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# Suffering in silence: How COVID-19 school closures inhibit the reporting of child maltreatment☆

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ABSTRACT

To combat the spread of COVID-19, many primary and secondary schools in the United States canceled classes and moved instruction online. This study examines an unexplored consequence of COVID-19 school closures: the broken link between child maltreatment victims and the number one source of reported maltreatment allegations—school personnel. Using current, county-level data from Florida, we estimate a counterfactual distribution of child maltreatment allegations for March and April 2020, the first two months in which Florida schools closed. While one would expect the financial, mental, and physical stress due to COVID-19 to result in additional child maltreatment cases, we find that the actual number of reported allegations was approximately 15,000 lower (27%) than expected for these two months. We leverage a detailed dataset of school district staffing and spending to show that the observed decline in allegations was largely driven by school closures. Finally, we discuss policy implications of our findings for the debate surrounding school reopenings and suggest a number of responses that may mitigate this hidden cost of school closures.

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> "Teachers and school personnel comprise one of the largest groups to report child abuse ... On average, we are seeing an over 25 percent decrease in calls to our hotline since schools closed. That means many children are suffering in silence."
> [—Darren DaRonco, Arizona Department of Child Safety Spokesperson, April 13, 2020]

## 1. Introduction

To combat the spread of COVID-19, nearly all primary and secondary schools in the United States (U.S.) canceled in-person classes and transitioned to remote instruction. This measure substantially decreased the amount of time that children interacted in person with their teachers and other school personnel. While the potential negative impacts of COVID-19 school closures on academic outcomes are currently being investigated (Kuhfeld et al., 2020), time away from school could also negatively impact children through a much less explored channel: a broken link between reporters and victims of child maltreatment.[1]

Nearly four in ten children experience maltreatment by the time they reach adulthood (Kim et al., 2017). Child maltreatment presents significant costs to society; adults who experienced maltreatment as children have lower levels of education, lower earnings, and are more likely to engage in crime (Currie and Tekin, 2012; Currie and Widom, 2010). Teachers, guidance counselors, school psychologists, and other school workers are mandated reporters of suspected child maltreatment in every state, and education personnel are the primary reporting source of suspected child maltreatment. This group submitted more than 20% of the roughly 4.3 million nationwide reports in 2018, surpassing the shares of law enforcement officers, medical professionals, and social services staff (Administration for Children and Families, 2020).

This study examines the impact of COVID-19 school closures on child maltreatment reporting. In the absence of real-time data on child maltreatment allegations for the entire U.S., we collect monthly,

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[1] Although individual states have their own definition of maltreatment, in this study we refer to "child maltreatment" as the abuse, neglect, or abandonment of individuals younger than 18 years old.

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county-level data on the number of child maltreatment allegations made to the Florida Child Abuse Hotline. This information is made publicly available by the Florida Department of Children and Families (DCF) for all 67 counties in Florida and is available from January 2004 through April 2020, which allows us to obtain timely, reliable data to examine changes in reporting around the time schools closed in Florida.

A central challenge in identifying changes in maltreatment allegations as a result of COVID-19 school closures is the absence of a natural control group—all schools in Florida and nearby states closed at roughly the same time. Rather than relying on a cross-sectional control group, we leverage our monthly data to predict the number of allegations that would be expected in March and April 2020—the first two months in which in-person instruction was canceled in response to COVID-19—due to seasonal fluctuations and secular trends. We then compare the actual number of allegations to the predicted, counterfactual values and find that the number of allegations reported in March and April 2020 were 27% lower than would be expected otherwise. We conduct a number of robustness checks to ensure that the main results are not sensitive to the choice of specification or counterfactual estimation. Furthermore, we show that these findings are likely not unique to Florida's institutional context and may apply broadly across the country. Scaling up our estimates nationwide, we calculate that approximately 212,500 allegations went unreported during the months of March and April 2020.

Interpreting the welfare effects of this decline in allegations depends greatly on how many of these allegations are actual cases of child maltreatment. From 2003 to 2015, 20–22% of all maltreatment allegations made by school personnel were eventually substantiated both nationally and in Florida.[2] While it will take some time to understand whether this rate of substantiation remained relatively constant throughout March and April 2020, these figures suggest that, nationally, roughly 40,000 additional instances of child maltreatment would have been confirmed were it not for school closures.

We note that our estimated 27% decline in reported allegations is potentially a conservative estimate, since the counterfactual number of allegations for March and April 2020 is likely underestimated. The COVID-19 pandemic has caused an unprecedented amount of sudden financial, physical, and mental stress, and previous studies have shown that child maltreatment is more likely to occur under these circumstances (Lindo et al., 2018; Lowell and Renk, 2017; Paxson and Waldfogel, 2002).[3] Therefore, we suspect that simultaneous changes due to COVID-19 have increased the underlying rate of abuse, and as a result, the documented decrease in allegations in March and April 2020 is probably attenuated.

Importantly, the observed decline in the number of maltreatment allegations is likely not the consequence of school closures alone. Even if our empirical strategy successfully captures the causal effect of COVID-19 on maltreatment reporting, the absence of a cross-sectional control group prevents us from ruling out the possibility that other factors besides school closures may have affected reporting during this time. In-person interactions greatly declined in the early months of 2020 due to COVID-19. While there was no official statewide stay-at-home order in Florida until April 3, 2020, current research suggests that, even in the absence of a stay-at-home order, people voluntarily chose to stay at home to avoid infection (Goolsbee and Syverson, 2020). Such a dramatic decline in social interactions has likely limited the exposure of children to a wide range of potential reporters of child maltreatment including law enforcement personnel, pediatricians, and extended family members.

