challenges to implementing telemedicine: Patient ability to use technology Challenges to implementing telemedicine: Other
Champion, 2021[176]	cost-effectiveness of the appointment
Chen, 2021[178]	Ability to adopt new technology Audiovisual quality of telehealth visit Ability to adopt new technology Audiovisual quality of telehealth visit Effectiveness in completing physical examination Confidence in physical examination: inspection Confidence in physical examination: determination of tenderness Confidence in physical examination: determination of sensation Confidence in physical examination: determination of range of motion

Author, Year	Survey Questions
Datta, 2021[190]	reported having previous experience with video calls Patients who indicated that they have used video platforms in the past were more than 10 years younger than those who did not have experience with video calls prior to their clinic encounters Among the factors that favorably influenced patients' decision to choose telehealth for epilepsy instead of face-to-face visits, inclement weather and lack of transportation were reported most frequently
Dramburg, 2021[200]	perception of TM technical implementation
Fieux, 2020[206]	I was satisfied with the sound quality during the teleconsultation TH easy to get technical back up if needed Teleconsultation saved time and money I was bothered that the doctor could not examine me
Freiman, 2021[214]	Internet use Own: laptop Own: smart phone Video conf in last year Video conf capable device Confidence: phone and video conf Confidence: phone and picture Confidence: downloading app Confidence: bluetooth pairing Confidence: video conf any Confidence: info seeking
Gabe-Walters, 2021[217]	I am extremely concerned about accessibility to the service for some patients if we increase our telephone/video ways of working A virtual consultation for a follow-up patient is quicker than a face-to-face one* virtual consultation for a new patient is quicker than a face-to-face one* Being hands-on when assessing all patients is essential
Gilbert, 2021[223]	Do you feel the current technological solutions are secure in terms of patient data?

Author, Year	Survey Questions
Goh, 2021[226]	Benefit of Telemedicine Visits: No travel Benefit of Telemedicine Visits: More convenient Benefit of Telemedicine Visits: Continuity of care for families who are hesitant to come for in-person visits Benefit of Telemedicine Visits: Less cancellations/no shows Benefit of Telemedicine Visits: Decreased patient wait times Benefit of Telemedicine Visits: Decreased clinic visit length Benefit of Telemedicine Visits: Other (e.g., opportunity to observe a patient's home environment) Challenges of Telemedicine Visits: Limited ability to perform physical exams Challenges of Telemedicine Visits: Assessing disease activity Challenges of Telemedicine Visits: Access to technology Challenges of Telemedicine Visits: Safety labs being performed at recommended interval Challenges of Telemedicine Visits: Adequate Internet bandwidth Challenges of Telemedicine Visits: Providing multidisciplinary care Challenges of Telemedicine Visits: Patient education Challenges of Telemedicine Visits: Communicating after-visit instructions/making follow-up visits Challenges of Telemedicine Visits: Licensure Challenges of Telemedicine Visits: Reimbursement Challenges of Telemedicine Visits: Other-Miscellaneous technological issues for the patients/providers
Hamad, 2021[235]	visual quality of visit how your privacy was respected how your privacy was respected - new how your privacy was respected - existing
Hasson, 2021[239]	Reasons to continue TM: reduced expenses Felt their privacy was secured Reasons to continue TM: shorter arrival time protected privacy protected privacy
Hentati, 2021[241]	Disadvantages of TH: tech difficulties
Hertling, 2021[243]	Disadvantages of TH: less personal interaction Disadvantages of TH: poor communication Does anything prevent you from using telemedicine (y) Very good to good knowledge of Telemedicine Concern: Technical comprehension of patients

Author, Year	Survey Questions
Hyung, 2021[249]	Perceived time consumption compared with in-person visit? Shorter Perceived time consumption compared with in-person visit? Equivalent Perceived time consumption compared with in-person visit? Inferior Perceived time consumption compared with in-person visit? Inferior Inability to perform neuro exam Limitations of technology Technical support barriers Reimbursement barriers Provider lack of interest Patient lack of interest Administrative barriers Provider lack of training Malpractice Documentation barriers Other barriers Licensing barriers Less travel time for patients Less cost for patients Access to greater catchment area Cost efficient for hospitals More frequent patient followup Other benefits Duration of teleconference/video conference visits? <15 minutes Duration of teleconference/video conference visits? <15 minutes Duration of teleconference/video conference visits? 15-30 minutes Duration of teleconference/video conference visits? 15-30 minutes Duration of teleconference/video conference visits? 30-60minutes Duration of teleconference/video conference visits? 30-60minutes Duration of teleconference/video conference visits? >60 minutes Duration of teleconference/video conference visits? >60 minutes Quality of care compared with in-person visit? Superior Quality of care compared with in-person visit? Superior Quality of care compared with in-person visit? Equivalent Quality of care compared with in-person visit? Equivalent Quality of care compared with in-person visit? Inferior Quality of care compared with in-person visit? Inferior
Isautier, 2020[252]	Factor associated with poor TH experience: male Factor associated with poor TH experience: history of depression or anxiety Factor associated with poor TH experience: low patient activation score Not able to access TH services
Iyer, 2021[255]	This video/telephone visit saved me travel costs

Author, Year	Survey Questions
Jaclyn 2021[256]	Degree of concern regarding absence of Pulmonary Function Testing Degree of concern regarding absence of Weight Measurement Degree of concern regarding absence of Throat/Sputum Culture Degree of concern regarding absence of Vital Signs and Physical Exam Degree of concern regarding absence of Pulmonary Function Testing Degree of concern regarding absence of Weight Measurement Degree of concern regarding absence of Throat/Sputum Culture Degree of concern regarding absence of Vital Signs and Physical Exam Able to see desired disciplines Difficulty accessing visit Able to see desired disciplines Difficulty accessing visit
Johnson, 2021[263]	difficulty engaging with remote appts by phone or via digital platforms
Joughin, 2021[264]	Respondents who participated in a video consultation required help accessing equipment—usually from family members experienced difficulties logging on to video consultations being able to hear and understand the clinician throughout the whole consultation could see the doctor all of the time understanding the reason for the consultation and felt better able to manage and understand their condition. I was given adequate opportunity to express my opinion and ask questions during the consultation
Kasturi, 2021[268]	lack of physical contact during the TH visit was not a problem
Kaufman, 2021[269]	difficulties using phone counseling: technical difficulties median score for technical quality (IQR) difficulties using video counseling: technical difficulties difficulties using phone counseling: lack of anthropometric measurements difficulties using video counseling: lack of anthropometric measurements
Kayser, 2021[270]	reported technical problems during consultation
Kippen, 2020[272]	Practices were highly/medium impacted by the challenge: telehealth reimbursement
LeBrun, 2021[285]	Needed assistance with accessing the telemedicine visit Difficulties during the telemedicine visit What negative things did you experience during the virtual consultation? Technical difficulties that disrupted the visit Did you notice a reduction in expenses using TM vs. outpatient care at HSS What negative things did you experience during the virtual consultation? Difficulty addressing concerns or symptoms in the absence of an in-person physical examination What negative things did you experience during the virtual consultation? inability to obtain a radiograph

Author, Year	Survey Questions
Lee, 2021[286]	Telehealth improves my patient's access to healthcare services Telehealth saves my patients time traveling to a hospital or specialist clinic I think the visits provided over the telehealth system are the same as in-person visits Whenever I make a mistake using the system, I could recover easily and quickly The system gave an error message that clearly told me how to fix problems This system is able to do everything I would want it to be able to do I could easily talk to the patient using the telehealth system I could hear the patient clearly using the telehealth system I felt I was able to express myself effectively Using the telehealth system, I can see the patient as well as if we met in person
Lun, 2020[292]	perceived safety of virtual clinic
Madden, 2020[295]	Telephone improves access to healthcare services for my patient Telehealth provides adequate care when appropriately scheduled Telehealth is convenient for my patients Telehealth is convenient for my practice Telehealth is compatible with my daily practice Telehealth technology was easy to set up I received sufficient technological support during the transition I faced significant challenges during implementation I spent a significant amount of time learning how to use telehealth I needed significant technological support during the transition

Author, Year	Survey Questions
Margolin, 2021[298] Margolin, 2021[298]	Factor associated with patient overall satisfaction: Imaging review Factor associated with physician overall satisfaction: Imaging review Factor associated with patient overall satisfaction: Lab review Factor associated with physician overall satisfaction: Lab review Factor associated with patient overall satisfaction: Male gender Factor associated with patient overall satisfaction: MyChart (vs. other platforms) Factor associated with physician overall satisfaction: MyChart (vs. other platforms) Factor associated with physician overall satisfaction: New patient visit (vs. follow-up) Factor associated with patient overall satisfaction: New treatment/surgery planned Factor associated with physician overall satisfaction: New treatment/surgery planned Factor associated with patient overall satisfaction: Non-English preferred language Factor associated with patient overall satisfaction: Non-White Factor associated with physician overall satisfaction: Non-White Factor associated with patient overall satisfaction: Not Hispanic/Latino Factor associated with physician overall satisfaction: Not Hispanic/Latino Factor associated with patient overall satisfaction: Pathology review Factor associated with physician overall satisfaction: Pathology review Factor associated with patient overall satisfaction: Patient age > 70 years Factor associated with physician overall satisfaction: Patient age > 70 years Factor associated with patient overall satisfaction: Prior patient telemedicine experience Factor associated with physician overall satisfaction: Prior physician telemedicine experience Factor associated with patient overall satisfaction: Prostate cancer (vs. other cancers) Factor associated with physician overall satisfaction: Prostate cancer (vs. other cancers) Factor associated with patient overall satisfaction: Technological barriers Factor associated with physician overall satisfaction: Technological barriers Factor associated with patient overall satisfaction: Urologic oncology (vs. other specialties) Factor associated with physician overall satisfaction: Urologic oncology (vs. other specialties)
Masi, 2021[302]	Telehealth therapy services not possible for child Practitioner/s are confident/competent in providing services via telehealth
Meno, 2021[305]	it was easy to set up my telehealth visit using my phone/computer/tablet it was easy to see my doctor during the telehealth visit it was easy to hear my doctor during the telehealth visit
Mohammed, 2021[308]	

Author, Year	Survey Questions
Mrugala, 2021[310]	concerned about patients' limited access to technology and devices concerned about their degree of technology knowledge connectivity issues such as inconsistent Wi-Fi/Internet connection worried about the limited resources increase in demand for time standards for virtual care outlined by their profession's college would be a helpful support resource usefulness of accessible resources on virtual care platforms. written information offering of evidence on virtual care effectiveness inability to justify the cost of virtual visits Concerns about patient privacy concerns obtaining email consent lack of adequate training
	new tech applied toward patient care were a positive outcome Has switching to TM resulted in positive patient outcomes: travel burdens Has switching to TM resulted in positive patient outcomes: cost of gas/food
Mustafa, 2020[312]	prefer in-person: I experienced tech difficulties prefer in-person: I wanted a physical exam prefer in-person: I wanted skin testing prefer in-person: I wanted lung function assessment
Mustafa, 2021[313]	most important reason you would prefer in-person encounter: i want to avoid tech difficulties most important reason you would prefer in-person encounter: I want a physical examination most important reason you would prefer in-person encounter: i want allergy or breathing tests
Nagra, 2021[315]	respondents felt professional liability was GREATER with remote consultations compared to f-2-f appointments respondents felt professional liability was THE SAME with remote consultations compared to f-2-f appointments respondents felt professional liability was LOWER with remote consultations compared to f-2-f appointments
Ng, 2021[319]	Providers Offered Telehealth During the COVID-19 Pandemic Usual providers offered telehealth to replace a regularly scheduled appointment Providers Offered Telehealth During the COVID-19 Pandemic Usual providers offered telehealth to replace a regularly scheduled appointment
Parikh, 2021[324]	More convenient for patients
	Patient challenges with software

Author, Year	Survey Questions
	Increases access More convenient for provider More efficient use of time Provider fatigue specific to using video visit format Patient discomfort with video visit Provider challenges with software Video visits lack the authenticity of in-person appointments Documentation of visit is easier Patient worries about security or privacy Provider discomfort with video visit Provider worries about security or privacy I have been able to connect well with my patients (provider patient rapport) I have been able to effectively communicate exercises or suggestions for my patients The video visit sessions I've had with patients have been effective I have been able to effectively evaluate my patients' mood and thinking I'm comfortable using video visits to provide clinical care
Park, 2021[325]	It was convenient to use this system
	Telemedicine is convenient to use compared with the in-person visits
	I can check patients' condition through telemedicine as in-person visits Emergent situation hardly ever happens although I cannot see patients I know the purpose of telemedicine I understand advantages and disadvantages of telemedicine I know the purpose of telemedicine
Patt, 2021[328]	Top platform challenges--first time installation Top platform challenges--technology quality
Peahl, 2021[329]	It is easy to do virtual visits I had technical issues with virtual visits.
Peden, 2020[433]	The audio & video quality was appropriate for clear communication Instructions for gaining access to the system and completing my visit were clear and easy to complete
Pooni, 2021[332]	confidentiality was not significantly changed confidentiality moderately worsened confidentiality moderately improved
Puteikis, 2021[334]	It is possible to reliably note the side effects of AEDsa I managed to provide consultations for most of my patients at a usual rate
Rametta, 2020[336]	Any type of issues affecting encounter quality Concerns not adequately addressed
Ritchie, 2021[341]	COVID-19 related practice challenges: Technical difficulties reaching patients COVID-19 related practice challenges: Preparedness for use of telemedicine COVID-19 related practice challenges: Patient lack of familiarity with telemedicine

Author, Year	Survey Questions
Ross, 2021[349]	Telehealth Teach-back tool used Needed clarification on teaching Reported decrease in level of concern using Telehealth Listening Reported that they felt a connection with project implementer Looked at fact sheet or received teaching orally Reported it was nice to talk with someone for a while today
Rush, 2021[350]	communicated somewhat/far more often during COVID-19 than before did not have access to online mental health programming did not have access to virtual or phone mental health services frequency of communication with health care providers was “about the same” during COVID-19 compared to before communicated somewhat/far less often, and in some cases, this reduced frequency carried over into pressing issues such as a “lump in my breast because I feel I won’t have access to a mammogram right now.” participants’ eHealth literacy scores were relatively high
Salehi, 2020[353]	Do you use telemedicine to conduct patients visits in your practice Did you routinely use telemedicine to conduct patient visits prior to the ongoing COVID-19 pandemic? I am not trained/credentialed to do so My patients dislike it
Saliba-Gustafsson, 2020[354]	Technological limitations Patient expectations to have video visits as an option Maintaining access to readily available technology and equipment needed for video visits Difficulties arranging and completing necessary follow-ups after the video visit Patients’ unwillingness to come into clinic for requested in-person visits in the future Other (providers listed various reasons) Missing/losing the in-person connection/relationship with patients Including interpreters on video calls Insurance reimbursements for video visits are not the same as for in-person visits Being able to engage in training and education of residents and fellows Press-Ganey scores
Sathiyaraj, 2021[356]	satisfaction with video
Scherrenberg, 2021[357]	I see no advantages in comparison with center-based CR sessions Main advantages of remote CR sessions: No transportation needed Main advantages of remote CR sessions: Time saving Main advantages of remote CR sessions: No need to arrange supervision for children Main advantages of remote CR sessions: More flexibility Main advantages of remote CR sessions: More involvement of partner or friends Main disadvantages of remote CR sessions: The feeling of being monitored less by the rehabilitation team Main disadvantages of remote CR sessions: The feeling that the rehabilitation team has less insight in your clinical status Main disadvantages of remote CR sessions: The absence of social contact

Author, Year	Survey Questions
Severe, 2020[363]	reason for choosing phone: i tried a video visit in the past, and it didn't work reason for choosing phone: no access to a tablet or phone capable of video visits use of video tech: extremely easy use of video tech: somewhat easy use of video tech: neither easy nor difficult use of video tech: somewhat difficult use of video tech: extremely difficult factors in continuing virtual care: difficult to find transportation factors in continuing virtual care: difficult to find a person to come with me/coordinate schedules reason for choosing phone: insurance coverage reason for choosing phone: concerns about confidentiality over internet connection
Shivkumar, 2021[368]	Institutional preference was main reason for selecting synchronous video conferencing HIPAA was second reason for selecting synchronous video conferencing Barriers for adoption of non face to face methods: Provider resistance Barriers for adoption of non face to face methods: Patient resistance Barriers for adoption of non face to face methods: Lack of access for provider Barriers for adoption of non face to face methods: Lack of access for patient Barriers for adoption of non face to face methods: Institutional reluctance
Shklarski, 2021[369]	remote work is more draining than in-person
Shklarski, 2021[370]	concerned about client privacy during therapy sessions
Sklar, 2021[376]	Quality of communication between you and your patients/clients Patient/client focus during sessions Relationships between you and your patients/clients Rate of no-shows with fewer being better Confidentiality of discussions with patients/clients Patient/client willingness to schedule sessions Patient/client engagement in treatment Telehealth self-efficacy
Smith, 2021[379]	would not operate on a patient without meeting them in person first No aspect of physical exam could be performed during virtual care to an equivalent level External nasal exam, Cottle/modified Cottle maneuver, and Teapot maneuver could be performed adequately during virtual care general assessment, caudal septal assessment, and cranial nerve exam could be performed equivalently during virtual care physical exam was limited because of lack of nasal endoscopy
Smithson, 2021[381]	satisfied with video quality during the calls satisfied with sound quality during the calls

Author, Year	Survey Questions
Smrke, 2020[382]	reasons for telemedicine preference: reduced travel time reasons for telemedicine preference: reduced travel expenses reasons for telemedicine preference: convenience lack of video-based assessment was a barrier to care Documentation is a barrier in telemedicine Loss of rapport using phone Lack of private space to have appointment Lack of nursing presence
Stifani, 2021[388]	Concern about privacy during visit
Taylor, 2021[429]	Non-financial resources needed for telehealth: Access to suitable technology was extremely important Non-financial resources needed for telehealth: Reliable of technology was extremely important Non-financial resources needed for telehealth: Staff training was very important Non-financial resources needed for telehealth: Access to appropriate physical space was very important Time spent was about the same as face-to-face consultations Factors associated with clinician confidence in TH: It was extremely important to know systems are private and secure Factors associated with clinician confidence in TH: It was moderately important to trust colleagues Relationship factors that support the use of telehealth: having good leadership was extermely important Relationship factors that support the use of telehealth: Personal and organizational networks were very important Relationship factors that support the use of telehealth: Teamwork was very important Relationship factors that support the use of telehealth: Communities of practice very important Relationship factors that support the use of telehealth: Formal partnerships were very important
Tyler, 2021[398]	Did you have any concerns when you were told you would be having a virtual consultation? (yes) How was the process of booking the appointment? (good or excellent)

Author, Year	Survey Questions
Wilhite, 2021[412]	You sometimes or often experience the following challenges: Problems establishing connection on your end Problems establishing connection on patient's end Sound quality Integrating interpreter into call You sometimes or often experience the following challenges: Problems establishing connection on your end Problems establishing connection on patient's end Sound quality Integrating interpreter into call You sometimes or often experience the following challenges: Problems establishing connection on your end Problems establishing connection on patient's end Sound quality Integrating interpreter into call Share information with other health care team members Understand patient's concerns and preferences for care Maximize patient adherence Compared with in-person visits, televisits make the following more difficult: Complete a targeted physical examination Establish relationship with a new patient Take a good history Work collaboratively with other health care team members Educate patient about condition and follow up Maintain relationship with existing patients Understand family and social issues and support Explore patient's home and community environment Compared with in-person visits, televisits make the following more difficult: Complete a targeted physical examination Establish relationship with a new patient Take a good history Work collaboratively with other health care team members Educate patient about condition and follow up Maintain relationship with existing patients Understand family and social issues and support Explore patient's home and community environment Compared with in-person visits, televisits make the following more difficult: Complete a targeted physical examination Establish relationship with a new patient Take a good history Work collaboratively with other health care team members Educate patient about condition and follow up Maintain relationship with existing patients Understand family and social issues and support Explore patient's home and community environment
Zhang, 2020[419]	documentation time in person vs. TM unchanged
Zhu, 2021[420]	I was able to see and hear my healthcare provider adequately during my telemedicine appointment what factor would most make you choose a tm appt over a clinic visit: saving money for travel

Table D.20. Author defined satisfaction and dissatisfaction identified in qualitative studies (Key Question 3)

Author, Year	Author Defined Theme
Alkureeishi, 2021[140]	Video visit experiences have been positive, and are useful for many clinicians and patients.
Allison, 2022[141]	Although only five adolescents interviewed had alone time with the provider during their telehealth visit, when asked if finding privacy would be challenging when at home most were not concerned about confidentiality adolescents gaining access to their own patient portal (i.e., a secure virtual platform where patients can communicate with their providers or view their medical information) at 13 years old aided in providing confidential health care services and fostered feelings of autonomy for the adolescent adolescents generally reported being comfortable with time alone with the provider Some acknowledged that the current arrangement was an acceptable alternative given the COVID-19 pandemic, but did not see it as a substitution in the future telehealth offered a quick and convenient option when a simple conversation or general advice with a health professional is all that was required. For some participants, the lack of access to the physical environment and lack of physical contact with the health professional for the purpose of examination or demonstration were a limiting factor of telehealth.
Anghelescu, 2021[143]	Worsening of Motor Symptoms
Antoun, 2021[144]	Worsening of Non-Motor Symptoms
Ashcroft, 2021[146]	Health Care Uncertainty
Baadjou, 2020[148]	Health Care Limitations
Banks, 2021[149]	Virtual Medicine: Recommendations
Barnett, 2021[151]	expressed support for the use of telemedicine and described positive experiences they have had utilizing remote medicine within their clinical care
Barsom, 2021[152]	Impact on quality care
Ben-Ayre, 2021[157]	The changes experienced in specific components of pain rehabilitation
Bennell, 2021[158]	The overarching changes experienced, including both opportunities and limitations.
Bethel, 2021[159]	Convenience.
Birkhoff, 2021[161]	Concentration and appointment flow.
Bommersbach, 2021[162]	Similarities to face- to-face appointments.
Bos, 2021[163]	Video appointments.
Boydell, 2021[165]	Preference for face-to-face.
Brown Johnson, 2021[167]	the benefit of applying the treatment skills within the home setting
Brunton, 2021[168]	challenges with delivering the treatment protocol via telehealth
Byrnes, 2020[172]	VC can be a valuable supplement to care, but the value was dependent on the reason for consultation
Campbell-Yeo, 2021[173]	considering the additional value of visual cues and the ability to use inspection and read emotions, healthcare providers are satisfied with the use of VC
Cole, 2021[180]	Patients were also worried about not being able to discuss the treatment with the IO practitioner in person
Cook, 2021[182]	They were also worried about creating a quiet treatment setting in their home without distractions, or other factors preventing them from learning or performing the self-administered treatments
Cooper, 2021[183]	Despite the many challenges which online IO treatment presents, many patients reported a beneficial effect
Cormi, 2021[184]	Despite these difficulties, many IO practitioners described
Courtney, 2021[186]	a sense of creativity in their ability to design what they referred

Author, Year	Author Defined Theme
Dahl-Popolizio, 2020[188]	to as a new “online integrative toolbox.”
Dennett, 2021[192]	Some acknowledged that the current arrangement was an acceptable alternative given the COVID-19 pandemic, but did not see it as a substitution in the future telehealth offered a quick and convenient option when a simple conversation or general advice with a health professional is all that was required. For some participants, the lack of access to the physical environment and lack of physical contact with the health professional for the purpose of examination or demonstration were a limiting factor of telehealth.
DePuccio, 2022[193]	Interviewees elaborated on the new responsibilities of MAs and nurses in preparing patients for virtual visits, which prior to the COVID-19 pandemic, r Repurposed: Physicians describing the changing roles and responsibilities of staff to support telemedicine
Di Lalla, 2021[194]	IO practitioners also described how patients unfamiliar
Di Lorito, 2021[195]	with or wary of the online process eventually became interested,
Donovan, 2021[198]	even enthusiastic, about the process
Dozieres-Puyravel, 2021[199]	These non-specific effects of treatment became more apparent
Due, 2021[201]	as patients became actively involved by learning and self administering the treatments at home
Feijt, 2020[205]	One of the barriers identified by practitioners was the difficulty
Finn, 2021[208]	inmoving treatments from the in-person clinical setting
Franzosa, 2021[211]	in the oncology department to the patients’ home
Frayn, 2021[213]	What safety issues did you
Gabe-Walters, 2021[217]	experience delivering care
Gilbert, 2021[223]	via telehealth? Difficult to assess thoroughly
Goddard, 2020[224]	What safety issues did you
Godfrey, 2021[225]	experience delivering care
Goldberg, 2021[227]	via telehealth? Falls risk
Gomez, 2021[228]	What things helped you the most to deliver physiotherapy care via
Granberg, 2021[229]	telehealth? Patient willingness and engagement
Gullslett, 2021[231]	What safety issues did you
Hardy, 2021[238]	experience delivering care via telehealth? Unsupervised exercise/incorrect technique
Hunter, 2021[248]	
Imlach, 2020[251]	What barriers did you experience
Isautier, 2020[252]	delivering physiotherapy care
Iyer, 2021[255]	via telehealth? Lack of physical touch

Author, Year	Author Defined Theme
Jassil, 2022[258]	having a device with larger screen (e.g., desktop, laptop or tablet), a minimum internet bandwidth and instruction for them to follow. As a result, these participants felt that having access to the tele-exercise classes provided them with the much-needed support to engage in physical activity and helped to increase their motivation to keep active during this challenging period The tele-exercise classes gave them something to look forward to and enabled them to interact with others, as well as expand their social networks, which appeared to help them cope with the social isolation caused by the pandemic One of the advantages of tele-exercise classes that was reported by a few participants was feeling less self-conscious and intimidated by their peers, compared to attending in-person classes at the gym. These participants did not feel they were being judged because of their physical limitations or feel they were in competition with others in the tele-exercise classes
Javanparast, 2021[259]	What barriers did you experience
Javanparast, 2021[260]	delivering physiotherapy care
Jimenez-Rodriguez, 2020[261]	via telehealth? Poor room setup
Johnson, 2021[263]	Continuum of Acceptance of Telehealth
Kang, 2020[266]	Benefits or Detractors
Kang, 2021[267]	Participants emphasized that they liked being able to see the nurse and perceived greater accessibility regarding scheduling visits
Kolin, 2021[274]	it would be helpful if the complexity of connecting to the virtual platform and WiFi connectivity issues could be resolved.
Krawczyk, 2021[277]	Another area of satisfaction among participants was the ability to discuss their concerns with their telehealth nurse. The consistency of having the same telehealth nurse at each VNV was also appreciated
Krok-Schoen, 2021[278]	Telehealth and teleconferencing provides benefits to both staff and patients but some patients are not served well by it
LaRoche, 2021[283]	Patient-friendly, no travel time, no need to mobilize family for travels
Luckett, 2021[290]	Through apps possible to draw attention to important aspects of disease or treatment
Macchi, 2021[294]	Poor availability of patients by phone
Malden, 2021[296]	No difference in payment of remote and physical consultations
Marshall, 2021[300]	Many decision moments while insufficient information available
Martin, 2021[301]	Continued willingness of organization to speed up ehealth
Murphy, 2021[311]	More often use of telephone consultations, replacing physical contacts
Nagra, 2021[315]	Eye-opener for patients
Neumann-Podczaska, 2021[317]	Combination of telephone consultations and electronic PROM
Newman-Casey, 2021[318]	Full day telephone or video consultations is exhausting
Pagano, 2021[323]	All participants described their experience of the telephone consultation as positive, and as good as in-person care, with regard to communication, building rapport and information sharing.
Parkinson, 2021[326]	Satisfaction: travel and Access - scheduling
Parsons, 2021[327]	Positive Perceptions: Patients do not have to travel, find parking, or sit in waiting rooms
Philip, 2020[330]	Positive Perceptions: Provides RDNs with an opportunity to “look into” a patient’s refrigerator/pantry to better understand home environment and diet
Pogorzelska-Maziarz, 2021[331]2021[331]	Positive Perceptions: Patients more likely to keep appointments

