

APPENDIX A: SEARCH STRATEGIES

1. Primary Databases Date Searched: 6/30/17	
Sources:	Search Strategy/ Evidence:
Medline	<p>Database: Ovid MEDLINE(R) <1946 to June Week 4 2017>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <June 29, 2017> Search Strategy:</p> <p>-----</p> <ol style="list-style-type: none"> 1 exp Hematoma/ (32815) 2 exp Craniocerebral Trauma/ (143473) 3 exp Intracranial Hemorrhages/ (64114) 4 ((brain or head or subdural or epidural or intraparenchymal or intracranial or intercranial or cranial or cerebral or subarachnoid) and (hematoma* or haematoma* or hemorrhage* or haemorrhage* or bleed*)).mp. (111165) 5 1 or 2 or 3 or 4 (251563) 6 exp Spectroscopy, Near-Infrared/ (10636) 7 exp Spectrophotometry, Infrared/ (59671) 8 exp Infrared Rays/ (11625) 9 (NIR or NIRS).mp. (15794) 10 (infrared and spectro*).mp. (102190) 11 (infrascan* or crainscan* or smartscan* or RunMan).mp. (13) 12 6 or 7 or 8 or 9 or 10 or 11 (117038) 13 5 and 12 (514) 14 remove duplicates from 13 (497) 15 limit 14 to english language (445) <p>*****</p>
CDSR	<p>Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to June 29, 2017> Search Strategy:</p> <p>-----</p> <ol style="list-style-type: none"> 1 ((brain or head or subdural or epidural or intraparenchymal or intracranial or intercranial or cranial or cerebral or subarachnoid) and (hematoma* or haematoma* or hemorrhage* or haemorrhage* or bleed*)).mp. (1496) 2 (NIR or NIRS).mp. (17) 3 (infrared and spectro*).mp. (24) 4 (infrascan* or crainscan* or smartscan* or RunMan).mp. (0) 5 2 or 3 or 4 (30) 6 1 and 5 (19) <p>*****</p>
CCRCT	<p>Database: EBM Reviews - Cochrane Central Register of Controlled Trials <May 2017> Search Strategy:</p> <p>-----</p> <ol style="list-style-type: none"> 1 exp Hematoma/ (471) 2 exp Craniocerebral Trauma/ (2009) 3 exp Intracranial Hemorrhages/ (1315) 4 ((brain or head or subdural or epidural or intraparenchymal or intracranial or intercranial or cranial or cerebral or subarachnoid) and (hematoma* or haematoma* or hemorrhage* or haemorrhage* or bleed*)).mp. (6922) 5 1 or 2 or 3 or 4 (9061) 6 exp Spectroscopy, Near-Infrared/ (242) 7 exp Spectrophotometry, Infrared/ (83) 8 exp Infrared Rays/ (193)

	<p>9 (NIR or NIRS).mp. (365) 10 (infrared and spectro*).mp. (856) 11 (infrascan* or crainscan* or smartscan* or RunMan).mp. (0) 12 6 or 7 or 8 or 9 or 10 or 11 (1126) 13 5 and 12 (17) 14 remove duplicates from 13 (15) 15 limit 14 to english language (13)</p> <p>*****</p>
PsycINFO	<p>Database: PsycINFO <1806 to June Week 4 2017> Search Strategy: -----</p> <p>1 exp hemorrhage/ (3510) 2 exp Brain Damage/ (32812) 3 exp head injuries/ (5641) 4 ((brain or head or subdural or epidural or intraparenchymal or intracranial or intercrainial or cranial or cerebral or subarachnoid) and (hematoma* or haematoma* or hemorrhage* or haemorrhage*)).mp. (5477) 5 1 or 2 or 3 or 4.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures] (35950) 6 (NIR or NIRS).mp. (741) 7 (infrared and spectro*).mp. (1411) 8 (infrascan* or crainscan* or smartscan* or RunMan).mp. (2) 9 6 or 7 or 8 (1548) 10 5 and 9 (37) 11 limit 10 to english language (36)</p> <p>*****</p>
HTA	<p>Database: EBM Reviews - Health Technology Assessment <4th Quarter 2016> Search Strategy: -----</p> <p>1 exp Hematoma/ (0) 2 exp Craniocerebral Trauma/ (45) 3 exp Intracranial Hemorrhages/ (18) 4 ((brain or head or subdural or epidural or intraparenchymal or intracranial or intercrainial or cranial or cerebral or subarachnoid) and (hematoma* or haematoma* or hemorrhage* or haemorrhage* or bleed*)).mp. (49) 5 1 or 2 or 3 or 4 (92) 6 exp Spectroscopy, Near-Infrared/ (3) 7 exp Spectrophotometry, Infrared/ (2) 8 exp Infrared Rays/ (6) 9 (NIR or NIRS).mp. (2) 10 (infrared and spectro*).mp. (5) 11 (infrascan* or crainscan* or smartscan* or RunMan).mp. (0) 12 6 or 7 or 8 or 9 or 10 or 11 (11) 13 5 and 12 (0) 14 remove duplicates from 13 (0) 15 limit 14 to english language (0)</p> <p>*****</p>
DARE	<p>Database: EBM Reviews - Database of Abstracts of Reviews of Effects <1st Quarter 2016> Search Strategy: -----</p> <p>1 ((brain or head or subdural or epidural or intraparenchymal or intracranial or intercrainial or cranial or cerebral or subarachnoid) and (hematoma* or haematoma* or</p>