Still, we provide compelling evidence that the observed decline in child maltreatment allegations is substantially driven by COVID-19 school closures. First, we show that the number of maltreatment allegations in our sample generally declines sharply during the months when school is not in session (June, July, and December). Notably, the decline in reporting observed in March and April 2020 closely resembles the decline in allegations when school is out of session.

Second, school personnel have been shown to be primarily responsible for "initial" child maltreatment allegations—the first case-specific allegation made to the hotline (Fitzpatrick et al., 2020). We show that the decline in the total number of allegations in March and April 2020 is almost entirely driven by a decline in the number of initial allegations. Finally, we show that counties with previously higher numbers of staff trained to identify and report child maltreatment (e.g., school psychologists and school nurses) experience a disproportionately larger reduction in the number of child maltreatment allegations in March and April 2020. While one may worry that this pattern simply reflects general differences in resources, we find no such heterogeneity along other county characteristics including the level of educational spending on instruction, school administrators, or the operation and maintenance of school infrastructure. All of these patterns highlight the role of school personnel as reporters of suspected child maltreatment and provide evidence that the decline in maltreatment allegations observed in March and April 2020 was largely driven by school closures.

This study contributes to the emerging literature seeking to understand the public policy implications of COVID-19. Recent studies have examined the effects of COVID-19 policy responses (e.g., shelter-in-place orders) on outcomes such as mortality (Dave et al., 2020; Friedson et al., 2020), pollution (Almond et al., 2020), economic activity (Bartik et al., 2020; Hassan et al., 2020; Lewis et al., 2020), and inequalities by health access (Schmitt-Grohé et al., 2020), internet access (Chiou and Tucker, 2020), and gender (Alon et al., 2020). We focus on the impacts of school closures in response to COVID-19. This study's findings complement research by Fitzpatrick et al. (2020) which shows that school personnel are an important channel for child maltreatment reporting. As such, our main contributions are (i) to show that in the context of COVID-19, school personnel continue to be an important resource for child maltreatment reporting and (ii) to document the magnitude of a disruption of this reporting mechanism in this setting. Section 5 discusses policy implications of these findings for the debate surrounding school reopenings in the fall of 2020 and suggests a number of responses that may mitigate this hidden cost of school closures.

## 2. Background

The SARS-CoV-2 virus, which causes Coronavirus Disease 2019 (COVID-19), has spread quickly within the U.S. and other countries. After its initial detection in Wuhan, China, in December 2019, researchers confirmed the first COVID-19 case in the U.S. in the state of Washington on January 21, 2020. Shortly thereafter, the disease spread across every state in the U.S. and was declared a global pandemic on March 11 by the World Health Organization. As of May 14, 2020, there were 1.43 million confirmed cases in the U.S. and 4.37 million confirmed cases worldwide.

In response to the rapid spread, state and local governments around the U.S. enacted public health measures aiming to flatten the exponential spread of the virus. Because scientists believe that transmission of COVID-19 occurs mainly via respiratory droplets, limiting face-to-face interactions among individuals through social distancing measures has been a primary public health response. Examples of social distancing measures include shelter-in-place orders, which require residents to remain at home except for essential activities (e.g., purchasing food or medicine, or working essential jobs), canceling community events and extracurricular activities, canceling mass gatherings, and school closures.

[2] Authors' calculations from the National Child Abuse and Neglect Data System.

[3] In fact, while we document declines in the number of calls to child abuse hotlines, calls to domestic violence hotlines have risen sharply around the U.S., which indicates that many children may be in increasingly unsafe homes. See, for example, Lee, MJ (2020), *Visits to New York City's Domestic Violence Website Surged Amid Coronavirus Pandemic*, CNN. Accessed at: https://www.cnn.com/ (May 6, 2020).

Virtually all K-12 students in the U.S. had interruptions in face-to-face instruction during the 2019–20 academic year due to COVID-19. In Florida specifically, beginning on March 16, 2020, all public and private K-12 schools closed. Extended time out of school could impair students' cognitive outcomes.[4] Previous studies have shown that summer learning loss (Atteberry and McEachin, 2020), weather-related school closures (Goodman, 2014), teacher strikes (Belot and Webbink, 2010; Juame and Willén, 2019), and absenteeism (Aucejo and Romano, 2016; Gershenson et al., 2017) can significantly reduce student test scores and future earnings. Indeed, early projections of learning losses associated with COVID-19 school closures show students are likely to return in fall 2020 with approximately 37–50% of the learning gains in math relative to a typical school year (Kuhfeld et al., 2020).

While policymakers are likely aware of the negative impacts of COVID-19 school closures on academic outcomes, the potentially costly effects on child maltreatment under-reporting are much less salient. By the time students reach third grade, approximately 18% will have been associated with a formal Child Protective Services (CPS) investigation (Ryan et al., 2018). Children associated with maltreatment investigations have significantly worse test scores (Fry et al., 2017; Tessier et al., 2018), educational attainment (Morton, 2018), mental health (Ballard et al., 2015; Walsh et al., 2017), and adult earnings (Currie and Widom, 2010).

Early detection of child maltreatment could mitigate its harmful effects. Teachers and other school personnel spend a significant portion of time with children and are the primary reporters of initial allegations of child maltreatment. However, with the exception of recent work by Fitzpatrick et al. (2020), the causal role of school personnel as reporters of child maltreatment has been largely unexplored. Fitzpatrick et al. (2020) document that the number of child maltreatment cases is roughly 30 to 65% higher at the beginning and at the end of the school year, relative to the beginning and end of the summer break when children are out of school. As a result, one may expect school closures in response to COVID-19 to lead to similar declines in the reporting of child maltreatment allegations.

## 3. Data

### 3.1. Florida child abuse hotline allegations

To estimate the effect of COVID-19 school closures on the number of child maltreatment allegations, we combine three primary datasets. First, in the absence of real-time, publicly available information on child maltreatment allegations for the entire U.S., we use allegation data obtained from the Florida DCF. We collect county-level, monthly information on the total number of allegations of abuse, neglect, or abandonment of children made to the Florida Child Abuse Hotline.