Author, Year	Author Defined Theme
Robinson, 2021[344]	Positive Perceptions: Staff members able to continue seeing full caseload of outpatients during pandemic quarantine
Ross, 2021[348]	Positive Perceptions: Allows Registered Dietitian Nutritionists (RDNs) to provide timely patient services while patients remain safe at home
Saliba-Gustafsson, 2020[354]	Expressions about
Samuels-Kalow, 2022[428]	Recommendations included phone and technical support, including detailed instruction on the use of the platform via phone call with video tutorials and step-by-step instructions Suggested solutions included providing detailed training and technical support for families accessing telehealth ser- vices, with video options Some Spanish-speaking families suggested that the clinic assist families without resources by allowing them to borrow technology similarly to what is being done by some schooling systems Several participants commented on how older individuals may struggle more with virtual visits
San Juan, 2021[355]	a hybrid model of care delivery could combine the advantages of face-to-face care, including developing the therapeutic relationship, with the advantages of remote care, such as flexibility and reduced need for travel A blend of face-to-face and digital support groups was also identified as beneficial to balance the advantages of both methods, with face-to-face perceived as facilitating stronger interpersonal connections, whereas online groups provided greater flexibility and anonymity, which was sometimes preferred One person additionally stated that NHS crisis helplines did not offer support in different languages despite being promoted in several languages Several participants identified aspects of telemental health that they would like to see incorporated into their care in the future Overall, however, many participants expressed a preference to return to face-to-face for relational appointments such as psychological therapy in the future Needs not being met by helplines which were thought to be available 24/7 was perceived as a risk to personal safety There were also reports of people feeling that non-verbal signals of escalating distress and agitation were being missed by clinicians, particularly over the telephone, potentially leading to safety concerns Some people described feeling unsafe during remote consultations either due to a lack of privacy and safety at home, and this sometimes led to a pause in treatment
Schoebel, 2021[359]	the use of virtual
Searby, 2021[361]	visits with
Sharma, 2022[367]	Lack of skill in operating technology prevented them from feeling comfortable utilizing video appointments Many participants who themselves felt comfortable with technology expressed concern that elderly family members would struggle Most participants used the portal and found it to be mostly user-friendly Of participants who expressed they had low digital literacy nearly all struggled with the portal or did not use it. A few participants had trouble accessing the teleconferencing application required for video appointments from the portal. Many participants believed that, although their medical concerns could be addressed virtually, seeing their provider f2f would confer a diagnostic and therapeutic benefit fear of who might be listening in on either end of a video appointment fear of who otherwise might have access to the content of a video appointment
Shklarski, 2021[369]	patients

Author, Year	Author Defined Theme
Silviero, 2021[372]	many women recognised the importance of mental health as well as physical health during pregnancy, childbirth, the post- natal period, and during the COVID-19 pandemic Whilst many women understood why appointments were changing so rapidly, concern often arose about the lack of in-person care, in re- lation to the growth and wellbeing of the baby during pregnancy or of their newborn infant Many women expressed they had less postnatal care than expected, and often felt mental health care was lacking virtual care was often discussed as an inappropriate medium through which to conduct health checks, especially postnatally, during which time both newborns and new mothers required attention
Singla, 2022[375]	With COVID-19 restrictions resulting in children and spouses learning and working remotely, these participants stated the need to overcome a lack of the privacy to participate, especially while needing to homeschool children, or while living in a small space
Sloan, 2022[377]	Clinicians significantly over-estimated the convenience for patients compared with patient views and many patients reported that they weren't given appointment times for telemedicine in the same way as for face-to-face, leading to greater inconvenience for some. Administrative staff triaging and 'gate-keeping' was particularly disliked; and there were reports of being made to feel 'like I was making a fuss' or being refused access, sometimes with life-threatening consequences Cost-cutting, clinical need or choice?
Sloan, 2022[378]	Administrative barriers were frequently encountered by patients, often without clinicians' knowledge: 'Counted and. . .tried 121 times to get through to GPs'
Smith-MacDonald, 2022[380]	Participants questioned how to best manage client disclosures of suicidal ideation, intent of harm to self or others, or domestic violence. Dealing with such situations was identified as the primary reason that using digital health was uncomfortable and anxiety provoking
Smithson, 2021[381]	building and maintaining relationships between family and healthcare providers.
Snyder, 2021[383]	standardized COVID-19 messaging
Srinivasan, 2020[384]	pandemic-related goals
Stanhope, 2022[385]	Despite the noted convenience of phone visits and noted inconveniences of in-person visits, the majority of women preferred inperson visits for the opportunity to be physically checked. one patient who did not want phone visits to be part of care for a future pregnancy Another described missing the reassurance of ultrasounds. another patient described frustration after coming to her doctor with pain and being assumed to have a sexually transmitted disease (STD)
Stewart, 2021[387]	benefits of telehealth
Stifani, 2021[388]	drawbacks to telehealth
Subotic, 2020[389]	The facilitator experienced online delivery as more challenging than in-person, with some unanticipated issues.
Taylor, 2021[429]	Although a smaller group may make a difference, the facilitator thought that this was not likely because of the constraints imposed by the technology on the spontaneity and flow of conversation.
Treitler, 2021[393]	The facilitator also found it difficult to monitor the facial expressions and body language of individual participants when the video material was being shared on screen because of the minimized screens (and thus the size of participants' faces).
Triantafillou, 2021[394]	During weekly supervision, the therapist expressed her sense that she may not be getting the key messages through to specific participants.

Author, Year	Author Defined Theme
Tuijt, 2021[396]	The facilitator reflected that the online format mitigated the tendency for participants to look to the leader as an expert and seek opinions on what to do in particular situations.
Turchetti, 2021[397]	The attendance was higher than any previous group and all parents stated that they would recommend the online group to a friend
Uscher-Pines, 2020[399]	This result was better than our attendance rates for face-to-face groups, as illness in children and participants is the main cause of missed sessions
Van Dam, 2022[403]	Most participants expressed that telehealth can be a very good service and most preferred telehealth over face-to- face consultations. Participants largely preferred the convenience of telehealth for routine consultations, but many indicated that a consultation to discuss a new diagnosis or one requiring a physical examination was better face to face. Appropriate telehealth also related to being comfortable at home, as this led to more robust conversations with health care professionals. Most participants reported having to wait for their consultation, but observed it was often for less time than for a face-to- face consultation and it was more convenient because it was in the comfort of their own homes. Some participants expressed concerns that being on the phone could lead to losing the personal and practical connection with their health care professional, who may not understand the context surrounding the participant's illness/es. Some participants mentioned that the social interactions with their health care professionals had been diminished and this created a further sense of disconnection. Most participants expressed that they felt that their privacy was protected through telehealth methods. Most participants did not think that maintaining confidentiality was a concern. It was mentioned that protecting patient privacy could be a problem if the participant engaged in a telehealth consultation in a public space.
van Gelder, 2021[405]	Parents commented on the benefits of the program, including the immediacy of applying the model
Venville, 2021[406]	During the post-group interviews parents described the positive improvements in their relationship with their children
Walters, 2022[407]	Many participants noted that the COVID-19 contact-limiting protocols shepherded in new policies that patients benefited from, with the most well-received change being decreased requirements for in-person treatment and increased daily doses of medication to take home In addition to increasing medication take-homes, some New York City participants discussed how methadone clinics instituted a medication delivery system The most well-received changes were increased medication take-home dosages, medication home deliveries, and telehealth.
Wilson, 2021[413]	Retaining independence and social connectedness
Wood, 2021[415]	Adapting social connectedness in the face of the pandemic
Yelverton, 2021[416]	Managing social connections within and through the group intervention
Zhu, 2021[420]	Teleconsultation as a tool to limit follow-up interruptions.

Author, Year	Author Defined Theme
Silviero, 2021[372]	Whilst many women understood why appointments were changing so rapidly, concern often arose about the lack of in-person care, in relation to the growth and wellbeing of the baby during pregnancy or of their newborn infant Many women expressed they had less postnatal care than expected, and often felt mental health care was lacking virtual care was often discussed as an inappropriate medium through which to conduct health checks, especially postnatally, during which time both newborns and new mothers required attention
Allison, 2022[141]	Although only five adolescents interviewed had alone time with the provider during their telehealth visit, when asked if finding privacy would be challenging when at home most were not concerned about confidentiality adolescents gaining access to their own patient portal (i.e., a secure virtual platform where patients can communicate with their providers or view their medical information) at 13 years old aided in providing confidential health care services and fostered feelings of autonomy for the adolescent adolescents generally reported being comfortable with time alone with the provider
Van Dam, 2022[403]	Most participants expressed that they felt that their privacy was protected through telehealth methods. Most participants did not think that maintaining confidentiality was a concern. It was mentioned that protecting patient privacy could be a problem if the participant engaged in a telehealth consultation in a public space.
Ladin, 2021[281]	Patients worried about quality care and home diagnostics Patients appreciated the relaxed home environment and reducing COVID-19 risks
Barton, 2022[154]	Telehealth had value, but generally perceived as inferior to inperson care Challenges related to assessment, diagnosis, ‘hands on’ treatment, observation, communication, and technology
Stanhope, 2022[385]	Another described missing the reassurance of ultrasounds. another patient described frustration after coming to her doctor with pain and being assumed to have a sexually transmitted disease (STD)
San Juan, 2021[355]	Needs not being met by helplines which were thought to be available 24/7 was perceived as a risk to personal safety There were also reports of people feeling that non-verbal signals of escalating distress and agitation were being missed by clinicians, particularly over the telephone, potentially leading to safety concerns Some people described feeling unsafe during remote consultations either due to a lack of privacy and safety at home, and this sometimes led to a pause in treatment

Author, Year	Author Defined Theme
Jassil, 2022[258]	As a result, these participants felt that having access to the tele-exercise classes provided them with the much-needed support to engage in physical activity and helped to increase their motivation to keep active during this challenging period The tele-exercise classes gave them something to look forward to and enabled them to interact with others, as well as expand their social networks, which appeared to help them cope with the social isolation caused by the pandemic One of the advantages of tele-exercise classes that was reported by a few participants was feeling less self-conscious and intimidated by their peers, compared to attending in-person classes at the gym. These participants did not feel they were being judged because of their physical limitations or feel they were in competition with others in the tele-exercise classes
Singla, 2022[375]	With COVID-19 restrictions resulting in children and spouses learning and working remotely, these participants stated the need to overcome a lack of the privacy to participate, especially while needing to homeschool children, or while living in a small space
Sharma, 2022[367]	Many participants believed that, although their medical concerns could be addressed virtually, seeing their provider f2f would confer a diagnostic and therapeutic benefit fear of who might be listening in on either end of a video appointment fear of who otherwise might have access to the content of a video appointment
Sloan, 2021	Clinicians significantly over-estimated the convenience for patients compared with patient views and many patients reported that they weren't given appointment times for telemedicine in the same way as for face-to-face, leading to greater inconvenience for some. Administrative staff triaging and 'gate-keeping' was particularly disliked; and there were reports of being made to feel 'like I was making a fuss' or being refused access, sometimes with life-threatening consequences
Dennet, 2021[192]	For some participants, the lack of access to the physical environment and lack of physical contact with the health professional for the purpose of examination or demonstration were a limiting factor of telehealth.
Smith-Mac-Donald[380]	Participants questioned how to best manage client disclosures of suicidal ideation, intent of harm to self or others, or domestic violence. Dealing with such situations was identified as the primary reason that using digital health was uncomfortable and anxiety provoking
Sloan, 2022[378]	Administrative barriers were frequently encountered by patients, often without clinicians' knowledge: 'Counted and. . .tried 121 times to get through to GPs'
Mozes, 2002[309]	Wait times for telehealth appointments were too long

Table D.21. Author defined satisfaction and dissatisfaction identified in quantitative studies (Key Question 3)

Author, Year	Survey Questions

Adams, 2021[137]	My doctor can get a good understanding of my current health My doctor answers my questions My doctor deals with my problems I can explain my medical problems Telehealth is as satisfying as talking in person My doctor can get a good understanding of my current health My doctor answers my questions My doctor deals with my problems I can explain my medical problems Telehealth is as satisfying as talking in person My doctor can get a good understanding of my current health My doctor answers my questions My doctor deals with my problems I can explain my medical problems Telehealth is as satisfying as talking in person My health is better My health is better My health is better I can always trust it to work My privacy is protected during consults I would continue to use telemedicine after COVID-19 I can always trust it to work My privacy is protected during consults I would continue to use telemedicine after COVID-19 I can always trust it to work My privacy is protected during consults I would continue to use telemedicine after COVID-19 My doctor engages me in my care I am more involved in my care I follow my doctor's advice better My doctor engages me in my care I am more involved in my care I follow my doctor's advice better My doctor engages me in my care I am more involved in my care I follow my doctor's advice better Telehealth is a convenient form of healthcare for me In general, I am satisfied Telehealth is a convenient form of healthcare for me In general, I am satisfied Telehealth is a convenient form of healthcare for me In general, I am satisfied I manage my health and medical needs better I manage my health and medical needs better I manage my health and medical needs better

Author, Year	Survey Questions
Al Izzi, 2020[138]	Has your opinion on the applicability of virtual clinics for Maxillofacial Surgery changed in the wake of the COVID-19 pandemic? Do you think that you would continue to incorporate virtual clinic technology in your clinical practice post-COVID-19, assuming face to face consultations could return to preCOVID-19 levels?
Aleboyeh, 2021[139]	successful visit
Alkureeishi, 2021[140]	video visits compared to in-person visits: more documentation time video visits compared to in-person visits: more visit time video visits compared to in-person visits: more preparation time video visits compared to in-person visits: more patient trust video visits compared to in-person visits: more level of distraction video visits compared to in-person visits: more shared decision making video visits compared to in-person visits: more connection with patients video visits compared to telephone visits: more documentation time video visits compared to telephone visits: more visit time video visits compared to telephone visits: more preparation time video visits compared to telephone visits: more patient trust video visits compared to telephone visits: more level of distraction video visits compared to telephone visits: more shared decision making video visits compared to telephone visits: more connection with patients
Atay, 2021[147]	prefer TM: need to keep abortion a secret from partner or family prefer TM: i would rather keep my abortion private prefer TM: I would be more comfortable at home prefer TM: coronavirus prefer TM: I would rather take care of my own abortion prefer TM: It is hard to access abortion because of childcare prefer TM: I would rather have my partner or friend with me during the process prefer TM: stigma prefer TM: other reason prefer TM: abusive partner prefer TM: I find it empowering prefer TM: undocumented immigrant
Baadjou, 2020[148]	Clinicians reported moderate importance of having an already established therapeutic relationship for the quality of rehabilitation via videoconferencing Pre-COVID only moderately comfortable with videoconferencing After 4 weeks of experience, the clinicians reported feeling much more comfortable with videoconferencing effort needed to switch to videoconferencing was perceived as relatively low Prior to the COVID-19 pandemic, the clinicians reported moderate dread of the use of videoconferencing in pain rehabilitation MDs report overall moderate to high confidence with TH MDs report moderate to high satisfaction clinicians reported it was likely that they would continue to use videoconferencing for pain rehabilitation after the COVID-19 pandemic

Author, Year	Survey Questions
Banks, 2021[149]	How was your overall experience having an appt over the telephone? Pre-COVID - excellent How was your overall experience having an appt over the telephone? Pre-COVID - good How was your overall experience having an appt over the telephone? Pre-COVID - fair How was your overall experience having an appt over the telephone? Pre-COVID - poor
Barba, 2021[150]	was the telephone interview useful to check your state of health? was the telephone interview an adequate healthcare tool in consideration of covid-19 outbreak? could the telephone interview replace the conventional visit?
Barsom, 2021[152]	If I would have needed technical support, then I knew where and how I could ask for it "In general, I am satisfied with the quality of the video connection I think patients are able to use a VC I have discussed everything I needed to discuss during the video consultation I have discussed everything I needed to discuss during the video consultation I think it is easy to use a VC Even when this pandemic is over, I would like to use a video consult with my healthcare provider in the future Even when this pandemic is over, I would like to use a video consult with my healthcare provider in the future The equipment I needed to use a VC was available The use of VC fits the current workflow at the outpatient clinic I think this video consultation had the same value as if I had a physical appointment at the hospital I think video consultation is a good solution to continue the provision of healthcare during this pandemic I would recommend a video consult to other patients/ providers (who provider care to patients) who are not able or not allowed to attend a physical appointment at the hospital I am satisfied with the care I received during the video consult I think this video consultation had the same value as if I had a physical appointment at the hospital I think video consultation is a good solution to continue the provision of healthcare during this pandemic I would recommend a video consult to other patients/ providers (who provider care to patients) who are not able or not allowed to attend a physical appointment at the hospital I am satisfied with the care I received during the video consult In general, I was able to assess the healthcare condition of my patients over a video connection In general, I was able to assess the state of mind of my patients over a video connection
Barth, 2021[153]	Overall satisfaction with consultation(s) with a physician Overall satisfaction with consultation(s) with a physician Overall satisfaction with consultation(s) with a therapist Overall satisfaction with consultation(s) with a therapist

Author, Year	Survey Questions
Bate, 2021[155]	perceived engagement felt safer being able to see their clinician through telehealth time saved: clinical consultation time saved: additional admin for clinicians time saved: additional admin for non-clinicians overall time saved Overall quality of telehealth willingness to use again perceived standard of care
Belcher, 2021[156]	Actual experience with telehealth after their March and April 2020 experience
Bennell, 2021[158]	
Bhuva, 2020[160]	very satisfied with telemedicine satisfied with telemedicine neutral with telemedicine dissatisfied by telemedicine very dissatisfied by telemedicine rather have telemedicine over in-person appointments prefer telemedicine over in-person
Birkhoff, 2021[161]	I was satisfied with the ability to see and talk to my nurse through this virtual nurse visit. I would like to see the virtual nurse visit used more often in my plan of care. I think I would use this system frequently I would recommend this virtual nurse visit to other patients like me. I was satisfied with the education I received on how to use Zoom for this virtual nurse visit.
Bos, 2021[163]	I would all use TCs next year I would recommend TCs to my colleagues TCs offer added value in the treatment of my parents I find the me expenditure of TCs acceptable I am motivated for TCs I find the energy expenditure for TCs acceptable I find it easy to use TCs I am satisfied with the use of TCs
Cavagna, 2020[175]	Willingness to do TM Preferring to do TM over in person
Champion, 2021[176]	usefulness of the appointment quality of patient education received at the appointment ease of scheduling the appointment ease of attending the appointment

Author, Year	Survey Questions
Chen, 2021[178]	Effectiveness in asking/relaying questions/concerns Effectiveness of doctor answering questions/concerns Effectiveness of patient communicating questions/concerns Difficulty in arranging telehealth visit Difficulty in coordinating and setting up telehealth visits Confidence in accuracy of diagnoses/assessments Overall satisfaction with telehealth visit In absence of COVID-19, prefer telehealth to in-person, n (%) Overall satisfaction with telehealth visit Will continue to use telehealth after COVID-19 pandemic
Costa, 2021[185]	prefer in person to video sessions prefer video to in person sessions would like to continue seeing their mental health care provider by video sessions after the stay at home recommendations are lifted
Cronin, 2020[187]	satisfaction with the telephone follow-up in comparison to a hypothetical face-to-face encounter
Dahl-Popolizio, 2020[188]	I had fewer no-shows for telehealth visits than I usually have for in-person visits I was able to achieve established patient goals via telehealth I achieved similar health outcomes using telehealth as I would have expected in person In my professional opinion, telehealth is an effective platform for the delivery of OT services Telehealth should be a treatment platform option for the delivery of OT services permanently for those conditions that can be treated successfully via telehealth I was able to be sufficiently productive using telehealth I was satisfied with telehealth as a delivery platform I would recommend telehealth as a service delivery platform to my friends and family members Patients were satisfied with telehealth as a delivery platform Caregivers were satisfied with telehealth as a delivery platform
Datta, 2021[190]	reported very high satisfaction from receiving care via telemedicine services reported high satisfaction from receiving care via telemedicine services reported intermediate satisfaction from receiving care via telemedicine services The convenience of using the secure video platform integrated into the electronic medical record system was regarded as being ‘‘very easy” The convenience of using the secure video platform integrated into the electronic medical record system was regarded as being ‘‘intermediate” The convenience of using the secure video platform integrated into the electronic medical record system was regarded as being ‘‘difficult” definitely to continue care via the telemedicine format after the pandemic is no longer a concern would prefer a face-to-face assessment if their symptoms worsen

Author, Year	Survey Questions
Di Lalla, 2021[194]	radiation oncologists satisfactorily explained treatments by TM liked that initial consultation was conducted by TM dissatisfied by TM satisfaction with initial appointment
Dinuzzi, 2021[197]	Satisfaction (extremely) Will use telemedicine again
Dozieres-Puyravel, 2021[199]	avoids some challenges related to coming to the outpatient department for their disabled child satisfied with TC feeling that it allows answering questions in a better manner than a clinic at the hospital physician is more distant with TC. sparing the time to travel to the hospital as well as the time in the waiting room TC could replace clinic on site of the hospital
Dramburg, 2021[200]	impact of TM services on clinical routine desire to continue using TM in the future
Erben, 2021[203]	Patient rating telemedicine visit as very good
Fieux, 2020[206]	I could easily communicate and tell my doctor my health problems TH easy to use TH saved time The teleconsultation made me nervous The teleconsultation made me nervous I think the consultation was as effective as if it had been at the hospital I would use teleconsultation again Overall, I was satisfied with the teleconsultation TH satisfaction great help in context of health crisis wish to continue using it after crisis
Finn, 2021[208]	Telehealth Usability Questionnaire Baseline Telehealth Usability Questionnaire Endline Would wish to continue in person if it were safe Would wish to continue with telehealth
Fisher, 2020[209]	Telephone appointment experience Video appointment experience Telephone appointment experience Video appointment experience
Fonseca, 2020[210]	it was useful to conduct telephone visits for future follow-up would like to try a video call option higher percentage of patients with drug resistant-epilepsy preferred face-to-face visits satisfied with telephone visits during confinement predictor of a better perception of telemedicine in the future: patients with a greater fear for COVID-19
Futterman, 2021[216]	mean satisfaction score: telehealth

Author, Year	Survey Questions
Gabe-Walters, 2021[217]	I found doing the virtual/phone consultations difficult Virtual contact has shown me that I do not need to review patients as regularly as I did Virtual contact promotes value-based health care ‘Reducing the risk of lymphoedema’ assessment sessions could be virtual I have discharged more patients over the telephone than I would have normally All follow-ups could be virtual We should continue with the first appointment being virtual/by phone after this current period patients may be more able to self-manage than previously presumed
Gately, 2021[218]	ability to hear clearly ability to see clearly easy to communicate comfort with technology enough technical assistance the process of sharing the story being worthwhile having the medical care team read the story will help them provide better treatment
Gava, 2021[219] Gava, 2021[219]	satisfaction with telemedicine for endocrine care satisfaction with telemedicine for mental health care
Greven, 2021[230]	Do you normally have to take off work for in-person visits? How satisfied were you with your visit? Compared to previous in-person visits with Dr. ______ or a comparable specialist, how would you compare your telemedicine visit? Would you use telemedicine for a visit in the future? For this particular visit (initial visit, follow-up) would you have preferred to have an in-person or a telemedicine visit? Do you normally require assistance to get to in-person visits? Did your telemedicine visit require you to take off of work? Would you feel comfortable proceeding with surgery based on a telemedicine visit alone? Would you feel comfortable proceeding with a minor procedure (i.e., injection) based on a telemedicine visit alone?