	<p>hemorrhage* or haemorrhage* or bleed*).mp. (373) 2 (NIR or NIRS).mp. (4) 3 (infrared and spectro*).mp. (8) 4 (infrascan* or crainscan* or smartscan* or RunMan).mp. (1) 5 2 or 3 or 4 (10) 6 1 and 5 (0)</p> <p>*****</p>
NHS EED	<p>Database: EBM Reviews - NHS Economic Evaluation Database <1st Quarter 2016> Search Strategy: -----</p> <p>1 exp Hematoma/ (4) 2 exp Craniocerebral Trauma/ (78) 3 exp Intracranial Hemorrhages/ (55) 4 ((brain or head or subdural or epidural or intraparenchymal or intracranial or intercranial or cranial or cerebral or subarachnoid) and (hematoma* or haematoma* or hemorrhage* or haemorrhage* or bleed*).mp. (189) 5 1 or 2 or 3 or 4 (269) 6 exp Spectroscopy, Near-Infrared/ (1) 7 exp Spectrophotometry, Infrared/ (0) 8 exp Infrared Rays/ (2) 9 (NIR or NIRS).mp. (2) 10 (infrared and spectro*).mp. (1) 11 (infrascan* or crainscan* or smartscan* or RunMan).mp. (0) 12 6 or 7 or 8 or 9 or 10 or 11 (5) 13 5 and 12 (0) 14 remove duplicates from 13 (0) 15 limit 14 to english language (0)</p> <p>*****</p>
CINAHL	<p>Database: EBSCOhost - CINAHL Plus with Full Text Search Strategy: -----</p> <p>S1 (MH "Hematoma+") (4,158) S2 (MH "Intracranial Hemorrhage+") (10,947) S3 (MH "Head Injuries+") (31,332) S4 TX (((brain or head or subdural or epidural or intraparenchymal or intracranial or intercranial or cranial or cerebral or subarachnoid)) AND TX ((hematoma* or haematoma* or hemorrhage* or haemorrhage* or bleed*)) (42,314) S5 S1 OR S2 OR S3 OR S4 (73,222) S6 (MH "Spectroscopy, Near-Infrared") (1,291) S7 (MH "Spectrophotometry, Infrared") (686) S8 TX NIR OR NIRS (2,134) S9 TX infrared AND TX spectro\$ (53) S10 TX (infrascan* OR crainscan* OR smartscan* OR RunMan) (20) S11 S6 OR S7 OR S8 OR S9 OR S10 (3,800) S12 S5 AND S11 (169) S13 S5 AND S11 [English] (169)</p> <p>*****</p>
Military & Government Collection	<p>Database: EBSCOhost - CINAHL Plus with Full Text Search Strategy: -----</p> <p>S1 (MH "Hematoma+") (14) S2 (MH "Intracranial Hemorrhage+") (0) S3 (MH "Head Injuries+") (94)</p>

	<p>S4 TX (((brain or head or subdural or epidural or intraparenchymal or intracranial or intercranial or cranial or cerebral or subarachnoid)) AND TX ((hematoma* or haematoma* or hemorrhage* or haemorrhage* or bleed*)) (5,131)</p> <p>S5 S1 OR S2 OR S3 OR S4 (5,220)</p> <p>S6 (MH "Spectroscopy, Near-Infrared") (0)</p> <p>S7 (MH "Spectrophotometry, Infrared") (0)</p> <p>S8 TX NIR OR NIRS (2,150)</p> <p>S9 TX infrared AND TX spectro\$ (41)</p> <p>S10 TX (infrascan* OR crainscan* OR smartscan* OR RunMan) (26)</p> <p>S11 S6 OR S7 OR S8 OR S9 OR S10 (2,212)</p> <p>S12 S5 AND S11 (18)</p> <p>S13 S5 AND S11 [English] (18)</p> <p>*****</p>
Scopus	<p>Database: Scopus</p> <p>Search Strategy:</p> <p>-----</p> <p>1 ((TITLE-ABS-KEY (infrared)) AND (TITLE-ABS-KEY (spectroscopy OR spectrophotometry))) (414,078)</p> <p>2 ((TITLE-ABS-KEY (brain OR head OR subdural OR epidural OR intraparenchymal OR intracranial OR intercranial OR cranial OR cerebral OR subarachnoid)) (2,722,741)</p> <p>3 (TITLE-ABS-KEY (hematoma OR haematoma OR hemorrhage OR haemorrhage OR bleed)) (468,007)</p> <p>4 1 AND 2 AND 3 (386)</p>