This information is made publicly available by the DCF for all 67 counties in Florida and is available from January 2004 to April 2020, which allows us to examine the impact of school closures in March and April of 2020 on the number of allegations. We collect information on each county's total monthly number of allegations, as well as the monthly number of allegations that are accepted for investigation by the hotline. We also collect the monthly number of initial allegations—the first case-specific contact with the hotline. Each allegation is matched to the county where the alleged victim is located at the time the report is made to the hotline.

### 3.2. County-level economic conditions

To account for changes in economic activity that may be correlated with child maltreatment allegations, we collect proxies for local economic conditions. Specifically, we collect each county's monthly number of unemployed and employed persons, as well as the count of persons in the labor force, from the U.S. Bureau of Labor Statistics' Local Area Unemployment Statistics (LAUS). We also collect annual estimates of total county population available through the U.S. Census Bureau to calculate the employment-population ratio. Employment and unemployment measures are currently available from January 2004 through March 2020. Thus, in specifications that hold these variables constant, we drop the month of April 2020 from the sample.

### 3.3. School district variables

Finally, we collect detailed district-level K-12 staff and expenditure data. Staff data come from the Florida Department of Education. Since Florida school districts are drawn along county boundaries, we collect information on school staffing for each of the 67 counties in Florida. Specifically, we obtain county-level information on the number of school personnel such as instructional staff, guidance counselors, school psychologists, school nurses, and school social workers during the 2019–20 academic year. We merge this information to enrollment figures by county available through the National Center for Education Statistics (NCES) to calculate the number of staff per 1000 pupils for each staff category.

Expenditure data come from the NCES. This dataset reports function-specific expenditures that allow us to explore heterogeneity in the change in the number of allegations by the amount of previous school spending in different accounts. Specifically, we collect information on each county's per-pupil expenditures on instruction, school administration, utilities and energy services, operation and maintenance of school infrastructure, and textbooks used for instruction. We collect these data for the 2016–17 academic year (the latest year these data are available).

### 3.4. Final sample

The final sample contains a balanced panel of county-by-month observations from January 2004 to April 2020 for each of Florida's 67 counties. Table A.1 presents summary statistics. Panel A shows summary statistics for allegations of child maltreatment, while Panels B and C present summary statistics of variables capturing economic conditions and school district characteristics, respectively.

There are a total of 13,132 county-by-month observations. The average Florida county received roughly 330 monthly maltreatment allegations during our sample period. The standard deviation of monthly allegations was large relative to the mean (451 allegations). In terms of the number of allegations per 1000 children, the average county experienced roughly 6 monthly allegations. Most of the allegations received by the hotline were accepted for further investigation (86%).

Fig. 1 shows the time series of allegations received by the Florida Child Abuse Hotline from January 2015 to April 2020. The grey shaded regions highlight months when school is not in session (June, July, and December), while the red circles highlight the months of March and April. A number of important patterns that highlight the role of school personnel as reporters of child maltreatment emerge from the figure.

First, the number of allegations declines sharply during months when school is not in session. Second, the number of allegations increases immediately following these months, which suggests that interactions between children and mandated reporters in school environments are important for uncovering potential child maltreatment.

Third, the numbers of child maltreatment allegations in Marches and Aprils of previous years follow similar patterns and were not

[4] While the majority of school districts have provided some virtual instruction during the months of March and April, it remains unclear how effective virtual learning will be given the lack of experience with K-12 online instruction in many parts of the country. See, for example, Koh, Y. (2020), *Schools Try to Stem 'Covid Slide' Learning Loss*, The Wall Street Journal. Accessed at: https://www.wsj.com (May 7, 2020).

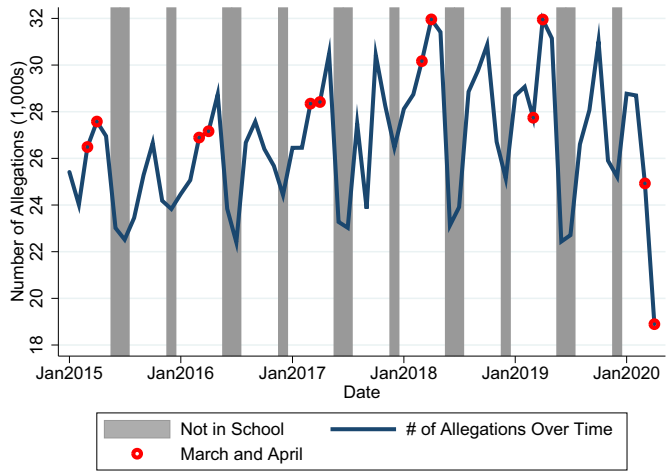



**Fig. 1.** Time series of the number of allegations in Florida. Notes: The figure shows the time series of allegations received by the Florida Child Abuse Hotline from January 2015 to April 2020. The grey shaded regions highlight months when school is not in session (June, July, and December), while the red circles highlight the months of March and April. Data on child abuse allegations come from the Florida DCF.

uncharacteristically high or low prior to 2020. However, there is a stunning, sudden reversal of this trend in March and April 2020. Notably, the declines observed in these two months closely resemble the declines in allegations observed when school is out of session. For instance, the number of allegations in April 2020 declined by 6033 allegations relative to March 2020. This decline was extremely similar to the average reduction of 5956 allegations observed in recent Junes (relative to recent Mays). The fact that school was out of session for the entire month of April 2020 and that the decline in April closely resembles the decline in recent summer months further suggests that school closures due to COVID-19 likely contributed to the sharp reduction in the number of child maltreatment allegations.