Author, Year	Survey Questions
Hamad, 2021[235]	courtesy/respect of provider treatment explanation of provider ease of teledermatology visit ease of teledermatology visit - new ease of teledermatology visit - existing pre-visit planning thoroughness/skillfulness of provider length of time with provider length of wait time personal comfort with using teledermatology overall experience using teledermatology overall satisfaction - new patients overall satisfaction - existing patients personal comfort with using teledermatology - new personal comfort with using teledermatology - existing pre-visit planning - new pre-visit planning - existing
Hardy, 2021[238]	Helpfulness of couple teletherapy training Helpfulness of general teletherapy training End results of teletherapy appear similar to traditional therapy Couples appeared to respond well to teletherapy Sense of working effectively with conflict in teletherapy Couples' responsiveness to "conflict interruptions" Sense of comfort distributing couple teletherapy Sense of competence distributing couple teletherapy Couples experienced teletherapy similarly to traditional therapy Intentionality keeping individual time private from other partner How well traditional method(s) work in couple teletherapy Likelihood of providing couple teletherapy post-COVID-19 Likelihood of pursuing additional training post-COVID- 19 Overall satisfaction with results of couple teletherapy

Author, Year	Survey Questions
Hasson, 2021[239]	Were able to clarify their physical and mental condition Explanation and treatment plan were clear Perceived having eye contact with the treating physician Felt physician was patiently listening Felt all their needs were met Felt their concerns were acknowledged clear treatment plan clear treatment plan Reasons to continue TM: felt safer at home Reasons to continue TM: reduced risk of covid Reasons to continue TM: med treatment was not compromised Reasons to continue TM: reduced risk from other infections Felt all relevant medical records were available to the physician Felt that the absence of an in-person visit harmed their treatment same treatment quality felt better regarding their concerns
Hentati, 2021[241]	Has the coronavirus pandemic changed your desire to be seen in person by a provider? Advantages of TH: safety Do you think anything was missed or not addressed because you were not seen in person? Would you do another virtual visit in the future if the pandemic ends and you could be seen face to face in clinic? Do you prefer the virtual visit experience to being seen in person, assuming the same quality of care? Do you feel that your needs were met via virtual visit? Do you feel that communication in your virtual visit was the same, better, or worse compared to being seen in person? Advantages of TH: Availability of provider Advantages of TH: Convenience Advantages of TH: No time off work Advantages of TH: No travel Advantages of TH: time saving Advantages of TH: visit not rushed Advantages of TH: none Disadvantages of TH: none Changes to TH: lower cost Changes to TH: Improved scheduling and coordination Changes to TH: Improved tech Changes to TH: Incorporation of diagnostic testing Changes to TH: none
Holcomb, 2020[245]	prefer virtual visits needs were met by virtual visit

Author, Year	Survey Questions
Humer, 2020[246]	telephone-based psychotherapy is comparable to in-person psychotherapy actual experiences with telephone-based psychotherapy were better than previously expected web-based psychotherapy is not comparable to in-person psychotherapy actual experiences with web-based psychotherapy were better than previously expected
Iacopi, 2021[250]	Have you found the contact useful regarding your health condition? Have you been given useful information for the management of your pathology? Do you think that this way of interacting between you and the doctors should be continued even after the end of the emergency?
Imlach, 2020[251]	Concern about not being seen (video) Concern about not being seen (phone) All respondents were asked what telehealth services they would like in the future (video) All respondents were asked what telehealth services they would like in the future (phone) High overall satisfaction with telehealth (video) High overall satisfaction with telehealth (phone)
Israilov, 2020[253]	medical teams were receptive to working with TPMVs
Itamura, 2021[254]	Did the care provider give you enough information Did the care provider seem to know your medical history significantly higher satisfaction scores for patients of in-person visits compared to those of virtual visits for the questions regarding careful listening significantly higher satisfaction scores for patients of in-person visits compared to those of virtual visits for the questions regarding knowledge of the patient’s medical history Was this method of connecting with a care provider easy to use? Did you trust the care provider? how likely would you be to recommend this facility to your family and friends? significantly higher satisfaction scores for patients of in-person visits compared to those of virtual visits for the questions regarding likelihood to recommend to family and friends
Iyer, 2021[255]	This video/telephone visit provided me with information similar to an in-person visit This video/telephone visit allowed me to provide information similar to an in-person visit Converting to a video/telephone visit allowed me to access care in a difficult time Converting to a video /telephone visit allowed me to provide care in a difficult time This video/telephone visit allowed me to feel better by limiting exposure to others for virus prevention As a result of this visit, I feel more comfortable with using video or telephone visits in the future Overall, I feel satisfied with this scheduled visit This video/telephone visit allowed me to feel better by limiting exposure to others I was satisfied with this scheduled visit

Author, Year	Survey Questions
Jaclyn 2021[256]	High level of convenience Desired frequency of future virtual visits: all visits Desired frequency of future virtual visits: most visits Desired frequency of future virtual visits: some visits Desired frequency of future virtual visits: no visits High level of satisfaction Felt all issues and concerns were addressed adequate time to speak with the care team
Jang, 2021[257]	convenience of the KM telemedicine center system patient satisfaction score for treatment their willingness to recommend the KM telemedicine center to acquaintances Satisfaction with using telephone
Jimenez-Rodriguez, 2020[261]	videoconference consultations are an adequate option for providing healthcare
Johnsen, 2021[262]	General practitioner's perception of patient satisfaction with video consultation Suitability of video consultation compared to a face-to-face consultation for the same reason Suitability of video consultation to assess the severity of the main reason for contact compared to a face-to-face consultation Loss from not being able to examine the patient physically Concern about not picking up signs of serious illness General practitioner's satisfaction with technology (connection, sound, image) Motivation to conduct a video consultation for a similar health problem (reason for contact) in a nonpandemic future
Joughin, 2021[264]	found virtual consultations more convenient than face-to-face rated the quality of the consultation as excellent rated the quality of the consultation as very good rated the quality of the consultation as good video consultations were rated adequate to deliver preoperative assessment, medical optimization, and shared decision-making telephone consultations were rated adequate to deliver preoperative assessment, medical optimization, and shared decision-making
Joyce, 2021[265]	numerical rating of program (1 being the worst and 10 best)

Author, Year	Survey Questions
Kang, 2020[266]	Was the quality of the video or call good enough? had more confidence in care they received as they were able to see the clinician's face and that they found it easier to describe their symptoms Did the care provider listen carefully to you? Did you know what to do if you have more questions afterwards? Were you able to talk to a care provider in a timely manner? significantly higher satisfaction scores for patients of in-person visits compared to those of virtual visits for the questions regarding patient's satisfaction with the amount of information offered by the provider it's easy to join the consultation. preferred a video consultation to a face-to-face consultation as it was safer and more convenient would recommend video consultations to others what number would you use to rate this provider? significantly higher satisfaction scores for patients of in-person visits compared to those of virtual visits for the questions regarding overall provider rating
Kasturi, 2021[268]	I felt comfortable communicating with my rheumatologist during the telehealth visit telehealth is an acceptable way to receive health care services telehealth visit was the same quality as an in-person visit
Kaufman, 2021[269]	difficulties using phone counseling: interpersonal or communication difficulties difficulties using video counseling: interpersonal or communication difficulties median score for organizational difficulties (IQR) phone consultation was inferior to usual face-to-face consultation phone consultation was similar to face-to-face consultation phone consultation was superior to face-to-face consultation difficulties using phone counseling: conducting session in home environment video consultation was inferior to usual face-to-face consultation video consultation was similar to face-to-face consultation video consultation was superior to face-to-face consultation median score for overall quality (IQR) difficulties using video counseling: conducting session in home environment
Kayser, 2021[270]	patient reported satisfaction with clinical assessment patient reported satisfaction with technical aspects
Kazi, 2021[64]	Preference for synchronous visits Preference for synchronous visits for return patients Preference for synchronous visits for complex dermatology patients Asynchronous visits preferred by providers (primary reason being better image quality)

Author, Year	Survey Questions
Kenney, 2021[271]	Getting list of tests/scans needed Future Visit Preference: All/almost all virtual visits Discussing emotional health Asking about worrisome symptom Learning about prior cancer treatment Overall satisfaction: Completely Overall satisfaction: Very Overall satisfaction: Moderately Overall satisfaction: Slightly/Not at all Helpfulness compared to in-person visits Met clinical care objectives Overall satisfaction: Completely Overall satisfaction: Very Overall satisfaction: Moderately Overall satisfaction: Slightly Overall satisfaction: Not at all
Klamroth-Marganska, 2021[273]	experienced it as positive or mostly positive experienced it as negative or mostly negative occupational therapists experienced telemedicine significantly more positive than midwives
Korecka, 2020[275]	Comparability of psychotherapy via the internet with psychotherapy in personal contact was significantly correlated only with the number of patients treated by internet Psychotherapists who began to treat a higher number of patients via telephone during COVID-19 had more positive actual experiences with psychotherapy via telephone compared to previous expectations Psychotherapists who began to treat a higher number of patients via internet during COVID-19 had more positive actual experiences with psychotherapy via internet compared to previous expectations (positive/negative
Koziatek, 2020[276]	satisfaction likelihood to recommend likelihood to use again likelihood to use again overall needs met
Kronenberger, 2021[71]	Could hear the audio well Could see the video well Testing this way was convenient Using the technology was easy Satisfied with video quality Satisfied with audio quality Satisfied with this testing method Would choose this testing method

Author, Year	Survey Questions
Lapadula, 2021[282]	Opportunity to evacuate doubts Clearly explained pregnancy Doctor's accent was easy to understand Doctor was polite and caring Easy to talk with doctor Overall consult quality Composite consult quality score Overall consult quality Composite consult quality score it allowed for good patient interaction Privacy and confidentiality were protected Satisfaction with Video quality Satisfaction with Audio quality Satisfaction with Overall quality of videocall Satisfaction with Video quality Satisfaction with Audio quality Satisfaction with Overall quality of videocall Good overall consultation quality telemedicine system was both reliable and adequate for providing neonatal consults telemedicine is an effective way of delivering healthcare information to patients agreed that it is comparable in quality with in-person care agreed that they felt comfortable providing advice to patients via telemedicine agreed with feeling relieved delivering consults through telemedicine agreed that their overall feeling about the use of telemedicine for prenatal consultations was good. agreed that they had received adequate training in use of the telemedicine system for providing virtual neonatal visits
LaRoche, 2021[283]	Support for TM provision of medication abortion during the pandemic

Author, Year	Survey Questions
LeBrun, 2021[285]	Did you experience the same degree of attention and interaction with your physician as you would expect in the examination room? Do you feel that you were able to discuss all or most of your concerns during the consultation? What positive things did you experience during the virtual consultation? Opportunity for the physician to assess your home environment and how it may affect your recovery What negative things did you experience during the virtual consultation? A sense of decreased interpersonal connection with your physician Did you find an increase in convenience and flexibility with virtual follow-up care compared with outpatient treatment? Did you find an increase in convenience and flexibility with virtual follow-up care compared with outpatient treatment? Compared with in-person visits, how would you rate your personal engagement and attentiveness to your own health and recovery? How satisfied are you with the support you received during the transition process to TM at HSS? Overall, compared with standard outpatient treatment, how would you describe your telemedicine experience? Would you consider continuing telemedicine care in addition to outpatient treatment at HSS? What positive things did you experience during the virtual consultation? Less anxiety and stress related to traveling to the clinic, navigating the hospital, etc. What positive things did you experience during the virtual consultation? Feeling more at ease and in control being in a familiar environment What positive things did you experience during the virtual consultation? longer appt time What negative things did you experience during the virtual consultation? shorter appt time
Lee, 2021[286]	Telehealth provides for my patient's healthcare needs I feel comfortable communicating with the patient using the telehealth system Telehealth is an acceptable way to deliver healthcare services I would use telehealth services again I am overall satisfied with this telehealth system It was simple to use this system It was easy to learn to use the system I believe I could become productive quickly using this system The way I interact with this system is pleasant I like using the system The system is simple and easy to understand Overall usability (Total average)
Li, 2021[288]	level of satisfaction with telemedicine visits
Ludwig, 2021[291]	would not be willing to use remote med services for future
Lun, 2020[292]	general satisfaction with TH neutral satisfaction with TH maximum satisfaction prefer TH in the future for non-urgent follow-up satisfaction with virtual clinic preference from virtual clinic in the future
Lynch, 2021[293]	"If there were no health risks, would you prefer to have your sessions conducted in person? "Telehealth sessions are as good as in-person sessions for receiving the help I want

Author, Year	Survey Questions
Madden, 2020[295]	I am motivated to continue using telehealth in my practice Prior to COVID-19 I was motivated to implement telehealth into my practice
Manz, 2021[297]	would have preferred to have their visit conducted via telemedicine if done again, regardless of COVID-19 reported they would use telemedicine again if offered in the future The overall mean satisfaction of telemedicine visits Patients establishing care with the provider for the first time via telemedicine had a mean visit satisfaction of Telemedicine satisfaction was significantly greater in patients traveling more than 50 miles to the clinic Telemedicine satisfaction was significantly greater in patients seeking care for a fracture No significant differences in overall telemedicine satisfaction were found in patients grouped by age above or below 65 years, and those from a region with a median household income more or less than $55679 would use telehealth in the future virtual physical examination
Margolin, 2021[298]	satisfaction with convenience of the telemedicine encounter satisfaction with timeliness and efficiency of the telemedicine encounter Given the opportunity, I would choose to have some of their future visits via telemedicine satisfaction with shared decision making of the telemedicine encounter satisfaction with time spent of the telemedicine encounter satisfaction with communication of the telemedicine encounter satisfaction with explanations/counseling of the telemedicine encounter I was able to discuss sensitive topics about my cancer care I preferred a telemedicine visit, rather than an in-person visit The care I received is as good as the care I would receive at an in-person visit. satisfaction with overall telemedicine encounter satisfaction with communication of the telemedicine encounter satisfaction with explanations/counseling of the telemedicine encounter I was able to discuss sensitive topics about my cancer care I preferred a telemedicine visit, rather than an in-person visit The care I received is as good as the care I would receive at an in-person visit.

Author, Year	Survey Questions
Martin, 2021[301]	relationship with client worsened during TH relationship with client stayed the same during TH telephone counseling was less comfortable than in-person telephone counseling was as comfortable than in-person telephone counseling was more comfortable than in-person telephone counseling was less convenient than in-person telephone counseling was as convenient than in-person telephone counseling was more convenient than in-person telephone counseling addressed client anxiety less than in-person counseling telephone counseling addressed client anxiety same than in-person counseling telephone counseling addressed client anxiety more than in-person counseling telephone counseling addressed client depression less than in-person counseling telephone counseling addressed client depression same than in-person counseling telephone counseling addressed client depression more than in-person counseling telephone counseling addressed client anger less than in-person counseling telephone counseling addressed client anger same than in-person counseling telephone counseling addressed client anger more than in-person counseling telephone counseling addressed client substance less than in-person counseling telephone counseling addressed client substance same than in-person counseling telephone counseling addressed client substance more than in-person counseling telephone counseling addressed client recovery less than in-person counseling telephone counseling addressed client recovery same than in-person counseling telephone counseling addressed client recovery more than in-person counseling Overall satisfaction with TH: very dissatisfied/dissatisfied Overall satisfaction with TH: neither Overall satisfaction with TH: very satisfied/satisfied
Masi, 2021[302]	I believe that telehealth services work well for my child I am satisfied with the telehealth services on offer
Melian, 2021[304]	overall satisfaction: telephone overall satisfaction: in-person consult preference: checkup consult preference: initial consult consult preference: postoperative consult preference: total
Meno, 2021[305]	Preference for future telehealth visits my information was securely transmitted during my telehealth visit Telehealth is better or no difference I felt very comfortable with my telehealth visit Telehealth is better or no difference Telehealth is better or no difference

Author, Year	Survey Questions
Mertz, 2021[306]	electronic medical record–assisted telephone follow-up (E-TFU) doctors had understood their needs they had understood the medical advice received during the E-TFU had an opportunity to ask for clarifications it would have been easy to undergo E-TFU instead of standard follow-up satisfied with the duration would like to have a future E-TFU in a nonemergency situation agreed with the medical decision to replace the standard FU visit with E-TFU in the absence of a real sign of emergency to minimize hospital exposure Overall satisfied when comparing E-TFU with a standard FU visit. pandemic phase II was correlated with satisfaction with E-TFU
Miller, 2021[307]	Satisfaction with getting connected with you telehealth PT session Satisfaction with using telehealth tech once you were connected with your PT session Satisfaction with hearing and being heard during your telehealth PT session Satisfaction with seeing and being seen during your telehealth PT session Satisfaction with feeling safe during your telehealth PT session Satisfaction with feeling comfortable during your telehealth PT session Satisfaction with your telehealth PT or PT assistant Satisfaction with the additional information shar4ed in the telehealth PT session Satisfaction with how the telehealth PT session met your needs/expectations Satisfaction with your overall PT session
Mohammed, 2021[308]	integrate well into daily workflow
Mohammed, 2021[308]	lack of integration with their current EMR overall satisfaction - very satisfied overall satisfaction - satisfied overall satisfaction - neutral overall satisfaction - dissatisfied overall satisfaction - very dissatisfied concerned with patients overusing the virtual service
Mrugala, 2021[310]	Has switching to TM resulted in positive patient outcomes: quality of care Has switching to TM resulted in positive patient outcomes: quality of care virtual meetings, including tumor boards, were very helpful increased satisfaction of patients and families

Author, Year	Survey Questions
Mustafa, 2020[312]	prefer in-person: I prefer a more personal interaction Overall, I was satisfied with my telemedicine encounter: strongly disagree Overall, I was satisfied with my telemedicine encounter: disagree Overall, I was satisfied with my telemedicine encounter: neutral Overall, I was satisfied with my telemedicine encounter: agree Overall, I was satisfied with my telemedicine encounter: strongly agree My telemedicine encounter was as satisfactory as an in-person evaluation would have been: strongly disagree My telemedicine encounter was as satisfactory as an in-person evaluation would have been: disagree My telemedicine encounter was as satisfactory as an in-person evaluation would have been: neutral My telemedicine encounter was as satisfactory as an in-person evaluation would have been: agree My telemedicine encounter was as satisfactory as an in-person evaluation would have been: strongly agree most important reason you would prefer in-person encounter: in person care allows for a more personal interaction and more questions most important reason you would prefer a video/phone encounter: more convenient most important reason you would prefer a video/phone encounter: easier for an acute visit most important reason you would prefer a video/phone encounter: quicker access to an appt overall, I was satisfied with my encounter: video overall, I was satisfied with my encounter: phone most important reason you would prefer a video/phone encounter: routine FU or simple visit most important reason you would prefer a video/phone encounter: feel safer during covid pandemic most important reason you would prefer a video/phone encounter: safer option when I am feeling sick most important reason you would prefer a video/phone encounter: no testing or exam needed most important reason you would prefer a video/phone encounter: only if dr's office is closed most important reason you would prefer in-person encounter: in person care is better for serious conditions most important reason you would prefer in-person encounter: i have a greater comfort level in person
Nagra, 2021[315]	how comfortable respondents felt undertaking remote consultations
Neumann-Podczaska, 2021[317] Neumann-Podczaska, 2021[317]	Do you feel sufficient care and concern were provided during the consultation? Do you feel sufficient care and concern were provided during the consultation? has the consultation provided you with sufficient information regarding your treatment? has the consultation helped you with the reported complaints? would you take part in the consultation again?
Newman-Casey, 2021[318]	How would you rate your satisfaction with your eye care during the COVID-19 epidemic How much of the time do you worry about your eyesight
Padala, 2020[322]	expressed willingness to participate in telemedicine capable and willing to participate in telemedicine
Parikh, 2021[324]	My patients seem satisfied with receiving care through video visits
Park, 2021[325]	I felt I was able to express myself effectively as in-person visits I can explain patients' medical conditions well enough as in-person visits I think patients can understand their condition during telemedicine as in-person visits I would use telemedicine services again Overall satisfaction

Author, Year	Survey Questions
Peahl, 2021[329]	Virtual visits improve access to health services. I think having a blood pressure cuff is important for virtual prenatal care. I think having a fetal Doppler is important for virtual prenatal care. I was able to express myself effectively during virtual visits. The quality of virtual visits is the same as in-person care. I think the virtual visits are as safe as in-person visits. I felt well-prepared to do virtual visits. I think virtual visits are a positive change for patients. I am satisfied with doing virtual visits. After COVID-19, I would like to continue virtual visits.
Peden, 2020[433]	I would recommend virtual visits to friends & family I would like to use virtual visits for other types of care My need & expectations for standards of care were met by having this visit online
Pooni, 2021[332]	engaging the patient or patient caregiver to help conduct components of the virtual exam patient engagement did not change via telemedicine they felt that telemedicine moderately worsened patient engagement when compared to in-person clinical visits telemedicine significantly worsened engagement telemedicine improved patient engagement not able to elicit all the pertinent information needed to make a complete clinical assessment telemedicine did not change their (self-perceived) level of burnout increase in burnout
Popova, 2021[333]	visit rating questionnaire for TH visits visit rating questionnaire for in person visits overall opinion of TH visit overall opinion of in person visit

Author, Year	Survey Questions
Puteikis, 2021[334]	Patient complaints and medical history are collected reliably I missed some data or clinical findings because of providing telehealth rather than in-person services Reasons for worsening in the patients' condition during the pandemic (1—almost never, 3—in half cases, 5—almost always): worse availability of in-person consultations Treatment can be initiated or adjusted appropriately Prescriptions for current treatment can be reliably renewed I managed to provide consultations of usual quality for most of my patients I provided services for a smaller number of patients than usually I provided services for a smaller number of patients than usually They are as effective as in-person consultations They are as effective as in-person consultations Seizure semiology may be investigated equally well as in-persona telehealth usefulness score
Rahman, 2021[335]	satisfaction scores based on patient categories: new satisfaction scores based on patient categories: follow up
Rametta, 2020[336]	Family interested in telemedicine in the future Satisfaction with telemedicine encounter Incorporating telemedicine into follow-up
Reid, 2020[338]	Satisfaction with V-PED V-PED site visit was able to address their concerns Overall satisfaction with V-PED Telephone: satisfied or highly satisfied Telephone: goals of the encounter were completed successfully Telephone: Encounter successfully replaced in-person visit Video: satisfied or highly satisfied Video: goals of the encounter were completed successfully Video: Encounter successfully replaced in-person visit would complete another telemedicine encounter again, if given the chance
Rosengard, 2021[346]	Did you believe a telephone visit was an effective way to get your epilepsy care Did you believe a video visit was an effective way to get your epilepsy care
Rush, 2021[350]	reported that telemedicine was an acceptable service model and were satisfied with the quality felt comfortable using telemedicine would use telemedicine again

Author, Year	Survey Questions
Sagar, 2021[352]	Audio quality Punctuality Comfort with telephone consult Duration of consultation is just right Clear plan Prefer telephone visit if had choice next time TP clinics continue post COVID-19 Audio quality the ability to conduct thorough patient assessment better than face-to-face Telephone clinic prevent you making definitive patient plans a video appointment have been preferable to voice alone TP clinics continue post COVID-19 Overall experience Overall experience
Salehi, 2020[353]	Concern on certain aspects of the physical examination Telemedicine lacks intimacy and human connection My patients do not have access to the necessary technology Concerns regarding HIPAA compliance Concerns regarding liability and/or malpractice Visits are not reimbursed Concerns regarding interstate licensing Software is too complicated The software and/or equipment is too expensive for my practice Do you plan to incorporate telemedicine into your practice even after the COVID-19 pandemic subsides? What effect do you think telemedicine will have on field of facial plastic and reconstructive surgery I have no concerns
Saliba-Gustafsson, 2020[354]	Saving patients from unnecessary travel Increased access for vulnerable populations Ability to see my patients from my home or nonclinical location Reduced uncompensated work Flexible scheduling of patient visits Ability to see patients in their home environment Ability to connect with patients' caregivers/family members Other (providers listed various reasons)
Sathiyaraj, 2021[356]	ease of use satisfaction with experience preferred option: video visit using own device preferred option: video visit using clinic device preferred option: in person visit video visit compared to in person visit would use TH in the future recommend to family and friends

Author, Year	Survey Questions
Scherrenberg, 2021[357]	Are you prepared to pay for remote CR like for center-based CR sessions? I get more supported by the health professional during remote CR sessions Did you feel supported during remote CR sessions? Are you satisfied with the remote CR sessions you received during COVID-19? Would you prefer remote CR sessions over center-based CR sessions? Did you find it easy to participate in a video consultation? I am more motivated for CR via telephone or video consultation I think that remote CR sessions are more useful as center-based CR sessions There is more time for support and additional information during remote CR sessions
Serafini, 2021[362]	I express more than usually do during phone therapy appointments compared to in-person therapy appointments level of comfort during phone therapy appointments compared to in-person therapy appointments level of safety during phone therapy appointments compared to in-person therapy appointments Would you like remote psychiatry to remain an option when the EHHOP clinic opens for in-person visits The availability of remote psychiatry has helped me manage my overall mental health The availability of remote psychiatry has helped me manage my levels of anxiety The availability of remote psychiatry has helped me manage my levels of depression
Severe, 2020[363]	reason for choosing video: i wanted to be able to see my provider's face reason for choosing video: a video visit sounded more convenient factors in continuing virtual care: virtual visits are more convenient reason for choosing video: i felt comfortable using video technology reason for choosing video: i followed my provider's recommendation reason for choosing video: i felt more comfortable with a video visit reason for choosing video: i did not feel like it was a choice reason for choosing video: i wanted to make sure i could get my meds reason for choosing video: i was a new patient and that was the option offered to me reason for choosing phone: more comfortable with phone visit reason for choosing phone: provider recommendation virtual visits were as expected virtual visits were somewhat better than expected virtual visits much better than expected factors in continuing virtual care: reduces my risk of contracting covid factors in continuing virtual care: provider availability
Shah, 2021[366]	Satisfied or very satisfied with overall TH care Satisfies or very satisfied with choices they had in decisions regarding their own healthcare TH consultation conducted for an appropriate duration
Shivkumar, 2021[368]	Preference for Zoom video platform
Shklarski, 2021[369]	remote therapy can be as effective as in-person therapy I am comfortable working from home prefer remote psychotherapy more than in-person in comparison to before the pandemic, they now have a positive attitude toward tele psychotherapy

Author, Year	Survey Questions
Shklarski, 2021[370]	process of engaging clients remotely was similar to engaging clients in office much more effort was required to build or maintain the therapeutic working alliance notable difference between face to face therapy and remote therapy conducting therapy remotely during the pandemic had been challenging would not mind continuing to see clients remotely
Silver, 2021[371]	Mean Physician satisfaction +/- SD: cycle 1 Mean Physician satisfaction +/- SD: cycle 2 Mean Physician satisfaction +/- SD: cycle 3 Mean Physician satisfaction +/- SD: cycle 4
Singh, 2021[373]	spent a lot of extra time providing this care able to provide care efficiently able to provide care safely
Sklar, 2021[376]	Telehealth beliefs
Smith, 2021[379]	ability to establish rapport was equivalent Exam was equivalent during virtual care virtual care is equivalent to in-person care for identifying a patient's diagnosis ability to initiate medical therapy was equivalent ability to prescribe medication was equivalent explaining diagnosis and treatment was equivalent patient satisfaction was equivalent to in person care quality of care was equivalent physician satisfaction was equivalent
Smithson, 2021[381]	I felt comfortable to share sensitive and personal info I prefer virtual over in person appts I felt my health needs were met property appointment started on time length of time for the appointment was sufficient
Smrke, 2020[382]	I would like at least some future appointments to be performed using telemedicine satisfaction with telephone consultation telemedicine should become part of regular practice favoring its use for follow-up of patients on active surveillance favoring its use for follow-up of stable doses on oral anticancer medication
Stewart, 2020[386]	Experiences with teledermatology during COVID
Stifani, 2021[388]	Should keep telemedicine for contraception after Covid-19 Satisfaction with telemedicine visit Telemedicine visit met needs Likelihood of choosing telemedicine over in-person visit

Author, Year	Survey Questions
Taylor, 2021[429]	Factors associated with clinician confidence in TH: It was extremely important to have easy to use systems Factors associated with clinician confidence in TH: It was very important to get technical or administrative support quickly Much better patient satisfaction (telephone) reported Much better patient satisfaction (video) reported Factors associated with clinician confidence in TH: It was very important to triaging the most suitable patients

Author, Year	Survey Questions
Tse, 2021[395]	Staff are sensitive to my traumatic or difficult experiences I feel connected to my care team I can get an appointment when I want The quality of my life is improving I feel comfortable asking about treatment and medications I feel connected to my care team I can get support when I need it I feel comfortable asking about treatment and medications Staff talk to me about specific goals for my health The quality of my life is improving I can get support when I need it I can get an appointment when I want I feel comfortable asking about treatment and medications Staff talk to me about specific goals for my health Staff are sensitive to my traumatic or difficult experiences I can get support when I need it I can get an appointment when I want I feel comfortable asking about treatment and medications Staff talk to me about specific goals for my health Staff are sensitive to my traumatic or difficult experiences The quality of my life is improving Staff talk to me about specific goals for my health Staff are sensitive to my traumatic or difficult experiences The quality of my life is improving I feel connected to my care team I can get support when I need it I can get an appointment when I want I feel comfortable asking about treatment and medications Staff talk to me about specific goals for my health Staff are sensitive to my traumatic or difficult experiences The quality of my life is improving I can get support when I need it I can get an appointment when I want I feel comfortable asking about treatment and medications Staff talk to me about specific goals for my health Staff are sensitive to my traumatic or difficult experiences The quality of my life is improving
Tyler, 2021[398]	How was the quality of the sound/picture during the consultation? (good or excellent) During the appointment I felt listened to (agree or strongly agree) During the appointment I felt involved in decisions about my care and treatment (agree of strongly agree) During the appointment I felt able to communicate everything I wanted to find the virtual consultation (agree or strongly agree)

Author, Year	Survey Questions
van de Poll-Franse, 2021[404]	My health care clinician is able to understand my health care condition via TC/VC My privacy is protected during a TC/VC In the future, I would like to use a TC/VC again This appointment was suitable for a TC/VC (Telephone Consultation or Video Consultation) I prefer a TC/VC rather than a face-to-face visit
Wang, 2021[408]	What did you think about using teletherapy before the pandemic? What do you think about using teletherapy now? How effective is teletherapy compared to in-office treatment in working with transference? How effective is teletherapy compared to in-office treatment in working with relational problems? How effective is teletherapy compared to in-office treatment in working with resistance?
Waterland, 2021[409]	sought help from family/ friends to set up the session system was easy to set up easy to use they would recommend [online education session] to others preparing for surgery. if given a choice they would attend the online education session as opposed to attending the hospital based session
Wilhite, 2021[412]	I am worried that I will be doing too many televisits in the future I think that a mix of televisits and in-person visits will work well for my patients in the future I am looking forward to doing more televisits as part of my regular practice I find doing televisits more exhausting than in person visits Doing televisits is more satisfying than in person visits
Wolthers 2020[414]	I feel that the telephone consultation was useful to us I am satisfied with the duration of the telephone consultation Overall, I feel good about the possibility of substituting our face-to-face appointment with a telephone consultation I would have preferred a face-to-face consultation
Yoon, 2020[417]	Overall, how satisfied were you with your telemedicine visit? How easy was it to talk with the telemedicine provider? How much did the telemedicine provider seem to care about you as a person? Did you feel relaxed or tense during the telemedicine session? Do you think your telemedicine visit improves your medical care? Do you think your telemedicine visit was as good as a regular in-person visit? How well did the telemedicine visit equipment work today? Would you want to use telemedicine again?
Zeghari, 2021[418]	Globally, the system was easy to use Instructions were clear Globally, I'm satisfied with this experience I would repeat this experience in the future On a scale from 1 to 7, how likely would I recommend this assessment method? Globally, my stress level was