2. Non-Database/ Grey Literature Sources Date Searched: 6/30/17	
Sources:	Search Strategy/ Evidence:
VA Products: VATAP, PBM, HSR&D publications, VA ART Database	<p>A. http://www.hsr.d.research.va.gov/research/default.cfm Search: infrared</p> <p>Relevant Results: None</p> <p>B. http://www.research.va.gov/research_topics/</p> <p>Relevant Results: None</p> <p>C. http://art.puget-sound.med.va.gov/default.cfm Search: WHERE (1 = 1) AND (Abstract LIKE "%infrared%") OR (Project Title LIKE ("%infrared%"))</p> <p>Relevant Results: None</p>
AHRQ	<p>http://www.ahrq.gov/research/findings/evidence-based-reports/search.html Search: infrared</p> <p>Relevant Results: None</p>
CADTH	<p>https://www.cadth.ca Search: infrared</p> <p>Relevant Results: None</p>
ECRI Institute	<p>https://www.ecri.org/Pages/default.aspx Search: infrared</p>



	<p>Relevant Results: FDA approves handheld device to detect bleeding in skull. 12/16/2011</p>
NICE	<p>http://www.evidence.nhs.uk/default.aspx Search: infrared</p> <p>Relevant Results: None</p>
NLM	<p>http://www.ncbi.nlm.nih.gov/pubmedhealth/ Search: infrared</p> <p>Relevant Results: None</p>
RePORT: Research Portfolio Online Reporting Tools	<p>https://projectreporter.nih.gov/reporter.cfm Search: (infrared AND (spectroscopy OR spectrophotometry)) AND ((brain OR head OR subdural OR epidural OR intraparenchymal OR intracranial OR intercranial OR cranial OR cerebral OR subarachnoid) AND (hematoma OR haematoma OR hemorrhage OR haemorrhage or bleed))</p> <p>Relevant results: None</p>
Trip: Turning Research Into Practice	<p>https://www.tripdatabase.com/ Search: (infrared AND (spectroscopy OR spectrophotometry)) AND ((brain OR head OR subdural OR epidural OR intraparenchymal OR intracranial OR intercranial OR cranial OR cerebral OR subarachnoid) AND (hematoma OR haematoma OR hemorrhage OR haemorrhage or bleed))</p> <p>Relevant results: None</p>
Epistemonikos	<p>https://www.epistemonikos.org/ Search: infrared</p> <p>Relevant Results: None</p>
Military Medicine	<p>http://militarymedicine.amsus.org/ Search: infrared</p> <p>Relevant Results: None</p>
BestBETs	<p>http://bestbets.org/index.php Search: infrared</p> <p>Relevant Results: None</p>
Google Scholar	<p>http://scholar.google.com/ Search: near infrared spectroscopy and hematoma; near infrared spectroscopy and hemorrhage; infrascanner; crainscan</p> <p>Relevant Results:</p> <p>Kessel B, Jeroukhimov I, Ashkenazi I, Oren M, Halevy A, Alfici R. Early detection of life threatening intracranial haemorrhage using a portable near infrared spectroscopy device. <i>Injury Extra</i>. 2009;40(10):213.</p> <p>Coskun F, Sezer EA, Karamercan MA, Akinci E, Vural K. An assessment on the use of infrascanner for the diagnosis of the brain hemotoma by using support vector machine. <i>Scientific Research and Essays</i>. 2010;5(14):1911-1915.</p> <p>Robertson C, Gopinath S, Chance B. Identifying intracracranial hematomas with near-infrared spectroscopy. <i>Transcranial Cerebral Oximetry</i>, G. Litscher and G. Schwarz. Eds; 1997; Pabst Science, Berlin.</p> <p>Park, Jung Yul, et al. "Usefulness of portable optical measuring device using near-infrared in detection of intracranial hemorrhage." <i>World Congress on Medical Physics</i></p>