One concern with using data from only one state is whether our results are externally valid. In other words, how similar is the number of child maltreatment allegations as well as the rate of allegations accepted for investigation in the state of Florida relative to other states in the U.S.? Could we apply the insights gained from this study to states in other parts of the country?

Fig. A.1 shows absolute deviations from the national average in the number of allegations per 1000 children (Panel (a)) and the share of allegations accepted for investigation (Panel (b)) by state. The solid black bar represents the state of Florida, while unfilled bars represent remaining states. The states more similar to the national average are on the rightmost end of the figure. In both panels, Florida has one of the smallest deviations from the national average. These findings suggest that Florida is not an outlier along child welfare dimensions.

To understand the external validity of our study, it is also important to consider how Florida compares to other states in terms of policy responses to the COVID-19 pandemic. Table A.2 presents the date of the first confirmed COVID-19 case as well as the dates of significant statewide policy responses to COVID-19 for Florida and the three other most populous U.S. states (New York, California, and Texas). The table shows that all four states closed schools during the same week in March and enacted a stay-at-home order within nearly two weeks of each other. Thus, in terms of the timing of statewide policy responses to COVID-19, Florida is not substantially different from similarly populated states. Policymakers may therefore have some confidence that this study's main findings are not unique to Florida's institutional context and may apply broadly across the country.

## 4. Empirical strategy and results

### 4.1. Counterfactual number of allegations

The absence of a valid counterfactual presents a central challenge in identifying changes in child maltreatment allegations due to school closures related to COVID-19. How many allegations would have occurred in March and April 2020 had schools not closed? Without a natural control group which could provide a plausible counterfactual (all schools in Florida and nearby states closed at roughly the same time in response to COVID-19), we leverage our monthly data to predict the number of allegations that would be expected due to seasonal fluctuations and secular trends in March and April 2020.[5] Specifically, we test whether the number of child maltreatment allegations in the months when schools first closed to slow the spread of COVID-19 is uncharacteristically high or low, relative to the number of allegations in other Marches and Aprils in our sample.

First, using monthly-level data on all child maltreatment allegations in Florida, we estimate a counterfactual distribution of allegations to examine how many allegations would have been made in the early months of 2020 had COVID-19 school closures not happened. We estimate a model that predicts a counterfactual number of monthly allegations, excluding months local to COVID-19 school closures. In our main specification, we exclude all months for which data are available in 2020 (January, February, March, and April). However, in Fig. A.2 we show that our main results are robust to alternative specifications of local months. We estimate the following equation:

$$maltreat_{my} = \mu_m + \tau_y + f_g(my) + \varepsilon_{my} \tag{1}$$

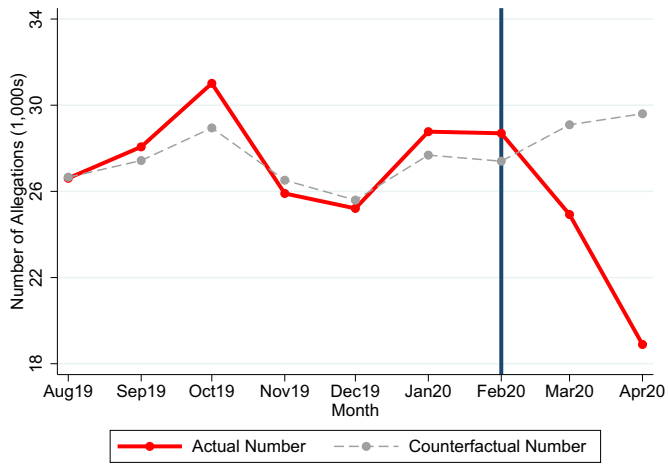
where the outcome variable, $maltreat_{my}$, is the number of child maltreatment allegations in month $m$ of state-fiscal year $y$; $\mu_m$ and $\tau_y$ represent month and state-fiscal year fixed effects, respectively. Here, $\mu_m$ and $\tau_y$ account for seasonal and secular trends which would have affected all of Florida in the same way; $f_g(my)$ is a polynomial of order $g$ in time. In our main specification, we specify $f(\cdot)$ as a third-order polynomial. However, we show that the results are robust to alternative polynomial-order specifications, including linear and quadratic, in Fig. A.3. The time trend captures changes in child maltreatment allegations over time that may not be well captured by fiscal-year effects and that may be coincident with COVID-19 school closures.

Fig. 2 shows the difference between the actual and predicted counterfactual number of allegations in Florida for each month of the 2019–20 academic year, separately for the total number of allegations (Panel (a)) and for the total number of accepted allegations (Panel (b)). The figure shows that the predicted number of allegations is similar to the actual number for every available month in the 2019–20 academic year, except for March and April. This implies that the number of actual allegations in a given month can typically be well predicted by our model.

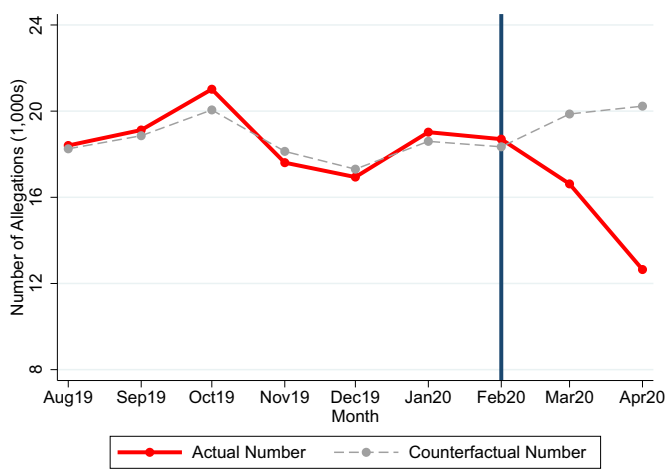
Beginning in March 2020, the figure shows a clear drop in the actual number of allegations relative to the predicted counterfactual. This figure suggests that the number of child maltreatment allegations in March and April 2020 was roughly 4200 and 10,700 allegations lower, respectively, relative to the estimated counterfactual.