Author, Year	Survey Questions
Zhang, 2020[419]	no difference in confidence in treating patients appropriately with telemedicine overall experience of telemedicine to be better than expected overall visit quality to be no different between telemedicine and in office in office visits preferential for personal connection with the patient
Zhu, 2021[420]	I feel that my telemedicine appt allowed me to communicate with my healthcare provider as effectively as a clinic visit
Zhu, 2021[420]	my laboratory and testing results were effectively reviewed with me during my TM visit I felt that my surgical needs were met during my TM appt my telemedicine appointment was more convenient than a clinic visit my TM appt made me feel safer during the covid pandemic I would prefer to see my healthcare provider in person during the covid pandemic in the future, I would choose a tm appt instead of a clinic visit once the covid pandemic is over what factor would most make you choose a tm appt over a clinic visit: avoiding risk of covid transmission what factor would most make you choose a tm appt over a clinic visit: other what factor would most make you choose a tm appt over a clinic visit: no need to inconvenience family/friend
Zimmerman, 2021[134]	Satisfied with the initial medical evaluation Satisfied with their treatment
Zimmerman, 2021[421]	I felt I could trust my doctor The evaluation was thorough and complete My diagnosis was explained in a clear way My questions were answered to my satisfaction My treatment was discussed in a clear and understandable way I was asked for my opinion about treatment I was told what to do if my symptoms got worse My doctor seemed genuinely interested in me My doctor seemed to understand my problems My doctor treated me with respect My doctor seemed to know what he/she was doing My doctor asked if I had any question Overall satisfaction with initial evaluation Expectation of improvement ACT group Skills group Interpersonal group Individual sessions with psychiatrist Number of sessions with psychiatrist Individual sessions with therapist Length of sessions with therapist Overall satisfaction with program Recommend program to friend or family Perception of improvement

Author, Year	Survey Questions
Zingone, 2020[422]	referred to undergo remote medical examination. Are you happy with telemedicine remote visits? Not at all Are you happy with telemedicine remote visits? A little Are you happy with telemedicine remote visits? Enough Are you happy with telemedicine remote visits? Much Are you happy with telemedicine remote visits? Very much
Zorron, 2021[423]	patient 6Q score (satisfaction summary based on 6 questions) - phone

Table D.22. CASP assessment of individual studies (Key Question 3)

Author, Year	1) Was There a Clear Statement of the Aims of the Research?	2) Is a Qualitative Methodology Appropriate?	3) Was the Research Design Appropriate To Address the Aims of the Research?	4) Was the Recruitment Strategy Appropriate to the Aims of the Research?	5) Was the Data Collected in a Way That Addressed the Research Issue?	6) Has the Relationship Between Researcher and Participants Been Adequately Considered?	7) Have Ethical Issues Been Taken Into Consideration?	8) Was the Data Analysis Sufficiently Rigorous?	9) Is There a Clear Statement of Findings?
Adams, 2021[137]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Alkureeishi, 2021[140]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Somewhat/ to some extent	Yes
Anghelescu, 2021[143]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Somewhat/ to some extent	Yes
Antoun, 2021[144]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Ashcroft, 2021[146]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Baadjou, 2020[148]	Yes	Yes	Yes	Yes	Yes	No	No	Somewhat/ to some extent	Yes
Banks, 2021[149]	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Can't tell	Yes
Barnett, 2021[151]	Yes	Yes	Somewhat/ to some extent	Yes	Yes	No	Somewhat/ to some extent	Yes	Yes
Barsom, 2021[152]	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Somewhat/ to some extent	Yes
Barth, 2021[153]	Yes	Yes	Yes	Can't tell	Yes	No	Somewhat/ to some extent	Somewhat/ to some extent	Yes
Ben-Ayre, 2021[157]	Somewhat/ to some extent	Yes	Yes	Yes	Yes	No	Yes	No	Somewhat/ to some extent
Bennell, 2021[158]	Yes	Yes	Yes	Yes	Somewhat/ to some extent	No	Yes	Yes	Yes

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Bethel, 2021[159]	Yes	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Somewhat/ to some extent	Yes	Yes
Birkhoff, 2021[161]	Yes	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Yes	Yes
Bommersbach, 2021[162]	Somewhat/ to some extent	Yes	Yes	Yes	Yes	No	Somewhat/ to some extent	Somewhat/ to some extent	Yes
Bos, 2021[163]	Somewhat/ to some extent	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Somewhat/ to some extent	No	Yes
Boydell, 2021[165]	Yes	Yes	Yes	Yes	Yes	No	Yes	Somewhat/ to some extent	Yes
Brown Johnson, 2021[167]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Yes	Yes
Brunton, 2021[168]	Yes	Yes	Yes	Somewhat/ to some extent	Can't tell	No	No	Can't tell	Yes
CampbellYao, 2021[173]	Yes	Yes	Yes	Can't tell	Somewhat/ to some extent	No	Yes	Yes	Yes
Clair, 2021[179]	No	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Yes	Somewhat/ to some extent
Cole, 2021[180]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Cook, 2021[182]	Yes	Yes	Yes	Yes	Yes	No	Can't tell	Can't tell	Somewhat/ to some extent
Cooper, 2021[183]	Somewhat/ to some extent	Somewhat/ to some extent	Somewhat/ to some extent	Yes	Yes	No	Yes	Yes	Yes

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Cormi, 2021[184]	Yes	Yes	Yes	Can't tell	Somewhat/ to some extent	No	No	Can't tell	Yes
Costa, 2021[185]	Yes	Yes	Somewhat/ to some extent	Yes	Yes	No	No	Yes	Yes
Courtney, 2021[186]	Somewhat/ to some extent	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Cronin, 2020[187]	No	Yes	Somewhat/ to some extent	Somewhat/ to some extent	Somewhat/ to some extent	No	Somewhat/ to some extent	Somewhat/ to some extent	Yes
Dahl-Popolizio, 2020[188]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Di Lalla, 2021[194]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Di Lorito, 2021[195]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Donovan, 2021[198]	Yes	Yes	Yes	Yes	Yes	No	Somewhat/ to some extent	Yes	Yes
Dozieres-Puyravel, 2021[199]	Yes	Yes	Somewhat/ to some extent	Yes	Yes	No	Somewhat/ to some extent	Can't tell	Yes
Due, 2021[201]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	Somewhat/ to some extent	Yes	Yes	Yes
Evans, 2021[204]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Feijt, 2020[205]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Filippi, 2021[207]	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes

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Finn, 2021[208]	No	Can't tell	Yes	No	Somewhat/ to some extent	No	Can't tell	Yes	Yes
Franzosa, 2021[211]	Yes	Yes	Yes	Yes	Somewhat/ to some extent	No	Yes	Yes	Yes
Franzosa, 2021[212]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Frayn, 2021[213]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Gabe-Walters, 2021[217]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Can't tell	Yes
Gefen 2021[220]	Yes	Yes	Yes	Can't tell	Yes	No	Yes	Yes	Yes
Gergerich, 2020[221]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Gilbert, 2021[223]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Goddard, 2021[224]	No	Can't tell	Somewhat/ to some extent	Somewhat/ to some extent	Can't tell	No	No	Somewhat/ to some extent	Somewhat/ to some extent
Godfrey, 2021[225]	Somewhat/ to some extent	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Goldberg, 2021[227]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Gomez, 2021[228]	Yes	Yes	Yes	Yes	Yes	No	Somewhat/ to some extent	Yes	Yes
Granberg, 2021[229]	Yes	Yes	Yes	Yes	Somewhat/ to some extent	No	Yes	Yes	Yes
Gullslett, 2021[231]	Yes	Yes	Yes	Can't tell	Somewhat/ to some extent	No	Yes	Yes	Yes

Author, Year	1) Was There a Clear Statement of the Aims of the Research?	2) Is a Qualitative Methodology Appropriate?	3) Was the Research Design Appropriate To Address the Aims of the Research?	4) Was the Recruitment Strategy Appropriate to the Aims of the Research?	5) Was the Data Collected in a Way That Addressed the Research Issue?	6) Has the Relationship Between Researcher and Participants Been Adequately Considered?	7) Have Ethical Issues Been Taken Into Consideration?	8) Was the Data Analysis Sufficiently Rigorous?	9) Is There a Clear Statement of Findings?
Haase, 2021[233]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Hardy, 2021[238]	Somewhat/ to some extent	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Somewhat/ to some extent	Yes
Heiskanen, 2021[240]	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Yes	Yes
Hlubocky, 2021[244]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Yes	Yes
Hunter, 2021[247]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Hunter, 2021[248]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Imlach, 2020[251]	Yes	Yes	Yes	No	Somewhat/ to some extent	No	Yes	Yes	Yes
Isautier, 2020[252]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Iyer, 2021[255]	Somewhat/ to some extent	Yes	Somewhat/ to some extent	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Somewhat/ to some extent	Yes
Javanparast, 2021[259]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	ny	Somewhat/ to some extent	Yes
Javanparast, 2021[260]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Somewhat/ to some extent	Somewhat/ to some extent
Jimenez-Rodriguez, 2020[261]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Somewhat/ to some extent	Yes
Johnson, 2021[263]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

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Kang, 2020[266]	No	Can't tell	Can't tell	No	Somewhat/ to some extent	No	No	No	No
Kang, 2021[434]	Yes	Yes	Yes	Yes	Somewhat/ to some extent	No	Yes	Yes	Yes
Klamroth-Marganska, 2021[273]	Yes	Somewhat/ to some extent	Somewhat/ to some extent	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Yes	Yes
Krok-Schoen, 2021[278]	Yes	Yes	Yes	Yes	Yes	No	Somewhat/ to some extent	Yes	Yes
LaRoche, 2021[283]	Somewhat/ to some extent	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Somewhat/ to some extent
Lin, 2021[289]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Luckett, 2021[290]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Yes	Yes
Lynch, 2021[293]	Yes	Yes	Yes	Yes	Yes	No	Somewhat/ to some extent	Yes	Yes
Macchi, 2021[294]	Yes	Yes	Yes	Can't tell	Somewhat/ to some extent	No	Yes	Yes	Yes
Madden, 2020[295]	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes
Malden, 2021[296]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Marshall, 2021[300]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Martin, 2021[301]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Somewhat/ to some extent	Yes
Murphy, 2021[311]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

Author, Year	1) Was There a Clear Statement of the Aims of the Research?	2) Is a Qualitative Methodology Appropriate?	3) Was the Research Design Appropriate To Address the Aims of the Research?	4) Was the Recruitment Strategy Appropriate to the Aims of the Research?	5) Was the Data Collected in a Way That Addressed the Research Issue?	6) Has the Relationship Between Researcher and Participants Been Adequately Considered?	7) Have Ethical Issues Been Taken Into Consideration?	8) Was the Data Analysis Sufficiently Rigorous?	9) Is There a Clear Statement of Findings?
Myers, 2020[314]	Yes	Yes	Yes	Yes	Somewhat/ to some extent	No	No	Yes	Yes
Nagra, 2021[315]	Yes	Yes	Yes	Somewhat/ to some extent		No	Yes	Somewhat/ to some extent	Yes
Newman-Casey, 2021[318]	Yes	Yes	Yes	Yes	Somewhat/ to some extent	No	Somewhat/ to some extent	Somewhat/ to some extent	Yes
Pagano, 2021[323]	Somewhat/ to some extent	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Parkinson, 2021[326]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	Yes	Yes	Yes	Yes
Parsons, 2021[327]	Somewhat/ to some extent	Yes	Yes	Yes	Somewhat/ to some extent	No	Yes	No	Yes
Philip, 2020[330]	Somewhat/ to some extent	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Can't tell	Yes
Pogorzelska-Maziarz, 2021[331]	Yes	Yes	Yes	Somewhat/ to some extent	Can't tell	No	Yes	Somewhat/ to some extent	Yes
Ritchie, 2021[341]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Robinson, 2021[344]	Yes	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	Somewhat/ to some extent	Yes	Yes	Yes
Rosenthal-2021[347]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Ross, 2021[348]	No	Yes	Yes	Can't tell	Yes	No	Somewhat/ to some extent	Yes	Yes

Author, Year	1) Was There a Clear Statement of the Aims of the Research?	2) Is a Qualitative Methodology Appropriate?	3) Was the Research Design Appropriate To Address the Aims of the Research?	4) Was the Recruitment Strategy Appropriate to the Aims of the Research?	5) Was the Data Collected in a Way That Addressed the Research Issue?	6) Has the Relationship Between Researcher and Participants Been Adequately Considered?	7) Have Ethical Issues Been Taken Into Consideration?	8) Was the Data Analysis Sufficiently Rigorous?	9) Is There a Clear Statement of Findings?
Saliba-Gustafsson, 2020[435]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Schindler-Ruwisch, 2021[358]	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Schoebel, 2021[359]	Yes	Yes	Yes	Yes	Yes	No	Somewhat/ to some extent	Yes	Yes
Searby, 2021[361]	Yes	Yes	Yes	Can't tell	Yes	No	Yes	Yes	Yes
Sezgin, 2020[364]	Yes	Yes	Yes	Yes	Yes	No	Somewhat/ to some extent	Yes	Yes
Shah, 2021[365]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Shklarski, 2021[369]	No	Yes	Yes	No	Somewhat/ to some extent	No	Yes	Somewhat/ to some extent	Somewhat/ to some extent
Shklarski, 2021[370]	No	Yes	Yes	Yes	Yes	No	Yes	Somewhat/ to some extent	Somewhat/ to some extent
Singh, 2021[374]	Yes	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Yes	Yes
Sklar, 2021[376]	No	Yes	Somewhat/ to some extent	Yes	Yes	No	Yes	Somewhat/ to some extent	Yes
Smithson, 2021[381]	Yes	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Somewhat/ to some extent	Somewhat/ to some extent	Somewhat/ to some extent
Snyder, 2021[383]	Somewhat/ to some extent	Yes	Somewhat/ to some extent	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Somewhat/ to some extent	Somewhat/ to some extent
Srinivasan, 2020[384]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Yes	Yes

Author, Year	1) Was There a Clear Statement of the Aims of the Research?	2) Is a Qualitative Methodology Appropriate?	3) Was the Research Design Appropriate To Address the Aims of the Research?	4) Was the Recruitment Strategy Appropriate to the Aims of the Research?	5) Was the Data Collected in a Way That Addressed the Research Issue?	6) Has the Relationship Between Researcher and Participants Been Adequately Considered?	7) Have Ethical Issues Been Taken Into Consideration?	8) Was the Data Analysis Sufficiently Rigorous?	9) Is There a Clear Statement of Findings?
Stewart, 2020[386]	Yes	Can't tell	Yes	Somewhat/ to some extent	No	No	Somewhat/ to some extent	No	No
Stewart, 2021[387]	Yes	Somewhat/ to some extent	Can't tell	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Somewhat/ to some extent	Yes
Stifani, 2021[388]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Subotic, 2020[389]	Yes	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Yes	Yes
Taylor, 2021[391]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Somewhat/ to some extent	Yes
Treitler, 2021[393]	Yes	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Yes	Yes
Triantafillou, 2021[394]	Yes	Yes	Yes	Yes	Yes	No	Somewhat/ to some extent	Yes	Yes
Tuijt, 2021[396]	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Turchetti, 2021[397]	Somewhat/ to some extent	Yes	Yes	Yes	Somewhat/ to some extent	No	Yes	Yes	Yes
Uscher-Pines, 2020[400]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Uscher-Pines, 2021[401]	Yes	Yes	Yes	Somewhat/ to some extent	Somewhat/ to some extent	No	Yes	Yes	Yes
Uscher-Pines[436]	Yes	Yes	Yes	Yes	Somewhat/ to some extent	No	Yes	Yes	Yes
vanGelder, 2021[405]	Yes	Yes	Yes	Can't tell	Yes	No	Yes	Somewhat/ to some extent	Yes

Author, Year	1) Was There a Clear Statement of the Aims of the Research?	2) Is a Qualitative Methodology Appropriate?	3) Was the Research Design Appropriate To Address the Aims of the Research?	4) Was the Recruitment Strategy Appropriate to the Aims of the Research?	5) Was the Data Collected in a Way That Addressed the Research Issue?	6) Has the Relationship Between Researcher and Participants Been Adequately Considered?	7) Have Ethical Issues Been Taken Into Consideration?	8) Was the Data Analysis Sufficiently Rigorous?	9) Is There a Clear Statement of Findings?
Venville, 2021[406]	Yes	Yes	Yes	Can't tell	Somewhat/ to some extent	No	Yes	Yes	Yes
Wilhite, 2021[412]	Yes	Yes	Yes	Somewhat/ to some extent	Yes	No	Somewhat/ to some extent	Yes	Yes
Wilson, 2021[413]	Somewhat/ to some extent	Yes	Yes	Somewhat/ to some extent	Yes	No	Yes	Yes	Yes
Wood, 2021[415]	Yes	Can't tell	Can't tell	No	Can't tell	No	Yes	Can't tell	Somewhat/ to some extent
Zhu, 2020[420]	Yes	Yes	Yes	Somewhat/ to some extent	Can't tell	No	Yes	Can't tell	Yes

Table D.23 Study characteristics of all studies included in Key Question 4

Author, Year	Intervention	Study Design	Data Types	Data Collection	Timing	Country	Sites	Geography	Participants
Agarwal et al, 2021 [437]	Tel + Video	cross-sectional	Quantitative	NR	Early	Canada	Single site	NR	Patients
Albert 2021 [438]	Not stated	Retrospective	Qualitative	Interview	Early	United States	Multiple site	Other	Providers
Braune, 2021 [439]	Video	prospective (undefined)	Mixed Methods	Survey	General	Germany	Single site	NR	Patients
Budhwani 2021 [440]	Tel + Video	Cross-sectional	Mixed Methods	Survey, Interview, FG, Administrative Database	General	Canada	Single site	Urban	Providers
Careyva et al, 2021 [441]	Tel + Video	prospective cohort	Quantitative	NR	Early	United States	Multiple site	Urban, suburban, and rural	Providers
Childs et al, 2020 [442]	Tel + Video	retrospective cohort	Quantitative	NR	Early	United States	Multiple site	NR	Providers
Corona 2021 [443]	Not stated	Retrospective cohort	Quantitative	Survey	Early	United States	Single site	NR	Patients
Cox, 2021 [444]	Not stated	cross-sectional	Quantitative	Survey	Early	Australia	Multiple site	NR	Providers
Dennett 2021 [445]	Tel + Video	Retrospective & prospective cohorts	Mixed Methods	Survey, Interview, Clinical & Administrative Database	General	Australia	Multiple site	Urban	Patients & Providers
Der Martirosian 2021 [424]	Tel + Video	Retrospective	Mixed Methods	Interview, Administrative Database	General	United States	Multiple site	Urban	Providers
El Zammar 2022 [446]	Not stated	Retrospective case series	Quantitative	Survey, Interview, Administrative Database	Later	Canada	Single site	NR	Patients & Providers
Fogarty 2021 [447]	Tel + Video	Cross-sectional	Qualitative	Interview & Focus Group	General	Australia	Multiple site	Other	Patients & Providers
Gilbert 2022 [448]	Tel + Video	Cross-sectional	Qualitative	Interview	Later	United Kingdom	Single site	NR	Patients & Providers
Gmunder 2021 [449]	Tel + Video	Retrospective cohort	Quantitative	DB-C, Administrative Database	General	United States	Multiple site	Other	Patients
Gonzalez, 2020 [450]	Not stated	retrospective cohort	Quantitative	NR	Early	UK	NR	NR	Providers

Author, Year	Intervention	Study Design	Data Types	Data Collection	Timing	Country	Sites	Geography	Participants
Gromatsky, 2021 [451]	Not stated	prospective (undefined)	Quantitative	NR	Later	United States	Multiple site	NR	Patients
Guarino et al, 2020 [452]	Tel + Video	prospective cohort	Quantitative	NR	Early	Italy	Single site	NR	Providers
Kapoor et al, 2020 [453]	Tel + Video	retrospective cohort	Quantitative	NR	Early	United States	Single site	NR	Providers
Keppel 2022 [454]	Tel + Video	Cross-sectional	Quantitative	Survey	Early	United States	Multiple site	Other	Providers
Ketigian 2021 [455]	Tel + Video	Retrospective	Quantitative	Survey,	Later	United States	Single site	NR	Patients
Krasovsky et al, 2021 [456]	Tel + Video	prospective (undefined)	Mixed Methods	Survey	Early	Israel	Single site	NR	Patients & Providers
Kreider 2022 [457]	Not stated	Retrospective	Qualitative	Interview & Focus Group	Early	United States	Multiple site	Rural	Providers
Loftus 2022 [78]	Tel + Video	Retrospective cohort	Mixed Methods	Interview & Administrative Database	Later	United States	Single site	NR	Patients & Providers
Lopez et al, 2021 [458]	Tel + Video	prospective cohort	Mixed Methods	NR	Early	Canada	Single site	NR	Providers
Lynch, 2021 [293]	Not stated	prospective cohort	Mixed Methods	Survey & Interview	General	United States	Single site	NR	Patients & Providers
Miller, 2021 [307]	Not stated	prospective cohort	Mixed Methods	Survey	Early	United States	Single site	Urban	Patients
Mishkind et al, 2021 [459]	Tel + Video	retrospective cohort	Quantitative	NR	Early	United States	Multiple site	NR	Providers
Nguyen 2021 [460]	Tel + Video	Cross-sectional	Qualitative	Interview	Early	United States	Multiple site	NR	Providers
Norman 2022 [461]	Tel	Retrospective cohort	Quantitative	Administrative Databases	Early	Canada	Single site	NR	Patients
Oelmeier 2021 [462]	Tel + Video	Prospective cohort	Quantitative	Survey,	General	Germany	Single site	NR	Patients & Providers
Ouellette et al, 2021 [463]	Tel + Video	cross-sectional (case study)	Qualitative	NR	General	Canada	Multiple site	NR	Providers
Patt, 2021 [328]	Not stated	cross-sectional	Mixed Methods	NR	General	United States	Multiple site	NR	Providers
Payan 2022 [464]	Tel + Video	Cross-sectional	Qualitative	Survey & Interview	Later	United States	Multiple site	NR	Patients & Providers
Peahl, 2021 [329]	Not stated	retrospective cohort	Mixed Methods	Survey	Early	United States	Single site	Suburban	Patients & Providers
Reid 2022 [465]	Tel + Video	Cross-sectional	Qualitative	Survey & Interview	Later	United States	Single site	NR	Providers

Author, Year	Intervention	Study Design	Data Types	Data Collection	Timing	Country	Sites	Geography	Participants
Reider-Demer 2022 [102]	Tel + Video	Retrospective	Quantitative	Survey, Administrative, and Clinical Databases	Early	United States	Multiple site	Urban	Patients & Providers
Saliba-Gustafsson, 2020 [354]	Not stated	retrospective cohort	Mixed Methods	Survey & Interview	Early	United States	Single site	NR	Providers
Shur et al, 2020 [466]	Tel + Video	cross-sectional	Quantitative	NR	General	United States	Single site	NR	Providers
Smith-MacDonald 2021 [380]	Tel + Video	Cross-sectional	Mixed Methods	Survey, Interview, Focus Group	Later	Canada	Multiple site	NR	Providers
Stewart 2022 [467]	Tel + Video	Cross-sectional	Mixed Methods	Survey, Interview, Focus Group	Later	Northern Ireland	Multiple site	NR	Providers
Story 2021 [468]	Not stated	Cross-sectional	Mixed Methods	Survey	Later	United States	Multiple site	NR	Providers
Thomas 2022 [469]	Tel + Video	Retrospective	Mixed Methods	Interview, Focus Group, Administrative Database	General	Australia	Multiple site	NR	Providers
Thomas 2022 [470]	Tel + Video	Cross-sectional	Mixed Methods	Interview & Administrative Database	General	Australia	Single site	Urban	Providers
Van Citters 2021 [402]	Not stated	Retrospective cohort	Qualitative	Interview & Focus Group	Later	United States	Multiple site	NR	Providers
Ward 2021 [471]	Tel + Video	Cross-sectional	Mixed Methods	Survey, Interview, Administrative Database	Early	United States	Multiple site	Urban	Patients & Providers
Watson 2021 [472]	Tel	Retrospective cohort	Mixed Methods	Survey, Administrative Database	Later	Canada	Single site	NR	Patients & Providers
Weems 2021 [473]	Tel + Video	Retrospective cohort	Mixed Methods	Survey, Interview, Administrative Database	General	United States	Multiple site	Other	Patients
Weiskittle 2022 [474]	Tel + Video	Retrospective	Mixed Methods	Survey	Early	United States	Multiple site	NR	Providers
Williams 2022 [475]	Tel + Video	Retrospective cohort	Mixed Methods	Interview, Focus Group, Administrative Database	Later	United Kingdom	Single site	NR	Patients

Author, Year	Intervention	Study Design	Data Types	Data Collection	Timing	Country	Sites	Geography	Participants
Zayde 2021 [130]	Tel + Video	Prospective cohort	Mixed Methods	Survey	Early	United States	Single site	Urban	Patients
Zeghari, 2021 [418]	Video	prospective cohort	Quantitative	NR	General	France	NR	NR	Patients

Early: Early COVID era (March-June 2020); General: General COVID era; Early: Later: Later COVID era (June 2020 and later); NR; Tel: Telephone.
* Lam et al. 2020[476] and Pizza et al. 2021[477] were excluded from KQ4 as neither used an implementation strategy; Hirschman et al. 2021[478] was excluded as it only focused on caregivers, not patients or providers. These studies are not shown in Appendix D Table 4.7.