	<i>and Biomedical Engineering 2006</i> . Springer Berlin Heidelberg, 2007.
Google	<p>www.google.com Search: near infrared spectroscopy and hematoma; near infrared spectroscopy and hemorrhage; infrascanner; crainscan</p> <p>Relevant Results:</p> <p>Schulz P, Kunz U. Experiences using a mobile near-infrared spectroscopy system for noninvasive detection of traumatic intracranial hematoma. Accepted abstracts from the International Brain Injury Association's Eighth World Congress on Brain Injury. March 10-14, 2010. Washington DC, USA.</p>
Secondary sources:	Search Strategy/ Evidence:
BlueCross BlueShield Foundation	<p>http://bluecrossfoundation.org/publications Search: infrared</p> <p>Relevant Results: None</p>
Campbell Collaboration	<p>https://www.campbellcollaboration.org/library.html?&searchword= Search: infrared</p> <p>Relevant Results: None</p>
CMS Policies	<p>http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Reports/Research-Reports-List.html Search: infrared</p> <p>Relevant Results: None</p>
Hayes	<p>http://www.hayesinc.com/hayes/ Search: infrared</p> <p>Relevant Results: None</p>
Institute for Clinical Evaluative Sciences	<p>http://www.ices.on.ca/Publications/Atlases-and-Reports Search: infrared</p> <p>Relevant Results: None</p>
IOM	<p>http://www.nationalacademies.org/hmd/Reports.aspx Search: infrared</p> <p>Relevant Results: None</p>
McMaster Health Systems Evidence	<p>http://www.healthsystemsevidence.org/open-search.aspx Search: infrared</p> <p>Relevant Results: None</p>
Robert Wood Johnson	<p>http://www.rwjf.org/en/research-publications.html Search: infrared</p> <p>Relevant Results: None</p>
Systematic Reviews (Journal)	<p>http://link.springer.com/journal/13643 Search: infrared</p> <p>Relevant Results: None</p>
UBC Centre for Health Services and Policy Research	<p>http://chspr.ubc.ca/pubs/pub-search Search: infrared</p> <p>Relevant Results: None</p>

WHO Health Evidence Network	http://www.euro.who.int/en/what-we-do/data-and-evidence/health-evidence-network-hen/publications/by-keyword Search: infrared Relevant Results: None
Infrascanner.com	https://infrascanner.com/research/ Relevant Results: Tyzo B, Trojanowski T, D. S, Rola R. Algorithm of initial management of mild head injury using the portable near-infrared spectroscope. Neurologia Praktyczna. 2014:13-20.

3. Current Guidelines**Date Searched: 8/4/17**

Sources:	Search Strategy/ Evidence:
VA/DoD Clinical Practice Guidelines	https://www.healthquality.va.gov/ Relevant Results: "VA/DoD clinical practice guideline for management of concussion/mild traumatic brain injury." (2016). The Department of Veterans Affairs (VA) published guidelines on the management of concussion or mild traumatic brain injury (mTBI) in 2016; these guidelines do not discuss a role for NIR brain hematoma detection using NIRS.
National Guideline Clearinghouse	http://www.guideline.gov/ Search: infrared; brain injury; head injury Relevant Results: None
American Academy of Neurology	https://www.aan.com/ Search: infrared; brain injury; head injury Relevant Results: None
World Federation of Neurology	https://www.wfneurology.org Search: infrared; brain injury; head injury Relevant Results: None
American Association of Neurological Surgeons	http://www.aans.org/ Search: infrared; brain injury; head injury Relevant Results: None
American Association of Neurological Nurses	http://aann.org/ Search: infrared; brain injury; head injury Relevant Results: None
American Neurological Association	https://myana.org/ Search: infrared; brain injury; head injury Relevant Results: None

4. Literature currently under development (forthcoming studies & protocols)**Date Searched: 6/30/17**

Sources:	Search Strategy/ Evidence:
----------	----------------------------

AHRQ topics in development (EPC Status Report)	https://www.epc-src.org/src/logon.cfm Emailed Robin.Paynter@va.gov and she reported no future, ongoing, or completed AHRQ Effective Health Care program reviews on this topic.
PROSPERO (SR registry)	http://www.crd.york.ac.uk/PROSPERO/ Search: infrared Relevant Results: None
DoPHER (SR Protocols)	http://eppi.ioe.ac.uk/webdatabases4/Intro.aspx?ID=9 Search: infrared Relevant Results: None
Clinicaltrials.gov	Search: infrared Relevant Results: An Evaluation of Near-Infrared Spectroscopy for Intracranial Hematoma Detection of Head Trauma Patients in the Emergency Department. NCT02222597
UK Clinical Trials Gateway	Search: infrared Relevant Results: None
metaRegister of Controlled Trials (mRCT)	http://www.isrctn.com/page/mrct Search: infrared Relevant results: None
WHO International Clinical Trials Registry Platform	http://apps.who.int/trialsearch/default.aspx Search: infrared Relevant results: None