The key identifying assumption of this model is that, in the absence of COVID-19, the number of child maltreatment allegations in March and April 2020 would not have diverged from its normal seasonal and yearly patterns. We believe that if this assumption is violated, the bias may assert a downward effect on the counterfactual levels. The pandemic has caused an unprecedented amount of sudden financial stress, and the literature has shown that child maltreatment is more likely to occur when a family is under economic burden (Lindo et al., 2018;

[5] This approach has been similarly used in the literature studying child welfare. For instance, Brehm (2019) and Rodgers and Wallace (2020) employ this strategy to estimate how the Federal Adoption Tax Credit impacted the number of adoptions from foster care.




(a) All Allegations




(b) Accepted Allegations

**Fig. 2.** Actual vs counterfactual number of allegations. Notes: The figure shows the difference between the actual and predicted counterfactual number of allegations for each month of the 2019–20 academic year and separately for the total number of allegations (Panel (a)) and for the total number of accepted allegations (Panel (b)). The counterfactual number of allegations comes from estimating Eq. (1) excluding January, February, March, and April 2020 and specifying $f(\cdot)$ as a third-order polynomial.

Lowell and Renk, 2017; Paxson and Waldfogel, 2002). To the extent that the true levels of maltreatment increased during the months of March and April 2020, the decline of 15,000 allegations is a conservative estimate of the impact of COVID-19.

To formally estimate the observed reduction in the number of allegations shown in Fig. 2, we estimate the following equation using monthly, county-level data:

$$maltreat_{cmy} = \theta SchoolClosures_{my} + \mathbf{X}_{cmy}\beta + \mu_m + \tau_y + \gamma_c + \varepsilon_{cmy} \qquad (2)$$

where $maltreat_{cmy}$, $\mu_m$, and $\tau_y$ are defined as in Eq. (1); $SchoolClosures_{my}$ is a dummy variable equal to one for the months of March and April 2020; $\gamma_c$ represents county fixed effects. Here $\gamma_c$ controls flexibly for any time invariant county-specific characteristics; $\mathbf{X}_{cmy}$ includes time-varying county-level variables that attempt to capture the county's economic climate such as the unemployment rate and the employment-population ratio; the parameter of interest is $\theta$, which measures the average change in the number of monthly maltreatment allegations for March and April 2020, after controlling for trends and seasonal fluctuations.

**Table 1**
Estimates of COVID-19 school closures on child maltreatment allegations.

| | (1) Baseline estimates | (2) Post-2010 | (3) Excludes Miami | (4) Controls March only |
|---|---|---|---|---|
| Panel A: levels | | | | |
| All allegations | −118.15 | −121.53 | −111.05 | −63.74 |
| | (40.96) | (42.90) | (39.05) | (13.73) |
| Accepted allegations | −86.74 | −86.94 | −81.60 | −52.87 |
| | (25.49) | (26.90) | (24.49) | (8.86) |
| Initial allegations | −100.92 | −103.39 | −94.79 | −54.99 |
| | (34.89) | (36.80) | (33.19) | (11.90) |
| Panel B: per 1000 children | | | | |
| All allegations | −1.70 | −1.74 | −1.81 | −0.92 |
| | (0.52) | (0.56) | (0.56) | (0.12) |
| Accepted allegations | −1.24 | −1.24 | −1.33 | −0.75 |
| | (0.34) | (0.37) | (0.36) | (0.07) |
| Initial allegations | −1.45 | −1.48 | −1.55 | −0.79 |
| | (0.44) | (0.48) | (0.47) | (0.11) |
| Panel C: logs | | | | |
| Log(all allegations) | −0.315 | −0.307 | −0.314 | −0.152 |
| | (0.119) | (0.131) | (0.119) | (0.021) |
| Log(accepted allegations) | −0.308 | −0.303 | −0.307 | −0.153 |
| | (0.115) | (0.127) | (0.115) | (0.018) |
| Log(initial allegations) | −0.325 | −0.315 | −0.324 | −0.156 |
| | (0.120) | (0.131) | (0.120) | (0.023) |
| *N* | 13,132 | 8308 | 12,936 | 13,065 |

Notes: The table presents estimates of $\theta$ in Eq. (2), along with standard errors in parentheses and two-way clustered at the county and month levels. Panel A shows the estimates obtained when estimating the specification in Eq. (2) using the level of child maltreatment allegations as the outcome variable. Panel B presents the results obtained when estimating the equation with the number of allegations per 1000 children as the outcome variable. All specifications in this panel are weighted by the county's total child population. Finally, Panel C presents the estimates obtained when using the natural log of allegations instead. The first row of each panel shows the estimates obtained when using all allegations of child maltreatment as the outcome variable. The second and third rows present estimates when using allegations accepted for investigation and initial allegations, respectively. The table shows the robustness of the estimates across four different specifications. Column (1) shows the baseline estimation, which includes only month, state-fiscal year, and county fixed effects. Second, to mitigate any potential bias arising from the Great Recession, we estimate the model for the months of January 2010 to April 2020 in Column (2). In Column (3), we exclude Miami-Dade County, Florida's most populous county, from the regression. Finally, in Column (4) we control for time-varying measures of the county's economic conditions such as the unemployment rate and the employment-population ratio. As mentioned in Section 3, these variables are only available through March 2020. As a result, the specification in Column (4) excludes the month of April 2020.