Table D.24. Study characteristics of studies that included patient participants (Key Question 4)

Author, Year	N Patients	% Female	Age, Mean (SD)	% White	% Black	% Other Races	Condition	Target Denominator
Agarwal et al, 2021 [437]	97	67	41*	N	N	N	COVID	Community-dwelling patients in the Greater Toronto Area diagnosed with COVID-19
Braune, 2021 [439]	28	64.2	8 (SD, 2.2)*	NR	NR	NR	Type 1 Diabetes	Pediatric patients with diabetes and their caregivers
Corona 2021 [443]	49 (in-person) 46 (telehealth) 20 (hybrid)	22 22 15	27.96 months (SD, 4.67) 28.17 months (SD, 4.58) 27.50 months (SD, 5.18)	74 54 70	6 11 15	20 35 15	Mental Health	Children with autism spectrum disorder (ASD) and their caregivers
Dennett 2021 [445]	102	57	65* (IQR, 56-72)	NR	NR	NR	Cancer Rehabilitation	Adult patients seeking an exercise-based cancer telerehabilitation program
El Zammar 2022 [446]	88	NR	NR	NR	NR	NR	Emergency Room Visits	Patients discharged from an emergency room and requiring follow-up
Fogarty 2021 [447]	5	100	37 (SD, 6.2)	NR	NR	NR	Intimate Partner Violence	Children and caregivers who experience intimate partner violence
Gilbert 2022 [448]	20	50	47 (range, 22-74)	NR	NR	NR	Orthopedic Rehabilitation	Orthopedic patients requiring tertiary rehabilitation
Gmunder 2021 [449]	362764	59.88	50.8 (SD, 20.3)	73	13	14	All Medical Conditions	Patients seeking care at an academic medical health system
Gromatsky, 2021 [451]	25	20	54.2 (SD, 11.95)	35	30	35	Mental Health	Veteran Health Administration patients experiencing COVID-19 related stress
Ketigian 2021 [455]	69	33	70.2 (SD, 8.4)	94	NR	NR	Parkinson's Disease	Adult patients with Parkinson's disease seeking routine care
Krasovsky et al, 2021 [456]	50	N	11.31 (SD, 4.81)	NR	NR	NR	Rehabilitation	Pediatric patients, requiring telerehabilitation services, and their families
Loftus 2022 [78]	95 (compare) 34 (telehealth)	71.6 88.2	47* (IQR, 30-57) 36.5* (IQR, 23-50)	96 94	2 0	2 6	Chronic Pain	Patients with suspected fibromyalgia and chronic abdominal pain
Lynch, 2021 [293]	64	31.25	28.1 (SD, 10)	NR	NR	NR	Mental Health	Adult patients with serious mental illness requiring psychosocial treatment and pharmacotherapy
Miller, 2021 [307]	307	65	18+ (adults)	55	6	39	Rehabilitation	Adult patient requiring outpatient physical therapy

Author, Year	N Patients	% Female	Age, Mean (SD)	% White	% Black	% Other Races	Condition	Target Denominator
Norman 2022 [461]	874	81.8	53*	52.6	1.6	45.8	Genetic Disorders	Adult patients requiring genetics services
Oelmeier 2021 [462]	75	100	32	NR	NR	NR	Prenatal Care	Patients requiring prenatal or pre pregnancy counseling at an academic medical center
Payan 2022 [464]	9	89	59 (SD, 11.6)	0	0	100	Community Health Services	Hispanic and AAPI patients with language barrier seeking care at federally qualified health centers
Peahl, 2021 [329]	253	100	31.2 (SD, 6.7)	71	5.5	23.5	Ob-Gyn	Female pregnant patients (more than 20-week gestation) receiving prenatal care
Reider-Demer 2022 [102]	7194	58	51	60.9	4.6	34.5	Mental Health	Adult patients with neurological disorders
Ward 2021 [471]	319	9	18-44 (32%), 45-64 (50%), 65+ (18%)	73	21	6	Mental Health	Veterans seeking mental health care in VA emergency departments and urgent care clinics
Watson 2021 [472]	397	51.6	63.8 (13.8)	NR	NR	NR	Cancer Care	Patients with cancer seeking care from a provincial cancer center
Weems 2021 [473]	28	96	68	NR	NR	NR	Alzheimer's and Related Dementias (ADRD)	Older adult patients with ADRD and their caregivers
Williams 2022 [475]	14	93	37.6 (SD, 12)	NR	NR	NR	Chronic Pain	Patients enrolled in a pain management program
Zayde 2021 [130]	12 (caregiver) 12 (child)	100 25	44.2 11.1	25	67	8	Mental Health	Caregivers and children with heightened psychological distress
Zeghari, 2021 [418]	8	50	76.7 (SD, 6.12)	NR	NR	NR	Mental Health	Isolated older adults residing in rural areas requiring cognitive screening

* Median age (i.e., mean age was NR)

AAPI=Asian American and Pacific Islander; ADRD=alzheimer's and related dementias; ASD=autism spectrum disorder; IQR=interquartile range; N=sample size; NR=not reported; Ob-Gyn= Obstetrics and Gynecology; SD=standard deviation

Table D.25. Study characteristics of studies that included provider participants (Key Question 4)

Author, Year	N Providers	Healthcare Setting	Provider Specialty
Albert 2021 [438]	22	Regional Health System	Primary Care
Budhwani 2021 [440]	30	Single Health System	Mental Health (Wide Range)
Careyva et al, 2021 [441]	222	Regional Health System	Primary Care
Childs et al, 2020 [442]	NR	Single Health System	Mental Health
Cox, 2021 [444]	31	Single Health System	Rehabilitation
Dennett 2021 [445]	10	Single Health System	Rehabilitation (Cancer)
Der Martirosian 2021 [424]	34	Single Health System	Primary Care
El Zammar 2022 [446]	15	Single Health System	Other (Emergency Medicine)
Fogarty 2021 [447]	14	Single Health System	Mental Health (Behavioral Health)
Gilbert 2022 [448]	20 (clinician) 15 (manager)	Single Health System	Rehabilitation (Orthopedics)
Gonzalez, 2020 [450]	NR	NR	Other (gastrointestinal)
Guarino et al, 2020 [452]	NR	Other (specific clinic)	Other (hepatology)
Kapoor et al, 2020 [453]	7	Other (specific clinic)	Other (ophthalmology)
Keppel 2022 [454]	16 (clinics)	Regional Health System	Primary Care
Krasovsky et al, 2021 [456]	67	Single Health System	Rehabilitation
Kreider 2022 [457]	12	Regional Health System	Rehabilitation
Loftus 2022 [78]	NR	Regional Health System	Other (Pain Management)
Lopez et al, 2021 [458]	12	Single Health System	Rehabilitation
Lynch, 2021 [293]	6	Other (specific clinic)	Mental Health
Mishkind et al, 2021 [459]	NR	Other (specific clinic)	Mental Health
Nguyen 2021 [460]	25	Regional Health System	Other (Obstetrics)
Oelmeier 2021 [462]	75	Single Health System	Other (Obstetrics)
Ouellette et al, 2021 [463]	2	NR	NR
Patt, 2021 [328]	NR	Regional Health System	Other (wide range)
Payan 2022 [464]	15	Other (specific clinic)	Primary Care
Peahl, 2021 [329]	77	Single Health System	Other (ob-gyn)

Author, Year	N Providers	Healthcare Setting	Provider Specialty
Reid 2022 [465]	19 (survey) 13 (interview)	Single Health System	Other (Obstetrics)
Reider-Demer 2022 [102]	29	Single Health System	Other (Neurology)
Saliba-Gustafsson, 2020 [354]	66	Single Health System	Other (neurology)
Shur et al, 2020 [466]	22	Other (specific clinic)	Other (pediatrics)
Smith-MacDonald 2021 [380]	31	Other (specific clinic)	Mental Health (Wide Range)
Stewart 2022 [467]	63	Regional Health System	Primary Care
Story 2021 [468]	97	Regional Health System	Mental Health (Behavioral Health)
Thomas 2022 [469]	80	Regional Health System	Other (Allied Health)
Thomas 2022 [470]	34	Single Health System	Other (Wide Range)
Van Citters 2021 [402]	23	Regional Health System	Other (Pulmonology)
Ward 2021 [471]	49	Single Health System	Mental Health (Psychiatric Care)
Watson 2021 [472]	396	Single Health System	Other (Oncology)
Weiskittle 2022 [474]	21	Regional Health System	Mental Health (Behavioral Health)

N=sample size; NR=not reported; Ob-Gyn= Obstetrics and Gynecology

Table D.26. Risk of bias assessment of cohort studies included in Key Question 4

Study	1	2	3	4	5a	5b	6a	6b	7	8	9	10	11	12
Albert, 2021 [438]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Braune, 2021 [439]	Yes	Yes	Yes	Yes	Yes	Can’t tell	Yes	Yes	*	Can’t tell	Yes	Yes	Can’t tell	Can’t tell
Careyva et al, 2021 [441]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Yes	Yes	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Childs et al, 2020 [442]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Yes	Can’t tell	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Corona, 2021 [443]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Yes	Can't tell	Can't tell
Dennett, 2021 [445]	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Der Martirosian, 2021 [424]	Yes	Can't tell	Yes	Yes	Can't tell	Can't tell	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
El Zammar, 2022 [446]	Yes	Yes	Can't tell	Yes	Can't tell	Can't tell	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Gmunder, 2021 [479]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Gonzalez, 2020 [450]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Yes	Can’t tell	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Gromatsky, 2021 [451]	Yes	Yes	Yes	Yes	Yes	Can’t tell	Yes	Yes	*	Can’t tell	Yes	Yes	Can’t tell	Can’t tell
Guarino et al, 2020 [452]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Yes	Yes	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Kapoor et al, 2020 [453]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Yes	Yes	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Ketigian, 2021 [455]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Krasovsky et al, 2021 [456]	Yes	Can’t tell	Yes	Yes	Yes	Yes	Yes	Yes	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Kreider, 2022 [457]	Yes	Yes	Yes	Yes	Can't tell	Can't tell	Can't tell	Can't tell	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell

Study	1	2	3	4	5a	5b	6a	6b	7	8	9	10	11	12
Loftus, 2022 [78]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Yes	Can't tell	Can't tell
Lopez et al, 2021 [458]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Can’t tell	Can’t tell	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Lynch, 2021 [293]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Yes	Yes	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Miller, 2021 [307]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Yes	Can’t tell	*	Can’t tell	Yes	Yes	Can’t tell	Can’t tell
Mishkind et al, 2021 [459]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Can’t tell	Can’t tell	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Norman, 2022 [461]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Oelmeier, 2021 [462]	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Peahl, 2021 [329]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Yes	Yes	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Reider-Demer, 2022 [102]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Saliba-Gustafsson, 2020 [354]	Yes	Yes	Yes	Yes	Can’t tell	Can’t tell	Yes	Yes	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell
Thomas, 2022 [469]	Yes	Yes	Can't tell	Yes	Can't tell	Can't tell	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Van Citters, 2021 [402]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Watson, 2021 [472]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Weems, 2021 [473]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Weiskittle, 2022 [474]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Williams, 2022 [475]	Yes	Yes	Yes	Yes	Can't tell	Can't tell	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Zayde, 2021 [130]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	*	Can't tell	Yes	Can't tell	Can't tell	Can't tell
Zeghari, 2021 [418]	Yes	No	Yes	Yes	Yes	Can’t tell	Yes	Yes	*	Can’t tell	Yes	Can’t tell	Can’t tell	Can’t tell

CASP questions: (1) Did the study address a clearly focused issue? (2) Was the cohort recruited in an acceptable way? (3) Was the exposure accurately measured to minimize bias? (4) Was the outcome accurately measured to minimize bias? (5a) Have the authors identified all important confounding factors? (5b) Have they taken account of the confounding factors in the design and/or analysis? (6a) Was the follow up of subject complete enough? (6b) Was the follow up of subjects long enough? (7) What are the results of this study? (8) How precise are the results (9) Do you believe the results? (10) Can the results be applied to the local population? (11) Do the results of this study fit with other available evidence? (12) What are the implications of this study for practice?

* See Appendix D Table D.31 for the study results.

Table D.27. Risk of bias assessment of cross-sectional studies included in Key Question 4

Study	1	2	3	4	5	6a	6b	7	8	9	10	11
Agarwal et al, 2021 [437]	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes	Can't tell	Can't tell	Yes	Can't tell	Can't tell
Budhwani 2021 [440]	Yes	Yes	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	Can't tell	Can't tell
Cox, 2021 [444]	Yes	Yes	N/A	N/A	N/A	N/A	Can't tell	N/A	N/A	Yes	Can't tell	Can't tell
Fogarty 2021 [447]	Yes	Yes	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	Can't tell	Can't tell
Gilbert, 2022 [448]	Yes	Yes	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	Can't tell	Can't tell
Keppel 2022 [454]	Yes	Yes	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	Can't tell	Can't tell
Nguyen, 2021 [460]	Yes	Yes	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	Can't tell	Can't tell
Ouellette et al, 2021 [463]	Yes	Can't tell	Can't tell	N/A	N/A	Can't tell	No	N/A	N/A	Yes	Can't tell	Can't tell
Patt, 2021 [328]	Yes	Yes	Can't tell	Can't tell	Can't tell	Can't tell	Can't tell	N/A	N/A	Yes	Can't tell	Can't tell
Payan 2022 [464]	Yes	Yes	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	Can't tell	Can't tell
Reid 2022 [465]	Yes	Yes	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	Can't tell	Can't tell
Shur et al, 2020 [466]	Yes	Yes	Yes	N/A	Yes	Can't tell	Yes	Can't tell	Can't tell	Yes	Can't tell	Can't tell
Smith-MacDonald, 2021 [380]	Yes	Yes	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	Can't tell	Can't tell
Stewart, 2022 [467]	Yes	Yes	Yes	N/A	Yes	N/A	Can't tell	N/A	N/A	Yes	Can't tell	Can't tell
Story 2021 [468]	Yes	Yes	Yes	N/A	Yes	N/A	Can't tell	N/A	N/A	Yes	Can't tell	Can't tell
Thomas, 2022 [470]	Yes	Yes	Yes	N/A	Yes	N/A	Can't tell	N/A	N/A	Yes	Can't tell	Can't tell
Ward 2021 [471]	Yes	Yes	Yes	N/A	Yes	N/A	Yes	N/A	N/A	Yes	Can't tell	Can't tell

CASP questions: (1) Did the study address a clearly focused issue? (2) Did the authors use an appropriate method to answer their question? (3) Were cases recruited in an acceptable way? (4) Were controls selected in an acceptable way? (5) Was the exposure accurately measured to minimize bias? (6a) Aside from the experimental intervention, were the groups treated equally? (6b) Have the authors taken account of the potential confounding factors in the design and/or in their analysis? (7) How large was the treatment effect? (8) How precise was the estimate of the treatment effect? (9) Do you believe the results? (10) Can the results be applied to the local population? (11) Do the results of this study fit with other available evidence?

Table D.28. Strength of evidence measurement for telehealth interventions in Key Question 4

Studies, N	Implementation Outcome	Number of Studies (Participants)	Study Limitations	Directness	Consistency	Precision	Reporting Bias	Strength of Evidence
12 studies [102, 293, 307, 329, 439, 443, 446, 447, 451, 455, 471, 472]	Acceptability	8874 patients	Medium	Direct	Inconsistent [d]	Imprecise	Undetected	Moderate
18 studies [78, 102, 293, 329, 380, 435, 438, 440, 445-447, 454, 456, 462, 465, 466, 468, 469]	Acceptability	910 providers	High [b]	Indirect [c]	Inconsistent [d]	Imprecise	Undetected	Low
17 studies [78, 435, 438, 439, 443, 445, 447, 454, 457, 461, 466, 473, 474]	Acceptability	1932 patients 340 providers	High [b]	Indirect [c]	Inconsistent [d]	Imprecise	Undetected	Low
11 studies [293, 307, 418, 437, 439, 447-449, 451, 464, 473]	Adoption	363,365 patients	Medium	Indirect [c]	Inconsistent [d]	Imprecise	Undetected	Low
15 studies [293, 328, 380, 424, 435, 440, 442, 444, 445, 447, 458, 459, 465, 469, 471]	Adoption	487 providers	Medium	Direct	Inconsistent [d]	Imprecise	Undetected	Moderate
11 studies [78, 130, 293, 418, 437, 439, 445, 451, 455, 461, 471]	Appropriateness	1739 patients	High [b]	Indirect [c]	Inconsistent [d]	Imprecise	Undetected	Low
19 studies [78, 102, 293, 328, 329, 435, 438, 441, 444, 447, 452, 456, 462, 465, 467, 469, 471, 472, 474]	Appropriateness	1379 providers	Medium	Indirect [c]	Inconsistent [d]	Imprecise	Undetected	Low
8 studies [130, 437, 445, 448, 451, 462, 471, 475]	Feasibility	676 patients	High [b]	Indirect [c]	Inconsistent [d]	Imprecise	Undetected	Low
7 studies [424, 438, 440, 448, 464, 465, 468]	Feasibility	265 providers	High [b]	Indirect [c]	Inconsistent [d]	Imprecise	Undetected	Low
7 studies [329, 435, 441, 448, 453, 458, 459]	Fidelity	419 providers	Medium	Indirect [c]	Inconsistent [d]	Imprecise	Undetected	Low
7 studies [329, 435, 445, 465, 472]	Sustainability	804 patients & 341 providers	High [b]	Indirect [c]	Inconsistent [d]	Imprecise	Undetected	Low

(a) See Table 1 for the list of evidence; (b) No randomization, no control, and no protection against bias (e.g., convenient samples); (c) No comparison with routine care; (d) Single studies only, with no comparison sites

Table D.29. Implementation strategies and assessment frameworks for telehealth interventions in Key Question 4

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Ouellette et al, 2021 [463]	Providers	Offering virtual care nursing leadership training	Adapting training goals and content to meet learner needs during training sessions.	Normalization Process Theory	NR	NR
Lopez et al, 2021 [458]	Providers	Delivering virtual cancer rehabilitation during the first 90 days of the COVID-19 pandemic.	Understand the experiences of patients and health care providers receiving and delivering virtual care.	Framework for Reporting Adaptations & Modifications-Expanded	Increased access & attendance to rehabilitation programming. Increased program capacity because of reduced burden for additional clinic space. Difficulty accessing private space at home. Unclear appointment reminders. Sense of reassurance and noted that they felt supported during a time of isolation and uncertainty. Able to establish rapport, particularly during video appointments because it normalized the virtual care experience. Communication barriers were more pronounced in a virtual environment, which hindered their ability to assess and build rapport with patients using interpretation services. Patient participants described virtual care as an isolating approach to their rehabilitation. Virtual visits were effective for screening a variety of cancer-related impairments. Physical therapists, occupational therapists, and physiatrists experienced more difficulties because of limitations in assessing musculoskeletal and neurologic impairments. Several challenges teaching locoregional rehabilitative exercises, resistance exercises, and lymphatic self-massage and bandaging. Patients felt worried about how accurately they were describing their physical limitations and symptoms. Most patients indicated that their confidence with receiving care virtually was increased with the provision of online resources and materials.	Multiple barriers were identified such as billing regulations for virtual care, organizational capacity, organizational readiness for change, and health & technical literacy of patients. Other barriers included communication challenges (e.g., language, speech impairments, cognitive impairments) and video quality & distances to cameras.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Mishkind et al, 2021 [459]	Providers	Virtualizing individual therapy and medication management visits for patients with mental health issues.	Assess the clinical outcomes of virtualizing mental health care.	Best practices in videoconferencing-based tele-mental health (Shore et al, 2018)	NR	Strong organizational leadership Staff willingness and commitment to take the timely actions necessary to virtualize Familiarity with tele-mental health services and existing protocols Rapid communication between staff Ability to understand and utilize regulatory flexibilities
Guarino et al, 2020 [452]	Providers	Providing telemedicine services for patients with chronic liver disease at a tertiary care center during the COVID-19 lockdown.	Analyzing the benefits of using telehealth services in improving clinical outcomes.	NR	NR	Familiarity of the patients with telemedicine facilitated the implementation process. Prevalence of high-speed internet and smartphones affected the roll out of the telehealth services. Policy measures adopted by government during the COVID-19 lockdown facilitated the use of telehealth services.
Kapoor et al, 2020 [453]	Providers	Developing a pediatric ophthalmology telemedicine program in the COVID-19 crisis	Describing the experience of a pediatric ophthalmology program in implementing a telemedicine program	NR	NR	NR
Careyva et al, 2021 [441]	Providers	Rapid implementation of virtual screening for COVID-19 in primary care	Assessing the key factors promoting rapid implementation of virtual screening for COVID-19	NR	NR	NR

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Zeghari, 2021 [418]	Patients	Using telehealth, backed by a mobile unit, to reach isolated older adults and administrating telehealth-enabled cognitive assessment.	Comparing the screening results of the telehealth approach with the classical face-to-face survey administration.	NR	Participants in the telehealth approach found the telehealth approach easier and would recommend it to others more than the face-to-face approach. Participants of the telehealth services expressed higher level of stress; however, they were willing to repeat the telehealth experience. Some participants expressed that the telehealth approach was easy to access and comfortable to conduct. Care assistants were positively surprised about the feasibility of the telehealth process.	Having an engineer, next to the assistant, to be present during the telehealth sessions ensured that technical equipment was used properly. Mobile units could be used as alternative if a participant did not have access to internet suitable for the telemedicine visit. Vulnerability and confidence in technology were possible barriers to acceptance of the technology for the participating patients. Internet access was the main concern, as rural areas were not always well served by high-speed internet. Presence of an assistant in the mobile units allowed patients to engage in human interaction while setting up the technology.
Childs et al, 2020 [442]	Providers	Designing and deploying intensive outpatient group-based psychiatric care using telehealth.	Describing the processes and workflows for service delivery and early results of telehealth for intensive outpatient psychiatric services.	NR	NR	Using the preexisting telehealth infrastructure, including patient- and provider- initiated messaging within the electronic health record and patient portal video visits, was critical in ensuring no lapses in care.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Lynch, 2021 [293]	Patients	Offering an 18-week in-person and tele health services of patients with severe mental illness.	Measuring acceptance of telehealth services vs. in-person health services among patients with severe mental illness.	NR	Staff believed that telehealth was well-received by most patients, noting that some patients appeared more comfortable with telehealth sessions than in-person. Staff found telehealth more challenging for patients who had technology or gaming addictions, or symptoms associated with attention deficit hyperactivity disorder or autism spectrum disorder. Staff experienced some increased apprehension regarding patients missing sessions or being unresponsive to outreach. Increased feelings of exhaustion, with more staff time required to find or adapt materials, prepare, and plan session curricula. Though staff perceived the shift to telehealth as slightly more challenging for themselves than patients, they emphasized that they “learn[ed] to navigate” the technology and virtual interaction quickly. Staff highlighted that continuity of care had been preserved to a great extent with a swift transformation to virtual services that allowed the full range and structure of supports to still be offered. The conversion impacted staff communication, particularly since it constrained their ability to have informal, but essential, conversations.	Staff credited their existing strong relationships, team mentality, and increased support from supervisors. The “nimble” and “proactive” clinic organizational culture facilitated rapid transition and the ability to maintain continuity of care. Workflows and infrastructure were developed in anticipation of regulatory change, rather than in response. Prior to the COVID-related stay-at-home orders, administrators anticipated the changing regulatory landscape and prospectively formulated the workflow, technology, and workforce adaptations. Clinicians perceived younger patients had increased comfort with and access to technology but tended to be more susceptible to distractions. Patients with neurocognitive or attentional issues (e. g., attention-deficit hyperactivity disorder) required additional instruction and supports.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
	Providers	-	Qualitative interviews of clinicians and administrators to assess factors that both facilitated and hindered implementation.	-	Clinician perspective on group dynamics Relying on virtual interaction allowed for a positive shift in the dynamic between staff and patients. Group dynamics in virtual sessions were largely positive and similar to in-person sessions, with patients interacting with one another and not responding solely to the group leader. Staff believed that telehealth was particularly well-received by patients who had a diagnosis involving psychosis. Staff reported a few patients had technology-related concerns, such as "paranoia associated with being recorded, privacy, and allowing us to see them." Staff had lingering concerns that, for some patients, long-term telehealth utilization may hinder recovery. To encourage alternatives for broader community participation, staff increased suggestions for virtual educational, recreational, and social activities	Threshold for attendance was reduced, allowing patients who were reluctant to be around others, had difficulty traveling, or lived out-of-state to maintain access to services.
Peahl, 2021 [329]	Patients	Providing prenatal telehealth services to female patients of a medical institution.	Evaluating the initial adoption and care experience of patients using prenatal telehealth services.	NR	Patients reported positive access experiences: virtual visits removed traditional barriers to care, such as employment, childcare, and travel time. The ability to afford home devices and access to reliable smart devices and internet were seen as important barriers to equity. Fewer than half of patients agreed with the statement "The quality of virtual visits is the same as exposure during the pandemic." Patients emphasized the importance of home device use in conjunction with virtual visits. Patient comfort in their own home and the ability to focus on patient questions and concerns. COVID-19 prenatal care model may be more difficult for first-time mothers, who may desire additional anticipatory guidance.	NR

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
	Providers	-	Evaluating the initial adoption of telehealth by providers offering prenatal services.	-	Providers reported positive experiences with virtual visits as it reduces traditional barriers to care and clinic inefficiencies. Concerns that barriers to care might disproportionately affect vulnerable populations. Fewer than half of providers agreed with the statement "The quality of virtual visits is the same as exposure during the pandemic." Concerns that usual prenatal care measurements, including blood pressure and fetal heart tones, were not incorporated into the model. Providers emphasized the importance of home device use in conjunction with virtual visits. High satisfaction with improved communication and counseling during virtual visits. Lower satisfaction about continuity, difficulty maintaining patient-provider relationships in new care models. Belief that virtual contact is not a perfect substitute for in-person relationship building.	NR
Saliba-Gustafsson, 2020 [354]	Providers	Implementing telehealth video visits in ambulatory neurology during the COVID-19 pandemic.	Assessing the adoption, acceptability, and perceptions of potential sustainability of telehealth video visits for ambulatory neurology visits.	NR	NR	NR

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Miller, 2021 [307]	Patients	Offering telehealth physical therapy in response to COVID-19 within a large urban academic medical center.	Identifying implementation strategies to maintain and scale up long-term telehealth physical therapy.	RE-AIM (reach, effectiveness, adoption, implementation, maintenance) framework	NR	Organizational factors that facilitated telehealth implementation included organizational policy changes, preexisting academic partnerships, and access to previously untapped telehealth resources (e.g., software, hardware). Clinician leaders (i.e., champions) were critical factors for addressing significant patient- and clinician-level barriers to telehealth implementation such as clinician education and process. Champions spearheaded clinician education efforts through multiple mechanisms and worked with leadership to conduct small tests of change that could be expanded to the larger group of clinicians. Engagement with external stakeholders through a satisfaction survey was a necessary step toward developing an understanding of potential for future adaptations of telehealth physical therapy. Consensus for which strategies should be used to maintain and scale up telehealth physical therapy was achieved among supervisors, champions, and academic stakeholders.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Agarwal et al, 2021 [437]	Patients	Leveraging telehealth to follow up with patients during the acute phase of COVID-19 (typically 14 days from symptom onset) or until they were discharged to community-based care from their primary care provider.	Assessing the adoption, feasibility, and safety of the telehealth services.	Adoption-Feasibility-Safety for early innovation (Proctor et al)	NR	NR
Shur et al, 2020 [466]	Providers	Rapid development of telemedicine care for genetic consultation during COVID-19	Examining the challenges and limitations faced by rapid deployment of telemedicine programs	NR	NR	Mechanism to identify pitfalls and technology gaps along with capturing and distributing workarounds was vital to maintaining momentum. SODOTO (see one, do one, and teach one) approach was necessary to execute the plan. Buddy system enabled providers with real-time visit challenges to reach out and receive immediate support to reduce workflow interruptions. Hospital wide support for IT and telemedicine was beneficial specially when including a physician peer-support system.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Gonzalez, 2020 [450]	Providers	Adaptation of a telehealth program for inflammatory bowel disease patients during COVID-19 pandemic	To describe the adaptations of telehealth services during COVID-19 pandemic	NR	Of those who had experienced cancellation of face-to-face follow-up appointments and offered telephone consultations (n=46), 92% rated the experience as 'good' to 'excellent'. Overall, there was a high rate of satisfaction from the patients regarding the information provided. 95% of patients stated they received understandable information about level of risk. 92% of patients felt the telehealth service had provided them with enough information and guidance concerning the impact of COVID-19 on their disease and treatment. 91% rated their understanding about social distancing and self-isolation, and the information with which they had been provided, as good to excellent.	Implementation can be facilitated by learning from international collaborators about the pattern of the pandemic allowed for rapid implementation of adaptions to the service. Clear and frequent communication with the whole team, using frequent virtual meetings and group messaging platforms, ensured that the key messages were acted upon promptly early in the pandemic. Lack of data on the risks to patients from COVID-19, in particular on possible mitigation strategies to protect patients on immunomodulators and biologics, was a barrier in earlier implementation of changes.
Gromatsky, 2021 [451]	Patients	Piloting a novel telehealth group-based intervention to reduce acute stress related to COVID-19 among Veterans.	Measuring the reduced stress levels and patient satisfaction with the new telehealth program.	NR	A third of participants reported subjective stress and/or symptom reduction. A majority (75%) noted participation increased interpersonal connection and reduced isolation. Participants noted participation challenges, most notably technological and connectivity issues (65%) and discomfort with participating in a virtual group with strangers (25%).	Various challenges were identified as limiting factors such as: availability of internet connection, group size, session time, and clinician flexibility to troubleshoot technological difficulties.
Cox, 2021 [444]	Providers	Implementing telerehabilitation by community rehabilitation services during COVID-19	Understanding barriers and enablers to implementing telerehabilitation with community outpatients during COVID-19	Hybrid Implementation Design (Curran et al, 2012)	Baseline questionnaire responses identified 6 behavior domains to support to maximize implementation of telerehabilitation.	Multiple challenges were identified including internet access for patients, patient skill or experience of telerehabilitation, patient ability and safety to undertake telerehabilitation, and rapidly changing landscape of medicine during initial phases of COVID-19 pandemic.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Patt, 2021 [328]	Providers	Using telemedicine to improve community cancer care during a pandemic	Describe utilization of telemedicine across community cancer care practices as a percentage of new and established patient visits.	NR	Clinical personnel suggested having additional time and effort to successfully have patients engage with the telemedicine platform and perform the usual preclinical functions such as vital sign assessment, confirming medications, documenting, and assessing pain. Positive feedback from patients with an increased desire for connection and community because of the isolation and uncertainty associated with the pandemic (regarding virtual support groups.	Main barriers were technical challenges, especially among older patients, and lack of broadband access, especially in rural areas.
Krasovsky et al, 2021 [456]	Patients	Describing the development of telerehabilitation usage guidelines in a large pediatric hospital.	Evaluate the implementation and usage of telerehabilitation from the perspectives of families.	NR	NR	Several factors hindered the implementation of the telehealth rehabilitation services such as: presence of sibling's or child's personal toys; distractibility of child; availability of equipment; and previous relationship with child and clinician.
	Providers	-	Evaluate the implementation and usage of telerehabilitation from the perspectives of healthcare practitioners.	-	-	-