The main results of the paper are shown in Table 1. The table presents estimates of $\theta$ along with standard errors in parentheses and two-way clustered at the county and month levels.[6] Panel A shows the estimates obtained when estimating the specification in Eq. (2) using the level of child maltreatment allegations as the outcome variable. Panel B presents the results obtained when estimating the equation with the number of allegations per 1000 children as the outcome variable. Finally, Panel C presents the estimates obtained when using the natural log of allegations instead. The first row of each panel shows the estimates obtained when using all allegations of child maltreatment as the outcome variable. The second and third rows present estimates when using allegations accepted for investigation and initial allegations, respectively.

The table shows the robustness of the estimates across four different specifications. Column (1) shows the baseline estimation, which includes only month, state-fiscal year, and county fixed effects. Second, to mitigate any potential bias arising from the Great Recession, we estimate the model for the months of January 2010 to April 2020 in

[6] This level of clustering allows for two types of correlation in the structure of the error term: (i) within county, across time correlation and (ii) correlation across a particular month. However, we show that the main results of the paper are entirely robust to this specification by showing a permutation test in Section 4.2.2 and alternative standard error specifications in Appendix A.

Column (2). In Column (3), we exclude Miami-Dade County, Florida's most populous county, from the regression.[7] Given the substantial size of Miami-Dade's population, one may be concerned that the main estimates are being driven by this outlier. Finally, in Column (4) we control for time-varying measures of the county's economic conditions such as the unemployment rate and the employment-population ratio. As mentioned in Section 3, these variables are only available through March 2020. As a result, the specification in Column (4) excludes the month of April 2020.[8]

Overall, the estimates are robust to the choice of specification. While the estimates shown in Column (4) are generally much smaller in magnitude than those in Columns (1) through (3), this can be explained by the exclusion of April 2020 from the estimation. The estimates show that the total number of allegations fell sharply in March and April 2020. Panel A shows that a typical county in Florida experienced an average reduction of 120 monthly allegations for each of these two months. This effect corresponds to a decline of 1.75 allegations of maltreatment per 1000 children. To understand the magnitude of these estimates, Panel C shows that this effect corresponds to a decline of roughly 27%.[9] The decline in the number of allegations accepted for investigation followed a similar pattern to total allegations and declined by roughly the same amount. The third row of each panel shows that the reduction in the total number of allegations is almost entirely driven by a reduction in the number of initial allegations. Importantly, school personnel have been shown to be primarily responsible for this type of allegation (Fitzpatrick et al., 2020). We take this as further evidence that the estimated decline in allegations in March and April 2020 is partially driven by school closures related to COVID-19.

### 4.2. Additional specifications

The results presented so far indicate that the number of child maltreatment allegations fell substantially in March and April 2020. This section presents additional analyses that are meant to further probe the robustness of the main results of the paper.

#### 4.2.1. Estimates by month

Given that our research design effectively compares the number of child maltreatment allegations in March and April 2020 to the average number in previous Marches and Aprils in the sample, one may worry that the observed decline in child maltreatment allegations during these months simply reflects a relative decline in allegations for the 2019–20 academic year. While Fig. 2 suggests that the relatively steep decline in the number of allegations is unique to March and April 2020, in this section we further address this concern. Specifically, we separately estimate variants of Eq. (2) where we replace the $SchoolClosures_{my}$ dummy variable with an indicator variable equal to one for an alternative month in the 2019–20 academic year. In other words, we estimate separate regressions where we capture the change in maltreatment allegations in each month of the 2019–20 academic year, relative to the same month in previous years in the sample.

These nine separate regressions yield nine different $\hat{\theta}$'s for the months of August 2019 through April 2020. Fig. 3 shows the estimated $\hat{\theta}$'s, along with 95% confidence intervals by month. Panel (a) shows the results obtained when using the total number of allegations as the dependent variable, while Panel (b) shows the results for total accepted allegations instead.

The estimates show that the large decline in child maltreatment allegations is not common to every month in the 2019–20 academic year. Months with COVID-19 school closures are the only ones that experience an unusual decline in allegations. The figure also shows that the main estimates presented in Table 1 may be attenuated, since they capture both March and April 2020 effects. COVID-19 school closures in Florida occurred on March 16, 2020. As a result, the month of March was only partially "treated." The figure reveals that the estimated effect for the month of April is much larger in magnitude, which further bolsters the argument that the observed decline in allegations of child maltreatment is partially driven by time away from school.

#### 4.2.2. Permutation tests

Statistical inference in our setting is complicated by the fact that treatment occurs only for two months across all counties in the sample, and models with few treated units can lead to improper inference (Cameron et al., 2008; Ferman and Pinto, 2019; MacKinnon and Webb, 2017, 2018).[10] To address these concerns, we follow Chetty et al. (2009) and Buchmueller et al. (2011) and conduct a nonparametric permutation test of the effect of COVID-19 school closures on the number of child maltreatment allegations.[11] We estimate variants of Eq. (2) where the $SchoolClosures_{my}$ dummy variable is replaced with an alternative, placebo month-year indicator (e.g., September of 2018). We then repeat this exercise for the permutation of all month-year combinations between January 2004 and December 2019 which yields a distribution of $\hat{\theta}$ based on 192 placebo estimates of $\theta$ (12 months $\times$ 16 years).

The distribution of placebo estimates then represents the sampling distribution of $\hat{\theta}$. We compute the $p$-value associated with the null hypothesis that the change in allegations of child maltreatment during March and April 2020 is no different from the change in other month-year combinations as the percentile of the actual estimate in the distribution of placebo estimates. We view this as an alternate, conservative approach to statistical inference since the permutation test does not make parametric assumptions about the variance-covariance matrix, nor does it suffer from biases which arise with small numbers of clusters.

Panels (c) and (d) of Fig. 3 show the empirical cumulative distribution function of the placebo estimates (as blue dots), as well as the actual estimated $\hat{\theta}$ from Eq. (2) (as a red diamond), separately for the total number of allegations and allegations accepted for investigation, respectively. The figure highlights that the actual baseline estimate ($\hat{\theta}$) is much larger in absolute value than the placebo estimates and remains statistically significant at conventional levels.