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Braune, 2021 [439]	Patients	Remotely supporting children with type 1 diabetes and their caregivers during diabetes management.	Increasing the time that these children spend in the optimum glucose range and improving the children quality of life.	Service Design Methodology	Caregivers expressed a reduction in the amount of time and stress associated with hospital visits. Opportunity to be in a safe, comfortable, and familiar setting allowed for more engagement and dedicated interactions between families and health service providers. Families also believed that health service providers were less stressed, more dedicated, and focused. The ability to review data together can result in new and valuable insights for most stakeholders and enabled caregivers to adjust therapy. Remote care was perceived to be "more modern, timely and suited to their needs," with an improvement of the children well-being.	NR
Van Citters 2021 [402]	Providers	Implement high-quality telehealth services among cystic fibrosis patients.	Qualitative exploration of facilitators and barriers to telehealth services.	Consolidated Framework for Implementation Research (CFIR)	NR	Process constructs were facilitators of implementation among programs that saw telehealth as similar quality to in-person care. External policies and incentives (e.g., temporary rules for providing telehealth) were facilitators for providing telehealth. Common barriers to reimbursement included identifying optimal billing structures within the context of time-based billing, limited reimbursement for home monitoring or telephone-only telehealth; inability to bill for the full multidisciplinary team; and lost revenue associated with lower patient volumes.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Reider-Demer 2022 [102]	Patients	Telehealth implementation in an urban academic neurology department	Describe telehealth implementation; estimate the travel time savings for patients using telemedicine; and. measure patient satisfaction with telemedicine.	NR	NA	Reduced travel time for telehealth visits can be a facilitator/motivator for patients.
	Providers	-	Measure provider satisfaction with telemedicine.	-	NA	Reimbursement rates of telehealth services may hinder provision of services.
Norman 2022 [461]	Patients	Maintain genetic counselling services during the COVID-19 pandemic using telehealth services.	Assess referral, clinic volumes, wait times, and uptake of genetic testing while offered via telehealth.	NR	NA	Barriers included lack of access to genetic testing blood draws and longer times to give blood samples.
Kreider 2022 [457]	Providers	Add telerehabilitation across VHA healthcare to the routine outpatient rehabilitation services.	Identify key practical strategies for engaging patients in telerehabilitation services for VHA providers.	NR	Willingness to give telerehabilitation a chance: A key ingredient Creativity and adaptability: Critical attributes for telerehabilitation providers Adapting assessments Adapting interventions Role and workflow adaptations Appraising for self the feasibility of the telerehabilitation modality Availability of informal, in-person support improves feasibility of telerehabilitation Shifts in the expectations by the patients and by the provider Benefit and anticipated future of telerehabilitation	Available administrative/IT support and resources enabled VHA providers to transition to telerehabilitation faster. Salient patient factors may make a patient a fit for telerehabilitation (e.g., falls risk, mental health status, caregiver availability, telehealth equipment). Preparing the patient and setting up the meeting ahead of time increase the chances of a successful telehealth session. Technical challenges faced by the patient may hinder the telehealth visit.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Weiskittle 2022 [474]	Providers	Address older adult's social isolation during the 1COVID19 pandemic using telehealth.	Survey of geriatric mental health clinicians who used telehealth to address the pandemic's mental health side effects.	Hybrid Type 1 design framework	Clinicians' satisfaction Utility/effectiveness Veterans' engagement Implementing wellness check-in and post-COVID content Opportunities for future modification	Technological challenges: access to high-speed internet; difficulty adapting to videoconferencing; and challenges related to telephone usage due to Veterans' functional impairment. Suggested content changes: More time for discussion; adaptation for cognitive challenges; and additional topics (e.g., grief/loss, finding community).
Corona 2021 [443]	Patients	Offer a six-session behavioral intervention and support service model either in-person, through telemedicine, or through a hybrid service model.	Compare intervention feasibility, fidelity of implementation, child outcomes, and stakeholder satisfaction across service delivery models.	NR	NA	Reported benefits included reductions in travel and transportation barriers for families. Additional scheduling flexibility for caregivers with busy schedules was a facilitator. Consultants reported experiencing technology-related challenges (e.g., unreliable internet connection; difficulty setting up camera). Other barriers: challenges related to modeling certain behaviors for patients; difficulty establishing caregiver buy-in for telehealth services; and establishing rapport.
Albert 2021 [438]	Providers	Evolve processes developed for remote chronic disease management and preventive care.	Understand the experiences of primary care practices in rapidly shifting to telehealth during the COVID19 pandemic.	NR	Telehealth (and clinical workflow/performance) Chronic disease management Screening and preventive care Access to care and equity	Persons with less access to the Internet, technology, or knowledge of how to navigate technology were among those that were most challenging to engage in telehealth. Older adult population was difficult to reach; while they were fearful of in-person visits, they often had less access to, and experience with, technology.
El Zammar 2022 [446]	Patients	Improve follow-up care for patients presenting to the ED using telehealth visits.	Assess the impact of the ED virtual care follow ups on patient outcomes.	NR	NA	Conditions that may require in-person follow up visits hinder the use of telehealth.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
	Providers	-	Assess the provider satisfaction for ED virtual care follow ups.	-	NA	Integrating imaging study and lab results can facilitate streamlining the ED flow using telehealth follow-up visits. Atypical presentation of specific conditions may result in delayed diagnosis if telehealth is being used, thus limiting such remote visits.
Keppel 2022 [454]	Providers	Use telehealth to provide routine care to patients while ensuring safety and managing patients with a highly transmissible disease.	Assess clinical workforce, operations, and use of telemedicine early in the COVID-19 pandemic.	NR	NA	Access to needed technology for patients Patient willingness to use telemedicine Billing or reimbursement for telemedicine Quality of care that can be provided via telemedicine Maintenance of appropriate staffing and workflows to deliver care via telemedicine Required provider training to deliver telemedicine Clinician or staff willingness to use telemedicine Access to needed technology for clinic staff
Payan 2022 [464]	Patients	Use telemedicine during the pandemic at federally qualified healthcare centers (FQHCs) with a focus on language service provision.	Examine the patient facilitators and barriers to telemedicine implementation and use in FQHCs with a focus on language barriers.	Consolidated Framework for Implementation Research (CFIR)	Individual-level barriers and facilitators Housing and the home environment Technology Interpersonal support and technical or language assistance	Facilitator: Availability of audio-only visits Convenience Family members who provide technical assistance Clinic staff who teach patients to use platforms Language concordant providers or trusted sources for interpretation Barrier: Older age Limited English proficiency Limited digital literacy Lack of housing Lack of privacy in home settings Lack of equipment or services

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
	Providers	-	Examine organizational and technology facilitators and barriers to telemedicine implementation in FQHCs.	-	Personnel capacity Professional development capacity Technological capacity	Facilitators: Implementation champion at various levels (leader, peer) Clinic staff to prepare ahead of a visit IT personnel for equipment and technical support Bilingual personnel who provide high quality, language concordant care Commitment to patient-centered care and serving marginalized populations Use of external resources and peer learning Experience communicating by telephone Investing in equipment and software for use in office or remote settings Option to use audio-only visits Barriers: Negative impact of COVID-19 on operations Lack of knowledge or uncertainty about appropriate use Reimbursement policy confusion Lack of private workspaces for personnel Limited equipment for patients in home settings Difficulty integrating a third-party language interpretation service

Thomas 2022 [469]	Providers	Implement telehealth services across 16 allied health departments over four health service facilities.	Determine the clinician, service and system level factors that influence sustained use of telehealth.	Non-adoption, Abandonment, Scale-up, Spread, and Sustainability (NASSS)	Forced telehealth adoption has increased clinician reluctance Value proposition for clinicians is lacking Lack of organizational readiness inhibited telehealth use; hybrid care needs to be integrated Clinicians perceive limited consumer demand for telehealth; greater consumer-end support required.	Develop guidelines and provide advice to clinicians about which patients are most likely to be amenable to telehealth Provide guidance to services and clinicians to assist them to tailor telehealth services to their own clinical needs Provide regular training on telehealth technology to clinicians and administrators Link clinicians to available support services and training resources for telehealth Consistently use one video conferencing platform for all staff Implement automated feedback cycle for video platform (e.g., log your issue) Integration of clinical functionalities into platform Assess and implement fit-for-purpose, user-friendly and appropriate hardware for clinicians Develop discipline-specific guidelines to prevent and manage adverse events Ensure standardized ways of offering telehealth to consumers Develop plans and strategies to increase geographical reach of specialist allied health services using telehealth Increase accessibility of telehealth to harder-to-reach population groups (e.g., culturally and linguistically diverse) Determine workflow of telehealth within each clinic Recognize that additional administration resources are likely to be required for telehealth Determine additional funding required to meet any additional identified needs Reduce the appointment time window or provide a dedicated appointment time for telehealth appointment

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
						Develop a checklist for telehealth appointments that includes consent, privacy, consumer deidentification check Establish dedicated, private spaces available for telehealth appointments Reform funding models for activity based funding and weighted activity units Audit and evaluate telehealth services including consumer reported outcome and experience measures
Der Martirosian 2021 [424]	Providers	Rapid uptake of telehealth services in a health care system.	Compare the use of telehealth services in a health care system 12 months before and after the onset of COVID19.	NR	Telehealth expansion Telehealth scheduling Telehealth modalities	Telehealth adoption can be facilitated by adopting new clinical workflows coordinating clinicians and staff. Experience with providing care over the phone for follow-ups and medication management prior to COVID19 facilitated telehealth adoption. Experience with video technologies via consultation appointments with patients in the past can also facilitate telehealth visits. Providers who do not schedule their own patients, described scheduling as a key barrier to telehealth adoption. Among Veterans, many patients did not have the technology for videoconferencing, hence using the telephone modality helped with the transition to telehealth services. Teaching patients who did not know how to use face-to-face remote technology proved to take too much time and be a barrier to telehealth adoption.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Weems 2021 [473]	Patients	Implement differing virtual caregiver support platforms during the COVID-19 pandemic.	Measure the pragmatic quality improvement project to enhance delivery of virtual support services for ADRD caregivers.	Consolidated Framework for Implementation Research (CFIR)	VA commitment to caregivers of veterans National social distancing mandates Semi-structured Facilitators have a wealth of caregiver support experience Structured implementation Technical issues Fluctuation in attendance Accessibility Empowering caregivers to identify needs Need to address access barriers	Aligns with VA mission National Caregiver Support Program (CSP) Exacerbated needs of veteran caregivers Social isolation Relatable Effective communication tools Personal experience Professional experience Facilitator training Facilitator handbook Participant workbooks Communication Lack of piloting No-shows Easy to access Barriers for those without internet access Participant distractions Well-structured Caregiver-centered Technological equipment Broadband access
Story 2021 [468]	Providers	Support training, protocol development, equipment, and guidance for better telehealth implementation at VHA's Arts Therapies.	Understand the barriers and identify potential solutions for better delivery of telehealth services.	NR	Training, experience, IT equipment, and internet issues Exercise focus, meditation, therapy groups, social groups, music therapy, leisure education, and wellness groups Intervention/platform specific, best practice, and equipment training Staffing, administrative support, networking, and veteran needs	Most consistently reported barrier to telehealth utilization was Veteran's lack of understanding. Lack of administration support, setting or environmental restrictions (e.g., lack of private office space) was a barrier to telehealth adoption. Another barrier was the difficulty with medical record documentation and a stop code for administrative purposes. Training, experience, and having the proper equipment/stable internet connections were identified as potential facilitators.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Budhwani 2021 [440]	Providers	Implement virtual care for mental health care at an academic ambulatory hospital.	Understand consistent facilitators of and persistent challenges to use virtual care and perceived impact on quality of care.	Non-adoption, Abandonment, Scale-up, Spread, and Sustainability (NASSS)	Behavioral Operational Cultural System or policy Quality of care perception	Behavioral barrier: Increased effort required by providers to deliver care during transition to virtual care Operational facilitator: Early targeted pilot prepared the department for virtual care delivery during the pandemic Cultural facilitator: Provider and staff acceptance and benefits of delivering virtual care System or policy facilitator: Availability of Virtual care billing codes for physician providers Quality of care perception: Perceptions on providing appropriate and patient-centered care Quality of care perception: Perceptions on the effectiveness of virtual care Quality of care perception: Perceptions on equitable access to virtual care
Reid 2022 [465]	Providers	Rapid implementation of obstetric telemedicine during the COVID-19 pandemic.	Assess the rapid implementation of obstetric telemedicine during the COVID-19 pandemic.	Consolidated Framework for Implementation Research (CFIR)	Provider perceptions of implementation Quality Adaptability Patient needs and resources Relative advantage Implementation climate Complexity Readiness for implementation Available resources Access to knowledge and information Knowledge and beliefs about the intervention Engaging	Travel time for an in-person visit is a major expense and may promote telehealth visits. Need to perform physical examinations, order labs, or do ultrasounds are barriers to telehealth adoption. Lack of patient access to at-home monitoring devices such as blood pressure machines, weight scales, and fetal heart doppler machines are barriers to telehealth adoption. Patient privacy and distractions are also barriers to patient comfort and a more efficient telemedicine visit.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Fogarty 2021 [447]	Patients	Provide virtual therapeutic services to women and children who have experienced intimate partner violence during the COVID19 pandemic.	Explore parents' experiences of participating in a parent-child telehealth intervention during the COVID19 pandemic.	NR	Positive intervention experience Therapeutic space and processes Outcomes of the program (i.e., Restoring Childhood) for families	Challenges for treatment: Difficulty maintaining attention and engagement across the telehealth sessions for children. Challenges for service delivery: Face-to-face sessions can allow for different therapeutic techniques and may be less tiring and more engaging for children.
	Providers	-	Assess clinician experience of participating in a parent-child telehealth intervention.	-	Service delivery Therapeutic space and processes\ Benefits for clients	Service delivery-therapeutic: Need to implement additional processes to ensure safety and confidentiality within sessions Service delivery-processes: Telehealth was more tiring than face-to-face therapy, describing increased fatigue.\ Working from home: Several challenges associated with delivering telehealth from home; and maintaining work-life balance.
Ward 2021 [471]	Patients	Implementation of a provider-to-provider telemental health intervention in unscheduled settings within the VHA.	To conduct a mixed-methods evaluation of an emergency telehealth intervention in unscheduled settings of the Veterans Health Administration (VHA).	Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM)	Timeliness Initial apprehension to try telemental health The COVID-19 pandemic Sustainability	NR

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
	Providers	-	To conduct a mixed-methods evaluation of an emergency telehealth intervention in unscheduled settings of the Veterans Health Administration (VHA).	-	Timeliness Initial apprehension to try telemental health The COVID-19 pandemic Sustainability	NR
Gmunder 2021 [449]	Patients	Implementation of telehealth services in an academic health system.	Identify variables that may affect telemedicine visit completion in order to determine actions that can be enacted across the entire health system to benefit all patients.	NR	NA	Technical, organizational, and behavioral hurdles to full adoption of telemedicine by health care providers. Patients who confirm appointment via the automated phone/text message are most strongly associated with a successful telemedicine visit completion. Having an active patient portal account predict the completion of telemedicine visits. Medical specialties group, including cardiology, gastroenterology, and pulmonology, had the lowest telehealth completion rates. The highest completion rates were by specialties, surgical specialties, and primary care physicians.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Dennett 2021 [445]	Patients	Rapid implementation of an exercise-based telerehabilitation program in response to COVID19 pandemic.	Complete a process evaluation of an exercise-based cancer telerehabilitation program.	NR	Service outcomes: Safety Implementation outcomes: Acceptability, adoption, feasibility, fidelity, and costs Client outcomes: Satisfaction, quality of life, and physical activity	Facilitators/Benefits: Convenience and efficiency Safe Communication General clinician support and understanding Access to friendly, knowledgeable staff Gained motivation Learning new things Access to exercise Personalized care Challenges/Barriers: Lack of social interaction Issues with fidelity Technology difficulties Lack of audio/visual feedback Managing symptoms Low motivation
	Provider	-	Complete a process evaluation of an exercise-based cancer telerehabilitation program.	-	Acceptability Adoption Feasibility Fidelity Costs"	NR

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Stewart 2022 [467]	Providers	Implement remote asthma consulting in UK general practices.	Evaluate the rapid and reactive implementation of telehealth in general practice in response to the COVID-19 pandemic.	Extended Normalization Process Theory (eNPT)	Coherence Engagement Action Monitoring	Consensus required on purpose and possibilities Identify a practice champion to drive implementation Engagement of the whole practice and wider primary care team Preparation with the patient prior to consultation Adaptation of approach to complete required assessments remotely Provision of training and resources Personalized approach to patient needs Integration of acute and chronic remote asthma consulting Informal appraisal of impact based on experience of implementation Formal appraisal of impact based on measurement
Zayde 2021 [130]	Patients	Treatment engagement, acceptability, and psychiatric distress among patients after the onset of COVID-19.	Compare treatment engagement (e.g., attendance and no-show rates) during sessions, before and after the transition to telehealth.	NR	NR	Challenges include lack of familiarity with and access to technology and connectivity as well as issues protecting confidentiality and data security. Many participants encountered initial technical difficulties yet persevered. Social distancing during the pandemic may have contributed to the motivation and engagement demonstrated by the participants.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Thomas 2022 [470]	Providers	Enable outpatient pharmacy services to be provided at a distance during the COVID-19 pandemic.	Determine the proportion of outpatient pharmacy appointments that were delivered via telephone and video consult before and after the start of the COVID19 restrictions. Understand the perceived clinician, service, and broader contextual challenges to using video consults within the outpatient pharmacy setting.	NR	The sudden disruptor role of COVID19 Influences on choice of telehealth modality	Redesign of workflows and an increase in workload A new hybrid model of care emerged The funding model incentive Pressure to meet activity targets Infrastructure and skilled workforce influences to adopt video consults Video consults are better but more challenging to implement than phone consults. Patient's support and familiarity with technology. Assumption that patients are not able to use the technology for video consults.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Ketigian 2021 [455]	Patients	Transition in-person Parkinson's programs to online visits at the start of the COVID19 pandemic.	Determine the practicability, satisfaction, and barriers to online telehealth programs, and their relationship to perceived symptoms, mood, and quality of life.	NR	NA	Major barriers in the Virtual Rock Steady Boxing program: Difficulty focusing Lack of enjoyment Cost Lack of safe space Internet connection problems Major barriers in the Virtual Support Groups program: Not the same as in-person Scheduling conflicts Forgetting appointments Already have support Nothing to talk about Major barriers in the Buddies program: Akward virtual interactions Unaware of the program No expected benefits Speech difficulties Fatigue
Oelmeier 2021 [462]	Patients	Implement remote consultations for prenatal care.	Evaluate both the technical feasibility and patient satisfaction with video consultations in a tertiary center for obstetric care.	NR	NA	Technical problems experiences during video consultation (e.g., image and sound quality).
	Providers	-	Evaluate the provider satisfaction with video consultations in a tertiary center for obstetric care.	-	NA	NR

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Williams 2022 [475]	Patients	Rapidly developing and implementing a pain-management program (PMP) in a hospital setting.	Improvement was measured qualitatively with frequent and repeated qualitative data collection, and quantitatively by patient demographic comparisons.	Model for Improvement Framework (MIF)	The importance of peer support Individualized care and access to support Program intensity Access to resources	Optimizing the patients' home environment for participation Interactive peer support Overcoming technical challenges Program intensity – avoiding videoconferencing fatigue Protecting staff well-being and communication Training for staff
Nguyen 2021 [460]	Providers	Implement telehealth to reduce maternal health equities by providing doula support.	Explore changes to doula care using telehealth services during the COVID19 pandemic.	NR	Doula communication and support challenges during COVID19 Adapting and coping as a doula during COVID19	The limitations of virtual doula support The role of physical presence in doula advocacy Provider attitudes about doula care matter during a pandemic Miscommunication about doula services from providers and hospitals Adapting to virtual communication Coaching partners to provide support A growing interest in doula telehealth services Virtual doula education to raise awareness about inequity
Loftus 2022 [78]	Patients	Create multispecialty telehealth-enabled clinics for patients with chronic pain conditions.	To evaluate a multispecialty clinic for patients with central sensitization syndromes that combined virtual pre-visit consultations, traditional facet-to-face appointments, and technology-enabled educational programming.	NR	NR	Set patient expectations of upcoming clinical visits Provide clear communication about services provided within new clinic design Standardize clinic note Provide clear and concise communication among patients, physicians, and care teams Gather subspecialty expertise, refine patient scheduling, consolidate itinerary, and eliminate repetition of patient history Create digital, self-directed patient education program Provide a scalable virtual patient-centric education offering that can be completed within the patient's home

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
	Provider	-	To evaluate a multispecialty clinic for patients with central sensitization syndromes.	-	NR	NR
Smith-MacDonald 2021 [380]	Providers	Deploy trauma therapy via digital health for military, veteran, and public safety personnel.	Determine the barriers and facilitators experienced by mental health service providers in the transition to the use of digital health.	NR	Being forced into change Daring to deliver mental health services using digital health Future possibilities offered by digital health	Facilitators: Not having to travel Greater convenience Greater availability of services (i.e., more therapists available) Increased privacy Reduced mental health stigma from others Barriers: Lack of appropriate internet access Reduced privacy Reduced security Interruption to communications Lack of personal presence Difficulties developing a therapeutic relationship Challenges delivering or receiving therapeutic modality Issues of safety in case of negative response

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
Gilbert 2022 [448]	Patients	Implement virtual consultations in tertiary orthopedic rehabilitiation settings.	Measure patient preferences for orthopedic virtual consultation following COVID19.	Normalization Process Theory (NPT)	Normative expectations Relational expectations Congruence Potential Coherence Cognitive participation Collective action Reflexive monitoring	Establish the norms and rules for care Establish the ways in which patients and clinicians are organized and relate to each other Restrict or develop care pathways that are more easily accommodated in the patient's lifeworld Withhold or provide access to material and informational resources to patients Frame the ways patients make sense of the alternative consultation options Withhold or support patients to invest commitment into the alternative consultation options Make it harder or easier for patients to operationalize the alternative consultation options Frame the ways patients appraise the alternative consultation options
	Providers	-	Measure provider preferences for orthopedic virtual consultation following COVID19.	-	NR	NR
Watson 2021 [472]	Patients	Offer virtual care to cancer patients during the COVID19 pandemic.	Capture key learnings from a rapid virtual care implementation because of the COVID-19 pandemic and to understand the impact on patient experiences.	NR	NR	Less confident addressing topics of death and end-of-life in a telehealth visit. Difficult to comfort someone virtually. Impaired nonverbal communication inherent in conducting assessments over the phone.

Author, Year	Target Participants	Implementation Strategy	Implementation Assessment	Assessment Framework	Emerging Qualitative Themes	Facilitating or Hindering Factors
	Providers	-	Understand the impact of virtual care implementation on staff/clinician experiences.	-	NR	Unable to pick up on nuanced or nonverbal communication and could not read body language. No clear guidelines as to which patients are appropriate for virtual assessment and which are not. Telehealth visits save time and money on traveling, parking, and waiting. Virtual visits worked well for patients who are stable, not on active treatment, on follow-up, or have little or no complications.