### 4.3. Heterogeneity by school district characteristics

We have shown that the number of allegations in March and April 2020 sharply decreased relative to its predicted counterfactual. Furthermore, we provided complementary evidence that suggests school closures played a key role in this decline. First, school personnel are the primary reporting source of suspected child maltreatment. Second, school personnel are primarily responsible for "initial" allegations, and we show that the decline in allegations in March and April 2020 was almost entirely driven by this type of allegation. Third, we show that the

[7] According to the 2010 U.S. Census, Miami-Dade's population is nearly one million more people than Florida's second most populous county, Broward County.

[8] While we acknowledge that these variables may be poor controls as they themselves change in March 2020 due to COVID-19, we nevertheless include them to show that estimates in Column (1) are not driven by underlying changes in economic conditions.

[9] The point estimate across the first three specifications is roughly $-0.31$. To express the decline in terms of a percent change, we calculate $e^{-0.31} - 1 \approx -0.27$.

[10] It is common to assume in regression models that the error term is correlated within clusters but uncorrelated between them. Inference under this assumption can be achieved by a cluster-robust variance estimator. However, test statistics based on cluster-robust standard errors tend to over-reject the null hypothesis when the number of clusters is small. While the wild cluster bootstrap proposed by Cameron et al. (2008) can lead to much more reliable inference, it can still lead to improper inference if the number of *treated* clusters is small (MacKinnon and Webb, 2018).

[11] While we address inference concerns due to the small number of treated clusters with permutation tests in the main body of the paper, we show in Fig. A.4 that results are robust to alternative standard error specifications including clustering at the county and month levels.