IT=information and technology; n=sample size; NR=not reported

Table D.30. Implementation outcomes of studies that included patient participants for telehealth interventions in Key Question 4 (n=25)

Author, Year	Implementation Outcomes
Zeghari, 2021: [418]	
Acceptability	Not assessed
Adoption	Ten subjects were included in the mobile unit setting's first round. Two subjects withdrew from the study and did not attend the second appointment.
Appropriateness	Cognitive scores had significant agreement between the two methods; however, some of the cognitive scores did not have significant agreement. The Wilcoxon Paired sample test did not show significant differences between the two methods.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Lynch, 2021: [293]	
Acceptability	Though staff perceived the shift to telehealth as slightly more challenging for themselves than patients, they emphasized that they "learn[ed] to navigate" the technology and virtual interaction fairly quickly. The conversion impacted staff communication, particularly since it constrained their ability to have informal, but essential, conversations. 22% of the respondents both preferred telehealth sessions and believed that telehealth sessions were as good as in-person.
Adoption	Ninety three percent% (n=56) of the 60 clients enrolled at the time of conversion agreed to maintain their specific treatment plans virtually. Four clients (7%) opted out of telehealth services at time of conversion. Tele- health required more purposeful, formal, and planned communication with patients.
Appropriateness	Staff highlighted that continuity of care had been preserved to a great extent with a swift transformation to virtual services that allowed the full range and structure of supports to still be offered.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Peahl, 2021: [329]	
Acceptability	Half of both patient and provider groups reported that the quality of virtual visits was not equivalent to inperson care.
Adoption	Not assessed
Appropriateness	Majority of both patients and providers were concerned about performing virtual care without home devices and missing pregnancy complications such as hypertension in pregnancy.
Feasibility	Not assessed
Fidelity	Not assessed

Author, Year	Implementation Outcomes
Implementation cost	Our patients collectively saved 40,000 travel miles in 3 months—using the standard Internal Revenue Service mileage rate for vehicle wear ($0.575), this equates to more than $22,700 saved by patients in travel costs alone, not including reductions in childcare burden or the opportunity cost of missed work.
Penetration	Not assessed
Sustainability	Not assessed
Miller, 2021: [307]	
Acceptability	Satisfaction survey was sent to 1153 (75%) patients, and surveys were returned by 307 (27%) patients. The 10-item patient satisfaction survey was complete for 270 patients, and 254 (94%) were at least satisfied. Single yes/no question was completed by 305 patients, with 92% of respondents reporting willingness to participate in additional telehealth physical therapy sessions.
Adoption	Telehealth physical therapy comprised 85% of sessions (84% new, 91% follow-up) during the implementation phase in 2020. Compared with the prior year, a greater proportion of patients reached were younger, primarily English speaking, non-Hispanic White, commercially insured, and had fewer medical comorbidities. All physical therapists conducted at least 1 telehealth session, indicating 100% adoption. The average (SD) proportion of physical therapists' sessions that were delivered using telehealth technology during the implementation phase was 89% (16%).
Appropriateness	Consensus for which strategies should be used to maintain and scale up telehealth physical therapy was achieved among supervisors, champions, and academic stakeholders.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Agarwal, 2021: [437]	
Acceptability	Not assessed
Adoption	Over the study period, 97 patients had at least 1 visit, with a median of 4 (IQR 2–5) visits per patient. There was a total of 415 visits (62% booked as video visits). The median virtual length of follow-up was 8 (IQR 5–10) days.
Appropriateness	The implementation resulted in the following negative outcomes: 4% of patients had an ED visit; 0% patients were hospitalized; and, 0% died
Feasibility	Feasibility testing resulted in 25% sent oximeter, 5% sent thermometer, 4% patients having virtual consultation with internal medicine physician, 16% having virtual consultation with social worker, 6% having pharmacy consultation, and 1% having acute ambulatory care unit consultation.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Gromatsky, 2021: [451]	

Author, Year	Implementation Outcomes
Acceptability	A majority (75%) noted participation increased interpersonal connection and reduced isolation. Participants perceptions of intervention acceptability (M=17.35, SD=2.21), appropriateness (M=17.05, SD=2.33), and feasibility (M=17.25, SD=2.17) were very high. Participants enjoyed and approved of the intervention and found it suitable, applicable, and easy to use.
Adoption	All referred Veterans expressed interest in VA CONNECT and consented, suggesting strong recruitment ability. Attendance and retention were also strong, with 95% attending ≥7 of the core treatment sessions (M=9.3 sessions, SD=1.95, range=2-10).
Appropriateness	A third of participants reported subjective stress and/or symptom reduction.
Feasibility	Interventionists spent only 2.3 hours/session on average, supporting VA CONNECT being both cost- and time-efficient.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Krasovsky, 2021: [456]	
Acceptability	Not assessed
Adoption	Not assessed
Appropriateness	Not assessed
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Braune, 2021: [439]	
Acceptability	In 96.4% (118/122) of the consultations, participants felt confident with remotely uploading, accessing, and reviewing their data.
Adoption	The on-demand clinic service was used by 29% (8/27) of the families. Of these 8 families, 7 (88%) made use of this service once, and 1 (12%) used this service multiple times throughout the study.
Appropriateness	During the monthly check-ups, 90.4% (110/122) of children fully achieved their individual therapy goals, and 6.1% (7/122) partially achieved their individual therapy goals. After completing 3 months of remote consultations, participants time in range (P=.001) and time in hyperglycemia (P=.004) significantly improved. After 3 and 6 months of remote visits, patients time in hypoglycemia did not significantly increase (3 months: P=.21; 6 months: P=.08), no significant changes in HbA1c levels were observed (3 months: P=.43; 6 months: P=.42), and patients psychosocial health significantly improved.
Feasibility	Not assessed
Fidelity	All enrolled participants completed 6 months of monthly remote visits. In addition, 57% (16/28) of the participants opted to remotely attend at least one of their regular clinic visits (i.e., those that occurred every 2-3 months) with their pediatric endocrinologist.

Author, Year	Implementation Outcomes
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Reider-Demer 2022: [102]	
Acceptability	Patient satisfaction with telehealth for neurological care management was high before and during the COVID19 pandemic. 83 (81%) pre-COVID19 survey responders and 788 (88%) COVID19 survey responders either agreed or strongly agreed that they were satisfied with a video visit for care management. 693 COVID19 survey responders (77%) said that they either agreed or strongly agreed that they would prefer to have future video visits for neurological care.
Adoption	Of 9,468 scheduled telemedicine visits, there were 279 no-shows (2.9%) and 9,189 successfully completed telehealth visits (97%).
Appropriateness	Not assessed
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Norman 2022: [461]	
Acceptability	Previrtual care, 3.2% (6/186) of patients who were offered genetic testing declined, compared with 4.7% (12/255) during virtual care (p=.438). Interestingly, a smaller proportion of individuals offered predictive genetic testing declined testing previrtual care (1/37; 2.7% vs during virtual care: 6/49; 12.2%); however, this difference was not significant (p=.231).
Adoption	No significant proportion of patients offered testing previrtual care (186/368, 50.5%) compared with postvirtual care (255/506, 50.4%; p=.965).
Appropriateness	The median time from test offered to blood draw was significantly shorter previrtual care (0 days) than postvirtual care (11 days; p<.001) and a significantly longer period between date of blood draw to results was noted previrtual care to during virtual care (36 vs 29 days; p=.001). The median length of time from receipt of results to disclosure was significantly shorter previrtual care (21 days vs 29 days during virtual care; p=0.034), as was the overall median wait time for genetic testing results (64 days vs 78 days p<.001). Importantly, with median wait times of 21.5 and 23 days, respectively, there was no difference between overall result wait times for urgent patients among previrtual care and during virtual care groups (p=.625).
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Corona 2021: [443]	

Author, Year	Implementation Outcomes
Acceptability	Caregivers reported that the consultant with whom they worked was knowledgeable about interventions (92% reported strongly agree), communicated clearly (90% reported strongly agree), and provided useful recommendations (92% reported strongly agree). Caregivers also reported feeling satisfied with the outcomes of services (86% reported strongly agree). The majority of caregivers reported feeling that the telemedicine consultant was engaged during the session (86% endorsed strongly agree), that they were able to communicate their concerns to the consultant (89% endorsed strongly agree), and that the telemedicine session was private (75% endorsed strongly agree).
Adoption	Not assessed
Appropriateness	Across all groups, caregivers reported specific improvements in child communication development, as measured by various questionnaires. Similarly, caregivers reported increases across all composite scores from pre- to post- intervention.
Feasibility	Qualitatively, caregivers commented that telemedicine visits were convenient (n = 7) and provided an opportunity to continue services during the COVID19 pandemic (n = 2).
Fidelity	Overall, consultants reported completing an average of 82% of treatment objectives during the course of the intervention. Consultants reported that, on average, 70% of objectives were maintained over the course of the intervention.
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
El Zammar 2022: [446]	
Acceptability	75% of respondents were very satisfied or satisfied with telephone virtual care as a follow-up to their ED visit. 60% of patients strongly agreed while 25% agreed that they understood the explanation of their condition that was provided during the telephone follow-up.
Adoption	Not assessed
Appropriateness	Not assessed
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	95% of patients would like to continue to receive telephone follow-up care from the ED in the future.
Payan 2022: [464]	
Acceptability	Not assessed
Adoption	Audio-only visits were of particular benefit to reach patients of older age, with limited English proficiency, and with limited digital literacy.
Appropriateness	Some patients said it was difficult to assess the validity of different sources when they encountered conflicting information.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed

Author, Year	Implementation Outcomes
Penetration	Not assessed
Sustainability	Not assessed
Weems 2021: [473]	
Acceptability	Older adults appreciated the strength of group facilitators and reported enhanced connectedness related to virtual support.
Adoption	Telehealth was easy to access, but barrier such as technological equipment & broadband access, and participant distraction limited the adoption. Recruitment involved reminders and one-on-one discussions to encourage participation.
Appropriateness	Not assessed
Feasibility	Structured and comprehensive content included in the facilitator training, facilitator handbook and participant workbook empowered facilitators in content delivery.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Fogarty 2021: [447]	
Acceptability	Engaging in the online program was less stressful and more comfortable for children. Children appeared to enjoy and/or reported that they liked the telehealth sessions, with parents expressing relief that their child had a positive experience of help-seeking.
Adoption	Telehealth modality increased accessibility of the service, particularly for parents with multiple children who may otherwise have had to arrange childcare to attend sessions. Some parents noted a preference for some face-to-face sessions which can allow for different therapeutic techniques and may be less tiring and more engaging for children than screen time. Telehealth enabled parents to access therapeutic services for their child without taking time off work or arranging childcare for siblings.
Appropriateness	Parents, children, and clinicians were able to develop a strong level of trust and connection. Creativity of online activities was noted as a strength by parents who described how it assisted in rapport building and engagement with their children. Participating in the telehealth program and the support and therapy provided contributed to an increase in parenting skills and confidence.
Feasibility	At times children had difficulty maintaining attention and engagement across the telehealth session, particularly after spending considerable amounts of time in front of a screen during the day for remote learning at school.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Ward 2021: [471]	

Author, Year	Implementation Outcomes
Acceptability	Patients were willing to try telemental health because of the ongoing COVID-19 pandemic. 97% of patients agreed that the intervention improved access to mental health services. 96% of patients agreed that the intervention added value to their care. 99% agreed that they were very satisfied with the intervention. The perception of improved speed and efficiency of care contributed to increased patient satisfaction. Patients had a positive experience with telemental health, likely due to the timeliness of care.
Adoption	Demographics of the consultations were similar between preimplementation in-person compared with telemental health consultations postimplementation. The distribution of visits by site, age group, sex, race, and rurality was unchanged; however, in-person visits post-implementation were older, more likely to be female, Black, and urban.
Appropriateness	Safety and efficacy outcomes did not decline postimplementation.
Feasibility	99% of patients agreed that the sound quality was good. Patients identified minor technical barriers that were easily overcome. Telemental health also offered advantages over other forms of unscheduled mental health care provided during the pandemic (e.g., telephone) such as the ability to take down one's mask during the virtual encounter.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Following implementation, telehealth use was tracked for an additional 10 months and a total of 1010 telemental health consultations were performed. Use of telemental health remained steady at 82% of all consultations ranging from 73% (Dec 2020) to 88% (Jun 2020).
Gmunder 2021: [449]	
Acceptability	Not assessed
Adoption	Being a new patient (i.e., not a follow-up visit) was associated with a 12.5% decrease in odds compared with being a follow-up for the provider ($p<.001$). Patients who confirmed their appointment were 6.6 times more likely to complete their visit compared with those that did not answer the phone or text message (95% CI 6.483-6.717). Even those who only answered the phone call reminder but did not confirm the visit were almost twice as likely to complete their visit than those who had not answered (OR 1.930, 95% CI 1.790-2.081). MyUHealthChart portal status not activated had a 68.5% decrease in odds of visit completion in comparison to the activated MyUHealthChart reference group ($p<.001$). MyUHealthChart status of patient declined was associated with a 55.4% decreased odds of completion compared with the MyUHealthChart reference group (95% CI 0.344-0.577).
Appropriateness	Not assessed
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed

Author, Year	Implementation Outcomes
Penetration	Not assessed
Sustainability	Not assessed
Dennett 2021: [445]	
Acceptability	The telehealth program was acceptable to both patients. The median score on the System Usability Scale was 77.5 (IQR 67.5-90), indicating above average usability of telerehabilitation.
Adoption	Not assessed
Appropriateness	Perception of safety was increased when patients used video.
Feasibility	Main challenges of the program described by patients was poor internet infrastructure and lack of private space to complete online consults.
Fidelity	Most sessions were conducted via videoconference (n=381, 55%), followed by telephone (n=294, 42%), with the remaining sessions conducted in person. All patients received health coaching from a physiotherapist. A total of 61 (50%) patients received at least one nursing session. A total of 17 patients were referred to other disciplines from supporting programs. The average individual telehealth session duration was 25 (SD 9) minutes. Patients attended 80% (674/843) of scheduled 1:1 telehealth sessions. The primary reasons for nonattendance were unable to contact/forgot (90/169, 53% missed sessions), followed by conflicting appointments (37/169, 22% missed sessions).
Implementation cost	There was no cost to patients receiving telerehabilitation. Three patients required a home visit due to safety concerns, and 8 participants attended sessions at the center, as the program transitioned in and out of COVID19 restrictions.
Penetration	Not assessed
Sustainability	Not assessed
Zayde 2021: [130]	
Acceptability	On average, the participants reported high levels of alliance and cohesion after their first telehealth session. All participants perceived fit of the leader's and group's approach; feeling like part of the group; and feeling understood, respected, and accepted by the leader and the group.
Adoption	No-show rates decreased after the transition to telehealth relative to those for in-person treatment prior to the transition. The transition to the telehealth format had a small effect on participant no-show rates, although this decrease did not reach statistical significance. In-session participation rates were 100% during the in-person sessions and remained at 100% during the telehealth sessions. Duration of attendance was 95% across all in-person sessions and increased marginally to 97% across all telehealth sessions.
Appropriateness	Participants reported significantly fewer depressive symptoms (i.e., lower PHQ-9 scores) at the 20-week follow-up than they did prior to their first telehealth session. Participation in telehealth sessions had a large effect on depressive symptoms, with a statistically significant mean decrease of 4.70. Participants reported significantly fewer symptoms of anxiety (i.e., lower GAD-7 scores) at the 20-week follow-up than they did prior to their first telehealth session. Participation in telehealth sessions had a large effect on symptoms of anxiety, with a statistically significant mean decrease of 5.40.
Feasibility	25% of participants reported concerns about privacy. These concerns included being at home with other household members, other group members having household members at home, and technology-related issues such as hacking.
Fidelity	Not assessed
Implementation cost	Not assessed

Author, Year	Implementation Outcomes
Penetration	Not assessed
Sustainability	Not assessed
Ketigian 2021: [455]	
Acceptability	Overall, perceived improvements in symptoms and mood, together with the majority of respondents reporting very satisfied with each program, underscore satisfaction.
Adoption	Prior to the pandemic, an estimated 125 patients regularly attended at least one session per week. Attendance was not tracked for in-person support groups for anonymity purposes. By the end of July 2020, an estimated 75 patients were taking part in at least one virtual program. Virtual visits averaged 30 to 35 participants for the high functioning class.
Appropriateness	Majority of vRSB respondents felt the program improved their motor symptoms (83%) and mood (74%), with many reporting they would continue with online classes post pandemic (59%).
Feasibility	Barriers to participation in online programs were few and unique to each program with the most common barrier to vRSB being other (ex: difficulty focusing) (48%), to vSG, not the same as in-person (25%) and to Buddies, it would be awkward/I would have nothing to talk about (27%).
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Oelmeier 2021: [462]	
Acceptability	88% of participants had never used a video consultation with a health care professional before, but 96% of participants would do so again after their experience.
Adoption	Not assessed
Appropriateness	96% percent of remote consultations were considered useful.
Feasibility	More than one-third (37%) of the video consultations encountered technical problems of some kind.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Williams 2022: [475]	
Acceptability	A number of participants felt that video-conferencing sessions lasting 45-60min would be more tiring compared to face-to-face sessions and this could lead to lapses in concentration. It was suggested that group sizes should not fall below four patients to enable a good group dynamic but should be limited to enable discussion, without becoming overwhelming.
Adoption	Not assessed
Appropriateness	Not assessed

Author, Year	Implementation Outcomes
Feasibility	Maintaining access to physical written resources, gym facilities and exercise equipment was important to patients, and it was observed that these would not be accessible in the home environment. Paper-based resources such as technology guides, timetables and introductions to therapists were identified as essential for successful preparation. Sending information in advance was recommended.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Loftus 2022: [78]	
Acceptability	Patients provided positive feedback regarding their virtual previsit consultation as part of the complex care coordination telehealth clinic. Patients found the video call a very important interaction to allow them to tell their sign and symptoms to the doctors. Patinets found the telehealth approach suitable when traveling or living out of the state.
Adoption	When compared the comparison cohort, the telehealth complex care coordination clinic did not statistically significantly increase the number of appointment, imaging, or procedures
Appropriateness	More patient medical advice was given to the patients in the telehealth coordination clinic but it was not statistically significantly different from the comparison cohort.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Gilbert 2022: [448]	
Acceptability	Patients felt interactions over virtual care were inferior to face-to-face care; however, patients were willing to compromise and accept virtual consultation during COVID19. If concerned about their problem, patients often felt that a face-to-face assessment was preferable to a virtual consultation visit. Patients valued the extra time with their clinician and found this aspect of the virtual consultation to be beneficial. Patients had set expectations about their own progress and were reluctant to engage a modality if they felt it was less effective than their preferred option.
Adoption	Each individual patient had varying degrees of ability to incorporate virtual consultation. Some patients found that virtual care was more easily incorporated into their life than an in-person consultation and would consider using virtual consultation in the future beyond COVID19. Patients' access to resources shaped their ability to engage with virtual consultation. Patients who found face-to-face attendance challenging were more committed to virtual consultation. Virtual consultation rehabilitation was challenging in the home environment for some patients. Some patients and clinicians did not have the technical skills required to be able to use virtal consultation.
Appropriateness	It was not possible to conduct the range of interventions that were often needed if the patient's video device was not portable.

Author, Year	Implementation Outcomes
Feasibility	There was recognition that different individuals would have different access to resources.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Watson 2021: [472]	
Acceptability	Patients reported high satisfaction with virtual visits with percentage of positive responses ranging from 69.3% to 94.5%. Only 35.8% agreed or strongly agreed that it was easy to meet patients' needs who attended a virtual appointment. When asked about their confidence in meeting specific patient needs virtually, generally low levels were reported (50% confident).
Adoption	Not assessed
Appropriateness	Not assessed
Feasibility	Patients expressed positive experiences with ease of accessing care virtually while saving travel time for themselves, their family, and/or care providers.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Overall, 67% of patients indicated interest in receiving some degree of virtual care beyond the pandemic. Only 10% did not want to receive any virtual care in the future. The remaining 23% were either unsure or responded with a variation of yes.

ED=emergency department; IQR=interquartile range; M=mean; n=sample size; P=p-value; SD=standard deviation; VA=Veteran's Affairs

Table D.31. Implementation outcomes of studies that included provider participants and/or health systems for telehealth interventions in Key Question 4 (n=39)

Author, Year	Implementation Outcomes
Ouellette, 2021: [463]	
Acceptability	Not assessed
Adoption	Not assessed
Appropriateness	Not assessed
Feasibility	Flexibility in adapting training goals.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Lopez et al, 2021: [458]	
Acceptability	Not assessed
Adoption	Number of referrals increased substantially over the course of the first 90 days. Attendance rates ranged from 80%-93% across visit types and remained relatively consistent throughout the 90 days. The proportion of appointments completed over video compared with phone increased substantially after the first 30 days. Maximum number of comprehensive assessments that could be scheduled per week slightly decreased; however, the capacity for most 1-on-1 appointments increased.
Appropriateness	Average wait time decreased for comprehensive assessments (12 weeks in-person vs 4 weeks virtual), in part because of the decrease in referrals during the initial hospital-wide shift to virtual care.
Feasibility	Not assessed
Fidelity	Virtual care demonstrated an increase in the number of completed visits for all appointment types compared with the previous 3 months of in-person care.
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Mishkind, 2021: [459]	
Acceptability	Not assessed
Adoption	10.6% decrease in scheduled appts immediately following virtualization compared with the prior 2 weeks Completed visits decreased 6.33% from immediately pre- to immediately post-virtualization Overall monthly average of scheduled appointments increased with no-show rates decreasing. The daily mean of scheduled visits increased 17.8% from 46.5 to 54.8 across 6 months post-COVID virtualization.
Appropriateness	Not assessed
Feasibility	Not assessed

Author, Year	Implementation Outcomes
Fidelity	Clinic volume was back to, and beginning to exceed, immediately pre-COVID rates within a month of virtualization. The decrease in no-show rates led to a 26.2% increase in completed visits from a mean of 40.5 per day the first 2 months of the year to a mean of 51.1 post-COVID.
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Guarino, 2020: [452]	
Acceptability	Not assessed
Adoption	The telemedicine system did not postpone appointments, thus preventing any unintended loss to follow-up.
Appropriateness	A sizeable proportion (about 75%) of outpatient visits can be managed effectively with telemedicine without compromising patients health or quality of care.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Managed to avoid a surge in outpatient activity after the lockdown due to a backlog of postponed care.
Sustainability	Not assessed
Kapoor, 2020: [453]	
Acceptability	Not assessed
Adoption	Virtual visits were offered to 237 patients. Of these, 25 patients declined, and 212 visits were scheduled.
Appropriateness	Not assessed
Feasibility	Not assessed
Fidelity	Of the scheduled visits, 206 (97%) were completed by 7 providers. Of these, 43 were new patient visits and 163 were follow-up visits.
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Careyva, 2021: [441]	
Acceptability	Not assessed
Adoption	During the 11-week study period, 10,673 e-visits and 31,226 video visits were completed, for a total of 41,899 virtual visits. Video visits made up 60% (n = 7,688) of COVID-19 screening virtual visits, and 40% (n = 5,058) were e-visits.
Appropriateness	COVID-19 tests for 4,267 were ordered because of these COVID-19 virtual visits, for an overall testing rate of 33%.
Feasibility	Not assessed
Fidelity	Of the 41,899 visits, 12,746 were conducted for COVID-19 screening for patients expressing symptoms consistent with COVID-19.
Implementation cost	Not assessed

Author, Year	Implementation Outcomes
Penetration	Not assessed
Sustainability	Not assessed
Childs, 2020: [442]	
Acceptability	Not assessed
Adoption	During the first week of COVID-19 shutdown, telehealth comprised 65.45% of the visit volume, where 100% of these visits were telephonic sessions. In the second week of the pandemic response, telehealth accounted for 91.6% of the visit volume, where the bulk remained telephonic (83.49%), with a small margin of patient portal video visits at 15.6%. By the third week of the pandemic response, virtually no visits occurred in person, with 99% of the visit volume being accounted for by telehealth.
Appropriateness	Not assessed
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Lynch, 2021: [293]	
Acceptability	Challenges were found related to increased interruptions and distractions during sessions. The clinic adopted a collaborative approach to help clients navigate “the social grace" of engaging in online group therapy. Session attendance did not significantly differ over time or between in-person and telehealth formats.
Adoption	In the six-weeks prior to the telehealth conversion (pre), the clinical sample (n=60) attended an average of 22.58 (SD=14.02) sessions (3.76/ week) while missing an average of 5.63 (SD=5.71) sessions (0.94/ week). Following telehealth conversion (post1), 56 in-person participants and 8 newly consented individuals accepted telehealth (n=64) attended an average of 22.48 (SD=15.87) sessions (3.75/week), while missing an average of 4.31 (SD=4.13) scheduled sessions (0.72/week). During the subsequent six-week period (post2), telehealth participants (n=62) attended an average of 23.53 (SD=14.89) sessions (3.92/week), while missing an average of 2.37 (SD=2.12) scheduled sessions (0.4/ week). During the 18-week study timeframe, there were no documented psychiatric decompensations or referrals to higher levels-of-care.
Appropriateness	Managing group dynamics in virtual sessions required more active facilitation.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Peahl, 2021: [329]	

Author, Year	Implementation Outcomes
Acceptability	Home devices were seen as important for patient and provider comfort. 92.2% of patients (213 of 231) and 95.5% of providers (63 of 66) believed that a home blood pressure cuff was important for virtual prenatal visits. 84.8% of patients (196 of 231) and 71.2% of providers (47 of 66) believed that a home fetal Doppler was important. Many patients and almost all providers reported that the COVID-19 prenatal care model improved patients' access to prenatal care. Most patients (92.9%) and providers (88.3%) reported that using virtual visits was easy. Providers (39%) reported more technical issues than patients (7.9%).
Adoption	Prenatal care visit volume decreased by 31.6%, from 1051 visits before the pandemic, to 719 visits during the week of June 28, 2020. During this time, virtual visits also increased from 101 to 239 (136.6%).
Appropriateness	Most patients and providers felt prepared to conduct virtual prenatal visits.
Feasibility	Not assessed
Fidelity	Across the pre- and postimplementation periods, the average total visit volume fell from 898 to 765 visits (16.1%), and the average weekly proportion of virtual prenatal visits increased from 10.8% (97 of 898) to 43.3% (330 of 761).
Implementation cost	The 1265 patients seen over the study period saved more than 40,000 miles of travel through the conversion of in-person visits to virtual care.
Penetration	Not assessed
Sustainability	More providers (92.2%) than patients (40.3%) reported willingness to continue telehealth visits after the pandemic.
Saliba, 2020: [354]	
Acceptability	Technology was one of the top 3 concerns regarding video visits for 30 (63%) survey respondents. Perceptions of workflow efficiency were mixed. Major issues included rigid video visit scheduling, note-taking efficiency, and pre-visit planning. 40 (83%) surveyed clinicians agreed or strongly agreed that video visits supported their overall well-being. Most survey respondents (n=39; 81%) agreed that video visits should be supplemented with in-person visits. A concern mentioned by a minority of interviewees and 7 (15%) surveyed clinicians was that patients may find video too convenient and opt out of recommended in-person visits.
Adoption	Out of the 68 clinicians in the department's 11 ambulatory subspecialties, 66 clinicians conducted regular video visits during the 8-week implementation period. During the 8-week implementation period, video visit adoption was high based on both percentage of clinicians using them, and percentage of visits completed via video. Within the first two weeks, 52 (79%) clinicians integrated video into their practice, increasing to 65 (98%) clinicians by week 6. Almost all (92%) visits were conducted via video and adoption of video visits was high for both new and return patient visits (93% and 91% of completed visits, respectively).
Appropriateness	Barriers included access to technology, technological literacy, and language. Physical examination was more time-consuming, required assistance from caregiver at times as camera positioning and lighting were sometimes a limitation. Majority agreed that new patient visits, and patients with acute conditions and declining health, were less suited due to relative ease of the complete physical examination.
Feasibility	Not assessed
Fidelity	The total number of completed visits, conservatively estimated, was almost 80% of expected visits based on the 2019 comparison period.
Implementation cost	Not assessed

Author, Year	Implementation Outcomes
Penetration	Not assessed
Sustainability	Most clinicians were positive toward video visits and believed they could incorporate video into their practice long-term, although several insisted that video cannot replace a full in-person examination. Pre-visit screening and triage to determine which patients are best suited for video was considered burdensome, which could compromise sustainability.
Shur, 2020: [466]	
Acceptability	Providers expressed satisfaction with this model and internal polling showed that all providers wanted some form of telemedicine in their practice with the majority targeting around 50%.
Adoption	Patient no-show rates from comparable time periods for in-person visits were 13.6 and 14.4% respectively. For pre-COVID telemedicine visits (n = 136) the no-show rate averaged 9.1% and post-COVID (n = 474) was 8.9%. From the start of the post-COVID-19 telemedicine conversion, 150 medical geneticist encounters were captured. There were 116 additional charges by genetic counselors and dietitians.
Appropriateness	Not assessed
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	From the launch of the pilot program, medical geneticists, genetic counselors and dietitians participated; however, only medical geneticist billing was allowed by the hospital compliance team.
Penetration	By week three, the program was at 80% of normal clinical productivity.
Sustainability	Not assessed
Gonzalez, 2020: [450]	
Acceptability	Not assessed
Adoption	Fourfold increase in advice line contacts during the study period, increasing from 58 calls to 238 calls. 59% of the calls during the study period were for COVID-19 related queries, 13.4% were related to IBD flares, and 27.8% were related to advice about medications including home supply of biologics and supply issues of thiopurines. 27 new patients commenced biologics in the study period in comparison to 13 patients during the corresponding period in 2019.
Appropriateness	Of the 18 new referrals who had virtual consultations for suspected inflammatory bowel disease, 11 patients had calprotectin performed in primary care, and for the remaining seven, calprotectin was arranged by the service. Six patients were admitted – five with ulcerative colitis and one with Crohn's disease – and one patient required colectomy. Four patients were initiated on biologics during admission.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Cox, 2021: [444]	
Acceptability	Not assessed

Author, Year	Implementation Outcomes
Adoption	Previous telerehabilitation experience was limited with only 10% having used telerehabilitation for assessment of clients and monitoring of therapy sessions, 7% having used telerehabilitation to deliver therapy sessions, and 3% using telerehabilitation for group therapy programs At the conclusion of the 6-week brief intervention, more than half of all client consultations (58%) were taking place via telerehabilitation.
Appropriateness	The proportion of participants who reported using telerehabilitation for assessment and monitoring rose to 54%, for delivery of therapy sessions to 27%, and for 12% of group therapy programs.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Patt, 2021: [328]	
Acceptability	Not assessed
Adoption	Our practice conducted 50,000 telemedicine visits with patients yet had a substantial gap in the number of new and established patients from what we had forecasted we would serve year over year. After onboarding, telemedicine comprised about 15%-20% of new patient visits and 20%-25% of established patient visits.
Appropriateness	No-show rates by telemedicine for established patients were 50% of the no-show rate for traditional office visits during COVID-19.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Nursing and practice administration developed workflow guidelines, and more than 900 clinical support staff were trained on the platform to guide patients and perform usual clinical duties through the platform. Educational content was developed in the form of hand outs and website content to educate patients about the telemedicine platform to optimize engagement and specification requirements. Local tech support was trained on the platform to optimize audio and video interface. Patient education and support were developed and provided through web-based tools and support staff directly. Clinic liaisons were trained to provide information to referring providers on the ability to conduct telemedicine services for management of new and established patients.
Sustainability	Not assessed
Krasovsky, 2021: [456]	
Acceptability	Results showed that when comparing the different goals, therapists estimated that the ability to maintain the therapeutic alliance was superior to the ability to achieve other goals. Results identified environmental characteristics, such as the presence of siblings or the child's personal toys, as facilitators for therapy.
Adoption	Not assessed
Appropriateness	Items related to the child component were scored significantly lower than those related to the session itself or to the parent. The ability to evaluate the status of the child and to efficiently transfer feedback were particularly reduced. Our results further showed that with younger children, the ability to communicate feedback, grade levels of difficulty and provide guidance for parents was diminished. Our results further demonstrated that the ability of telerehabilitation to provide coping strategies for parents was relatively high.

Author, Year	Implementation Outcomes
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Van Citters 2021: [402]	
Acceptability	Readiness to adopt telehealth (i.e., individual stage of change) was a facilitator for programs that saw telehealth as similar quality to in-person care and barrier for programs that saw telehealth as worse quality.
Adoption	Not assessed
Appropriateness	Innovation characteristics were often a barrier to programs with lower perceived telehealth quality. Clinicians were less likely to see telehealth as a priority or as an essential alternative to in-person care.
Feasibility	All programs perceiving telehealth as similar quality to in-person care. Telehealth aligned with team values and systems; and teams often created synchronous or asynchronous workflows that allowed the multidisciplinary team to participate in visits. While several programs had home monitoring equipment available, they often had limited availability of the multidisciplinary team or limited numbers of computers or monitors to provide telehealth. Clinicians found it difficult to incorporate telehealth into workflows or coordinate and sequence care using telehealth.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	External policies and incentives (e.g., temporary rules for providing telehealth) as facilitators for providing telehealth.
Reider-Demer 2022:[102]	
Acceptability	92% of providers either agreed or strongly agreed that they were satisfied with the quality of care they provided via telehealth. 96% of providers stated that they agreed or strongly agreed that they would incorporate telemedicine visits for follow-up visits.
Adoption	Not assessed
Appropriateness	58% of providers said they would use telemedicine for new clinic consultations. 77% of respondents reported that they agreed or strongly agreed that they could provide an adequate clinical evaluation with the information obtained in a telemedicine visit. 48% of providers agreed or strongly agreed that the inability to obtain a full physical examination affected their clinical evaluation.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Kreider 2022: [457]	

Author, Year	Implementation Outcomes
Acceptability	Patients' acclimation to telehealth technologies for rehabilitation visits was supported by the adoption of telehealth by medical primary care providers. Societal shift to extensive use of remote technologies brought about by the pandemic was perceived as a helpful primer for Veterans' acceptance of telerehabilitation.
Adoption	Not assessed
Appropriateness	Not assessed
Feasibility	Health care providers from outside of rehabilitation also leveraged their experience and shared knowledge gained during their own telehealth sessions with other VHA providers, including those in rehabilitation. The telehealth sessions were supported by existing infrastructure and expertise. This infrastructure included a three-year-old team of program managers and rehabilitation clinicians with experience delivering telerehabilitation assessments and interventions to rural Veterans.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Administrative support from facility leadership and rehabilitation management included the availing of extra rooms and quiet spaces, as well as the computers and accessories needed to ensure patients' privacy during telerehabilitation visits.
Weiskittle 2022: [474]	
Acceptability	Clinicians generally indicated that Veterans enjoyed the groups and desired to participate again in the future.
Adoption	Not assessed
Appropriateness	Clinicians felt that telehealth sessions addressed COVID-related worry (M = 3.56, SD = 0.86) and social isolation in Veterans who participated (M = 3.61 SD = 2.04), with 55.6% of respondents describing the group as very or extremely effective in addressing social isolation, and 55.6% describing the group as very or extremely effective in addressing COVID-related worry. 66.7% reported they would definitely run this group again, 22.2% reported they would likely run the group again, and 11.1% stated they might or might not run the group again. 100% of respondents reported that they would be interested in a modified version of the manual for telehealth services post-COVID. Respondents noted the group was helpful for skill-building, led to social connections between Veterans, and demonstrated feasibility for use in geriatric mental health care.
Feasibility	Clinicians indicated the manual was a valuable guide for conducting group teletherapy with the complex older Veterans served in these settings.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Albert 2021: [438]	
Acceptability	Clinicians noted that telehealth visits reduced barriers to care involving transportation, travel time, work conflicts, and childcare, which resulted in much lower no-show rates for virtual appointments relative to in-person appointments. Interviewees felt that patients appreciated the ease of access characteristic of telehealth visits and cited this as a main motivation to maintain availability of telehealth visits post-COVID-19, pending reimbursement for such services.

Author, Year	Implementation Outcomes
Adoption	Practices were able to continue to care for their patients during the height of the COVID19 pandemic through a combination of telehealth and limited in-person visits. Certain groups of patients were more difficult to reach during this time. Persons with less access to the Internet, technology, or knowledge of how to navigate technology were among those that were most challenging to engage in telehealth. Older adult population was identified by several clinicians as a difficult to reach population; while they were fearful of in-person visits, they often had less access to, and experience with, technology. Respondents reported that patients' family members, caregivers, and in some cases practice staff helped bridge the digital divide. In addition to seniors, those with fewer resources, who are already among the most vulnerable, tended to have less access to the Internet and technology. One clinician noted that it was challenging to reach their refugee and immigrant populations and, even when reached, a lack of language concordance between the practice providers and staff and patients was a contributor to gaps in care, along with less acumen in navigating the health care system.
Appropriateness	A small number of providers cited benefits for elderly patients acknowledging that, while technology can be challenging for this subpopulation to set up initially, telehealth is the ideal visit format for this population even in the absence of a public health crisis as it reduces their exposure to common cold and seasonal flu, among other threats to their health that accompany in-person visits to the clinic. One respondent credited telehealth for bringing people back into care who had not been seen by the practice for quite some time. Home-based monitoring, when available, enhanced chronic disease management and was said by some to be a helpful, almost the same way of managing patients relative to in-person visits
Feasibility	The primary disadvantage noted by respondents was that not all patients have access to these monitoring devices, though one practice was able to overcome this obstacle by mailing patients blood pressure cuffs and glucometers, and another practice contracted with a company to have home International Normalized Ratio (INR) machines delivered to their patients. On the downside, practices were less able, or not able at all, to have labs taken and were not able to make necessary referrals (e.g., eye exams for diabetics).
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
El Zammar 2022: [446]	
Acceptability	80% of clinicians were either satisfied or very satisfied with their overall experience and found value in providing virtual follow-up care.
Adoption	Not assessed
Appropriateness	One case was identified by the provider as a potential safety concern. In some cases, it may have even been more appropriate for patients to be near their families when the cancer results were delivered instead of alone in the exam room due to visitation restrictions during the COVID19 pandemic.
Feasibility	Challenges physicians encountered are inability to reach patients (55%), too few patients per clinic (20%), inability to arrange appropriate follow-up (20%) and too many patients per clinic (5%).
Fidelity	Not assessed
Implementation cost	Not assessed

Author, Year	Implementation Outcomes
Penetration	Not assessed
Sustainability	In terms of future direction, 80% of physicians would like to continue providing the virtual care follow-up clinic, while 13% were neutral and one physician did not want to be involved.
Keppel 2022: [454]	
Acceptability	Two-thirds (62.5%) of clinics reported patient willingness to use telemedicine as a moderately or highly significant barrier. Only 12.5% of clinics reported that staff or clinician willingness to use telemedicine was a moderately or highly significant barrier.
Adoption	The majority of clinics (81.3%) cited patient access to needed technology as a moderately or highly significant barrier to the use of telemedicine. About half (56.3%) of clinics identified billing or reimbursement for telemedicine as a moderately or highly significant barrier to telemedicine use.
Appropriateness	The vast majority (81.3%) of clinics diverted patients with respiratory symptoms to a telemedicine evaluation, rather than seeing them in clinic. Over two-thirds (68.8%) of clinics diverted patients with respiratory symptoms to be seen in-person at another location off-site, such as a tent, emergency department, or drive-in visit.
Feasibility	The most common change to in-person care was to redesign workspace and implement procedures to allow for social distancing (62.5%). Less than half of clinics segregated off sections of the clinic (31.3%), dedicated rooms for in-person care (37.5%), or assigned dedicated providers to provide in-person care (18.3%). Two-thirds (62.5%) of clinics implemented at least three strategies to provide routine patient care.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Payan 2022: [464]	
Acceptability	Not assessed
Adoption	Personnel with limited telemedicine knowledge and prior experience struggled, saying a lack of knowledge and uncertainty about appropriate use was challenging in the face of rapid implementation and workflow changes.
Appropriateness	Not assessed
Feasibility	Personnel committed to providing patient-centered care and serving marginalized patients also facilitated their rapid transition to remote care. Personnel identified as central to facilitating implementation and use, included: (1) champions at various levels to provide leadership, motivation, and expertise; (2) clinic staff responsible for preparing patients and intake processes prior to each visit; (3) IT personnel to issue equipment and provide technical support; and (4) bilingual personnel who provided high quality language concordant care.
Fidelity	Not assessed
Implementation cost	Reimbursement policy confusion was particularly difficult to navigate.
Penetration	Not assessed
Sustainability	Not assessed
Thomas 2022: [469]	
Acceptability	General preference was expressed to meet a new consumer in-person, build rapport, and complete an initial assessment and then determine an appropriate modality of care. Clinicians felt more comfortable conducting reviews by telehealth as opposed to initial assessments.

Author, Year	Implementation Outcomes
Adoption	Services with prior telehealth experience and those providing tertiary (state-wide) care were better equipped to transition to telehealth modalities. Lack of telehealth policies and protocols and the technological infrastructure to deliver telehealth seamlessly. The rapid transition to telehealth came with considerable technology issues including low availability of peripheral devices (e.g. webcams), low data network capacity and the use of multiple video conferencing platforms which caused confusion. Clinicians perceive limited consumer demand for telehealth; greater consumer-end support required.
Appropriateness	Certain activities (e.g. when the clinician is required to touch the consumer or perform a procedure) are best conducted in-person and most clinicians wanted some in-person interaction. Consumer safety was also a reported concern, with the perception there is an additional risk if consumers perform activities without a clinician physically present.
Feasibility	Telehealth (particularly telephone calls) was reported to result in lower consumer engagement. Interestingly, some clinicians also appeared less engaged, reporting a lower sense of job satisfaction when providing care purely via telephone and increased fatigue when providing care via video conferencing. Limited clinician benefits were reported with a perception that telehealth increased their workload and reduced efficiencies. Many clinicians felt telehealth models were less efficient due to technical issues and could not achieve the same outcomes as in-person care. Lack of adequate space to conduct telehealth consultations was also a common issue across all sites, identifying a need for more dedicated spaces.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Der Martirosian 2021: [424]	
Acceptability	Not assessed
Adoption	Volume of all outpatient visits after the onset of COVID19 decreased for all 3 clinics. In terms of unique patients, the number of patients who accessed outpatient services at all 3 clinics 12 months before compared to 12 months after the onset of COVID19 also decreased. At the onset of COVID (during March 2020), telehealth use increased substantially after the onset of COVID-19 and reached its peak at 15,480 for one of the clinics in May 2020. Starting in August 2020, the use of telehealth services for all 3 clinics started to decline slightly, but never reached pre-COVID19 levels during the 12 months after the onset of COVID19.
Appropriateness	Not assessed

Author, Year	Implementation Outcomes
Feasibility	Most providers had experience providing care over the phone for follow-ups and medication management prior to COVID19. All providers were required to take virtual care training courses prior to the pandemic, and although some reported taking the course again at the onset of the pandemic, most were at least cursorily familiar with the technology. Although most clinics did not have the support or equipment necessary to widely use of virtual care, some respondents did report using telehealth for warm handoffs, whereby a physician would conduct a face-to-face visit with a patient and then connect with another subspecialty physician for consult. The telehealth platform was described as confusing for both patients and providers. Each clinic had its own scheduling infrastructure, which in turn significantly impacted the way the clinic's providers perceived the transition to telehealth.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Story 2021: [468]	
Acceptability	Respondents reported staff comfort level with telehealth on the higher end of the scale (median = 7), with 14% reporting 10 for comfort (scale 1–10, with 10 indicating the most comfortable).
Adoption	Not assessed
Appropriateness	Not assessed
Feasibility	Approximately 67% reported more than half of their full-time employees (FTEs) were telehealth capable; however, 19% of facilities reported 0% of their FTEs were telehealth capable. The majority of facilities (61%) reported having the clinical grid installed to capture proper clinic workload; the remaining facilities either did not (22%) or were unsure (17%). Lack of administration support (4%) and setting or environmental restrictions (10%), such as inpatient services only or lack of private office space to facilitate. Clinicians had difficulty with medical record documentation and a stop code for administrative purposes. The most consistently reported barrier to telehealth utilization was Veteran's lack of understanding (33%).
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Budhwani 2021: [440]	
Acceptability	Provider survey respondents indicated that, on a scale of 1 to 10 (with 1 being not at all likely and 10 being extremely likely), they would recommend use of video visits to other providers at an average rating of 7.9
Adoption	77% of provider survey respondents strongly agreed or agreed that they had adequate training and resources to learn how to use video visits, and 73% strongly agreed or agreed that they would have appropriate support if an issue were to arise with a video visit.

Author, Year	Implementation Outcomes
Appropriateness	In most cases, providers felt that quality of care during phone and video visits was inferior to that of in-person care. Virtual care was considered to be sufficient, but not excellent, quality of care in comparison to in-person care both during the pilot and during the pandemic.. Only 27% of mental health provider survey respondents strongly agreed or agreed that the quality virtually was similar to an in-person exam, while 80% strongly agreed or agreed that their last video visit enabled them to sufficiently address the patient's clinical need.
Feasibility	Factors affecting feasibility included: scheduling virtual appointments; workflow modifications; patients required education and support to set up virtual patient portal, which required staff time; technological issues (e.g., connectivity & bandwidth); increased administrative tasks for providers; and more burnout from virtual care; Pre-existing pilot that was implemented 3 months prior to the pandemic was perceived to contribute to the rapid uptake of video visits in mental health. Physician providers expressed the value-add of having billing codes and available financial compensation for the delivery of video and phone visits, as phone visit billing codes were unavailable to providers prior to the COVID19 pandemic.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Reid 2022: [465]	
Acceptability	Providers were receptive to the implementation of telemedicine visits.
Adoption	Providers reported generally gaining knowledge and access to information about telemedicine visits through in-person and online trainings. In particular, providers with fewer years in practice revealed that the process of familiarizing oneself with telemedicine was easier for younger or more tech savvy colleagues.
Appropriateness	Providers mostly considered telemedicine a usefulness alternative to deliver obstetric care especially for low-risk obstetric patients.
Feasibility	Technology access and support, staff support, time availability, and access to at-home monitoring devices (e.g., blood pressure machine). For some providers, resources for telemedicine implementation were considered adequate, while for others the opposite held true. Provision of time allotted for telemedicine visits was sufficient and appropriate for some, but not all providers.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Despite few providers believing that its implementation was rushed, some providers expressed the desire for telemedicine to continue beyond the pandemic.
Fogarty 2021: [447]	
Acceptability	Clinicians noted benefits of the transition to telehealth for the families with whom they were working with.
Adoption	Potential for telehealth to be integrated as a key component of the offered service post-COVID19 to increase accessibility of their service for families, including those from regional, rural and remote areas.

Author, Year	Implementation Outcomes
Appropriateness	Clinicians noted several strengths in the transition to telehealth and consequential changes in the therapeutic process. Clinicians stressed the importance of adjusting therapeutic style to engage with clients online, describing key changes in how they built rapport, and creative ways of bringing play-based therapy into the telehealth space. Clinicians shared that telehealth required parents to be more actively involved in the preparation and/or delivery of sessions. Telehealth also enabled greater insight into the family home environment. certain aspects of telehealth required them to adjust their therapeutic style.
Feasibility	Needed to implement additional processes to ensure safety and confidentiality within telehealth sessions. Telehealth was more tiring than face-to-face therapy, describing increased fatigue. Increase in preparation and paperwork prior to sessions compared to face-to-face sessions. Technological difficulties including losing internet connection momentarily, or the family's lack of access to stable internet connection.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Ward 2021: [471]	
Acceptability	98% of providers agreed that telemental health improved access to mental health care Using telemental health allowed some mental health providers with clinical comorbidities to reduce their exposure risk through remote work. Mental health providers commented on how telemental health improved their efficiency and benefited patients by facilitating multitasking, improving response time to initiate consultations, and through a reduction in interruptions.
Adoption	Out of 24 physicians, 5 advanced practice providers, and 15 resident physicians (n = 44) scheduled to work during these periods, 100% participated in telemental health consultations. Clinicians identified the ongoing COVID19 pandemic as an important facilitator of adoption, but would have otherwise occurred eventually.
Appropriateness	Some nurses reported that the switch to virtual care impeded their awareness of disposition planning for the patient, while others said it improved communication with consultants. Several staff said that they felt that a mental health provider should be available in-person, if needed.
Feasibility	Better integration of the telemental health units with other VHA software applications was identified as an area for improvement. Mental health providers identified work-arounds to handle physical paperwork, particularly for involuntary psychiatric holds. Mental health providers found cognitive assessments more challenging, but addressable with minor modifications. Clinicians identified that the timeliness benefit from telemental health could be compromised when multiple patients were waiting.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Mental health providers reported a desire to continue with telehealth after the pandemic due to enhanced job satisfaction.
Dennett 2021: [445]	
Acceptability	The telehealth program was acceptable to clinicians. Staff described implementation of the program as a rollercoaster. The program was largely viewed by staff as a positive and acceptable form of delivering care.

Author, Year	Implementation Outcomes
Adoption	Program staff described being impressed with the rapid transition to telehealth. Clinical and administrative staff attributed the success of the implementation to the combined efforts of the team, including their organizational, technical skills, and can-do attitude
Appropriateness	Overall, telerehabilitation was perceived as safe but staff acknowledged difficulty balancing safety needs with providing an adequate exercise prescription. Perception of safety was increased when patients used video. Staff also expressed reservations related to their competency to provide telehealth safely due to the rapid transition.
Feasibility	Clinicians at times felt underprepared to deliver telerehabilitation and wanted more guidance. Staff had difficulty accessing rooms for teleconferencing as they were shared with other programs within the hospital. There was also poor Wi-Fi coverage within certain hospital areas. Staff described the benefits of having hardware but that it was not helpful when the internet did not work.
Fidelity	Not assessed
Implementation cost	Primary resource cost was funding of staff. Clinicians described telerehabilitation as resource intensive compared to the previous group program due to perceived higher human resource costs from additional administrative burden of program setup and delivery, and the one-to-one nature of consults.
Penetration	Not assessed
Sustainability	There was desire from staff to continue with telerehabilitation into the future.
Stewart 2022: [467]	
Acceptability	Not assessed
Adoption	Staff identified the importance of having someone take a lead role on implementation and engaging others in the practice. Need to engage the wider practice and primary care team, including encouraging the late adopters in the practice
Appropriateness	Physical examination presented a challenge for implementation. Some staff felt the need for examination could be identified during initial remote consulting, while others felt the inability to perform physical examination remotely limited the usefulness of telehealth for acute asthma care. Some clinicians were amendable to remote consulting, others questioned the accuracy of some of the required assessments, including inhaler technique. There were concerns about the impact of remote consultation on access to spirometry, the current gold standard for new asthma diagnoses. Some staff felt the COVID19 pandemic presented an opportunity to better integrate delivery of acute and chronic care by rethinking staff roles within the practice.
Feasibility	Preparation with patients before remote consulting was felt to enhance efficiency, and enable the approach to be personalized to patient needs. Staff employed a variety of strategies to adapt the required assessments of acute and chronic asthma reviews for remote consulting. Staff also highlighted the benefits of training.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Staff reported greater fatigue when consulting remotely. Concerns were raised about the impact of telehealth on communication with patients, including the ability to establish rapport in future.
Thomas 2022: [470]	

Author, Year	Implementation Outcomes
Acceptability	Professionals' acceptability of video consults was attributed to the increased familiarity with video consults, resulting from the COVID19 social distancing requirements. Some clinicians stated that their patients had tried to use video consults and struggled, so they prefer to talk over the phone.
Adoption	Despite the limitations of phone consults, these consults continued to be used at a much higher rate than video consults. The reason for this appeared to be largely due to the issues with implementation and ease of use.
Appropriateness	Not assessed
Feasibility	Interviewees asserted that some patients do not have their own digital devices, enough data available and/or good connectivity to connect via video, and therefore they would still need to travel to use equipped facilities able to perform video consults, such as their local hospital or general practitioner.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Oelmeier 2021: [462]	
Acceptability	Health care professionals' satisfaction with remote appointments was equally high. In 88% of cases, they found that video consultation avoided an in-house visit.
Adoption	Not assessed
Appropriateness	In 93% of cases, all necessary aspects for clinical decision-making could be addressed through video consultation.
Feasibility	More than one-third (37%) of the video consultations encountered technical problems of some kind.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Nguyen 2021: [460]	
Acceptability	Several doulas noted that trust could be more difficult to establish virtually because they could not pick up on clients' bodily or environmental cues.
Adoption	Not assessed
Appropriateness	Technological limitations could make it seem like a doula is not even present. Providers who were more receptive to doula care and made an effort to interact with doulas virtually enhanced the overall birth experience for the client; however, when a doula is restricted from entering hospitals, it is more difficult to connect with medical providers in this way. Most doulas agreed that virtual support was inferior to in-person support quality-wise. They also noted that the accessibility of virtual support and improved work-life balance for doulas makes it a worthwhile tool to integrate into their practice.
Feasibility	Advocating for birthing people of color was more difficult to do when they could not physically be in the birthing room. Many hospital policies regarding doula support were miscommunicated during the pandemic. Providers may not be up to date on rapidly changing hospital policies and may provide inaccurate information regarding doulas to their patients.
Fidelity	Not assessed

Author, Year	Implementation Outcomes
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Loftus 2022: [78]	
Acceptability	Gastroenterology specialists indicated high value in the virtual previsit consultation with an average rank of 9 on a 10-point scale for perceived value. General internal medicine physicians ranked the value of these virtual previsit consultations at 6 on a 10-point scale across all patients.
Adoption	Not assessed
Appropriateness	General internal medicine physicians and gastroenterology specialists indicated a high degree of agreement in evaluating the appropriateness of each telehealth clinic pilot patient between patient need and fit for the telehealth clinic intent.
Feasibility	Not assessed
Fidelity	Physicians indicated that they made changes to patient planned visits. Physicians noted the ability to shift a patient from a planned visit to the telehealth clinic to another care area when they discovered additional information when speaking with the patient.
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Smith-MacDonald 2021: [380]	
Acceptability	Personal experience, skill level, and readiness to adopt technology were reasons for both mental health service provider excitement around and reluctance to accept the use of digital health to deliver trauma therapy. Digital health service delivery saved time because of a lack of commuting and fewer workday interruptions, which enabled them to respond to more clients.
Adoption	The strength of the therapeutic relationship impacted the ease with which service providers were able to transition from in-person to digital health delivery, with transitions being easier when a therapeutic relationship had been established through in-person sessions.
Appropriateness	Most respondents perceived that mental health services delivered remotely were effective. sense of engagement and energy were notably different between in-person and digital health sessions. Respondents also noted that assessing and monitoring nonverbal cues in a virtual setting is challenging. Participants also felt that digital health negatively impacted the therapeutic alliance and, at times, resulted in the clinician feeling distant or cut off from their client. Assessing risk over digital health was also consistently identified as a topic requiring consideration. Participants questioned how to best manage client disclosures of suicidal ideation, intent of harm to self or others, or domestic violence. Participants expressed that clients with cognitive dysfunction, who have experienced a brain injury, and who are highly emotionally dysregulated and in frequent need of active coregulation may not be suitable for digital health delivery of trauma therapy. For clients for whom technology is a trigger (e.g., police officers who may be required to watch graphic web-based content) may also not benefit from digital health-delivered trauma therapies.

Author, Year	Implementation Outcomes
Feasibility	Over half of the respondents expressed at least some concern regarding the maintenance of security and privacy when delivering mental health services through digital health means. Common barriers included lack of stable, interruption-free internet access, lack of personal presence, and challenges in developing a therapeutic relationship. Identified facilitators included decreased perception of stigma as well as greater convenience and access to mental health services. The proficient use of technologies was challenging for some and resulted in increased work time and administrative duties. Providing clients with therapy resources or exchanging confidential materials required creative problem-solving. Client information was not as readily accessible, thereby making assessments and case histories more difficult to complete. Securely and remotely accessing and transferring client files required additional consideration. Organizations and regulatory bodies for regulated health professionals were unprepared for a sudden shift to digital health service delivery. Security and privacy concerns were strongly highlighted. Managing screen fatigue (i.e., the sense of fatigue caused by staring at a computer screen) was also considered critical to the ongoing delivery of mental health services using digital health.
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Gilbert 2022: [448]	
Acceptability	Clinicians were able to determine the success of the consultation in relation to it meeting patient needs.
Adoption	Not assessed
Appropriateness	Not assessed
Feasibility	Some clinicians did not have the technical skills required to be able to use virtual consultation. Several clinicians encountered technical challenges that interfered with the delivery of a virtual consultation visit thus the virtual slots were increased from 30 min to one hour. Clinicians within this study were required to implement virtual consultation at a pace that required restructuring of policies and procedures.
Fidelity	The organization invested heavily in resources for clinical staff to be able to undertake virtual consultation with patients. These additional resources shifted the context for clinicians in favour of undertaking virtual consultation visits.
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed
Watson2021: [472]	
Acceptability	Less than one third of staff (31.5%) felt confident meeting patients' emotional needs virtually.
Adoption	Not assessed

Author, Year	Implementation Outcomes
Appropriateness	Staff expressed concerns about triaging patients appropriately for virtual care, with no clear guidelines as to which patients are appropriate for virtual assessment and which are not. Really difficult to comfort someone virtually and some shared they felt less confident addressing topics of death and end-of-life in this setting. There were also concerns regarding impaired nonverbal communication inherent in conducting assessments over the phone. Staff expressed they were unable to pick up on nuanced or nonverbal communication and could not read body language. Staff believed virtual visits worked well for patients who are stable, not on active treatment, on follow-up, or have little or no complications. Staff who completed the survey believed virtual care increased patients' access to care, especially for those living in rural and remote communities, and was convenient for patients by saving time and money on traveling, parking, and waiting. Staff identified areas where virtual care facilitated their ability to deliver cancer care, using terms like efficiency, flexibility, interdisciplinary coordination, and ability to see many patients.
Feasibility	Not assessed
Fidelity	Not assessed
Implementation cost	Not assessed
Penetration	Not assessed
Sustainability	Not assessed

IBD=irritable bowel disease; n=samplesize; SD=standard deviation

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