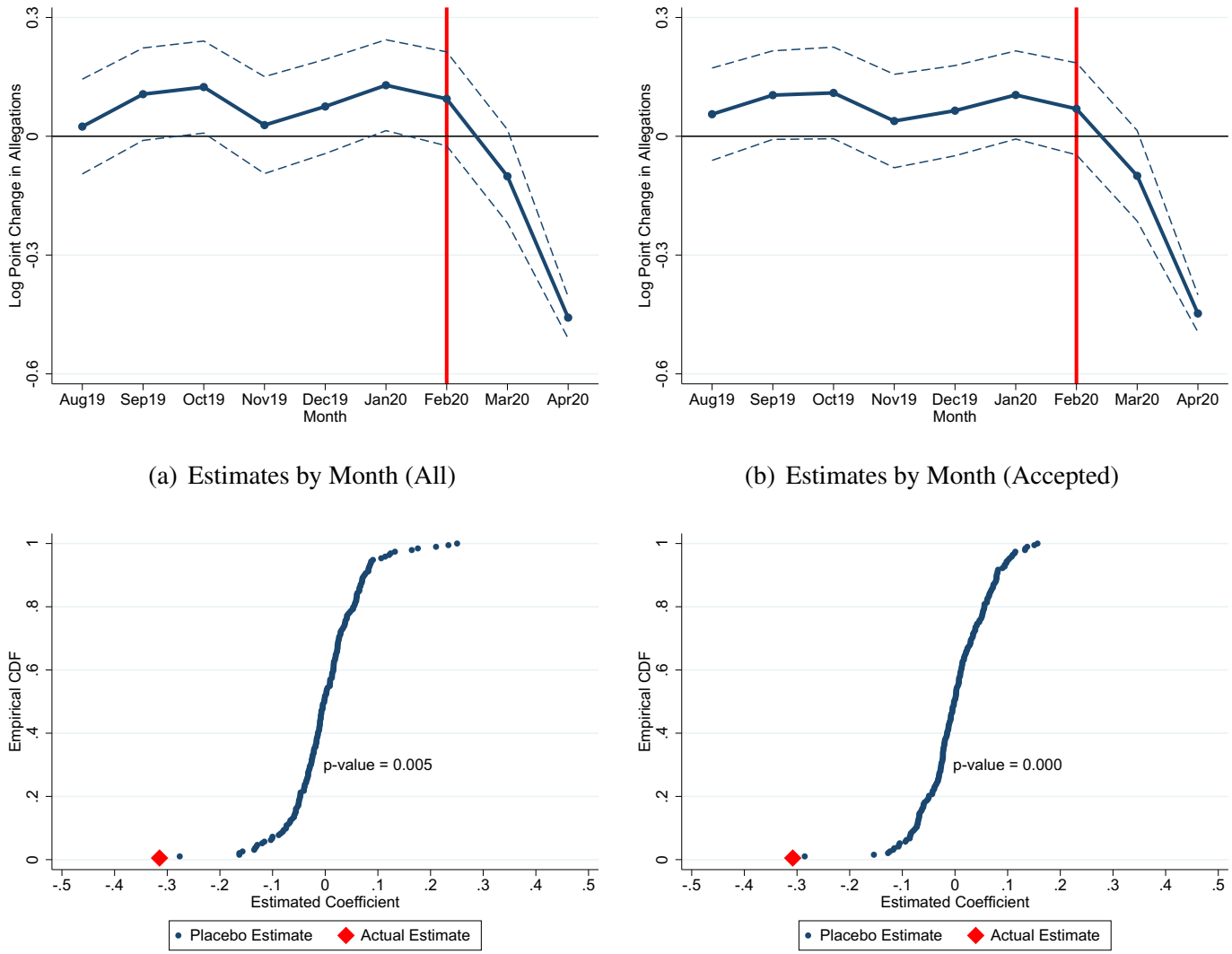



**Fig. 3.** Additional specifications. Notes: Panels (a) and (b) show the estimated 's, along with 95% confidence intervals by month. Standard errors used in the construction of the confidence intervals were two-way clustered at the county and month levels. The 's come from estimating nine separate variants of Eq. (2) where we replace the $SchoolClosures_{my}$ dummy variable with an indicator variable equal to one for an alternative month in the 2019–20 academic year. Panel (a) shows the results obtained when using the total number of allegations as the dependent variable, while Panel (b) shows the results for allegations accepted for investigation. Panels (c) and (d) show the empirical cumulative distribution function of the placebo estimates (as blue dots), as well as the actual estimated from Eq. (2) (as a red diamond), separately for the total number of allegations and allegations accepted for investigation, respectively. The placebo estimates are obtained by estimating variants of Eq. (2) where the $SchoolClosures_{my}$ dummy variable is replaced with an alternative month-year indicator from the permutation of all month-year combinations between January 2004 and December 2019. This yields a distribution of based on 192 placebo estimates of $\theta$ (12 months × 16 years).

number of maltreatment allegations in our sample generally declines during the months when school is not in session (June, July, and December), and the decline in reporting observed in March and April 2020 closely mirrors these previous reductions.

While these findings are consistent with recent work exploring the role of education professionals as reporters of child maltreatment (Fitzpatrick et al., 2020), understanding which school characteristics and which specific school staff are primarily responsible for reporting child maltreatment remains an open empirical question. The fact that Florida school districts are drawn along county boundaries allows us to investigate these questions using school district-level data.

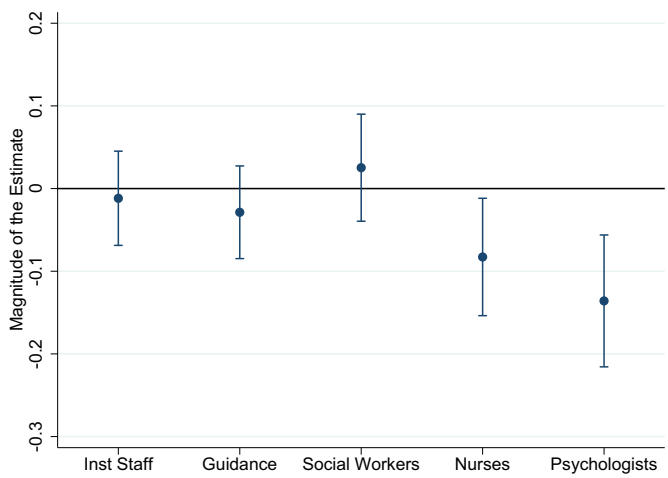
In this section, we explore heterogeneity in the decline in the number of allegations by a district's staff-student ratios of professionals likely to have consistent interactions with children. We estimate the following equation:

$$maltreat_{cmy} = \theta SchoolClosures_{my} + \mu_m + \tau_y + \gamma_c + \delta(SchoolClosures_{my} \times AboveMedian_c) + \varepsilon_{cmy} \quad (3)$$

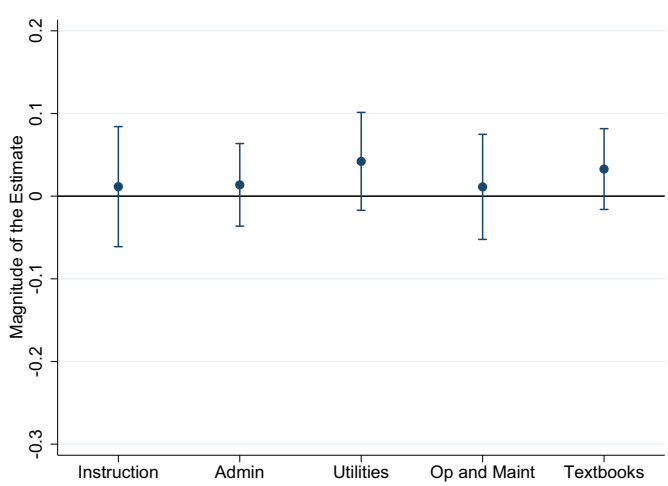
where $maltreat_{cmy}$, $SchoolClosures_{my}$, $\mu_m$, $\tau_y$, and $\gamma_c$ are defined as in Eq. (2); $AboveMedian_c$ is a dummy variable equal to one if the county is above the median of the Florida county distribution in each of the pre-COVID-19 staff-student ratios described in Table A.1; $\delta$ is the parameter of interest, which captures the differential impact of COVID-19 school closures in March and April 2020 on the number of child maltreatment allegations in counties with an above-median staff-student ratio (relative to counties below the median). For instance, if $\hat{\delta}$ is negative and statistically significant when examining heterogeneity by the district's guidance counselor-student ratio, then this is evidence that counties with a previously above-median ratio experienced a disproportionately larger decline in the number of child maltreatment allegations in March and April 2020.

Panel (a) of Fig. 4 presents estimates of $\delta$ from five separate regressions, each exploring heterogeneity by a specific staff-student ratio. The estimates show that counties with previously above-median staff-student ratios for instructional staff, guidance counselors, and social workers experienced no differential change in the number of child maltreatment allegations in March and April 2020, relative to counties with previously below-median ratios. However, relative to counties with previously lower nurse- and psychologist-student ratios, counties with previously higher ratios experienced a much steeper decline in the number of allegations in March and April 2020 (8 and 13 additional percentage points, respectively). This result highlights the role of specific school support staff in reporting child maltreatment by demonstrating the gap that arises in reporting when students are separated from these professionals and their resources.

While one may worry that this pattern simply reflects general differences in resources, Panel (b) of Fig. 4 presents estimates of $\delta$ from five separate regressions, each exploring heterogeneity by a specific school district expenditure account. The estimates show that counties with previously above-median expenditures in the instruction, administration, utilities, operation and maintenance, and textbook accounts experienced no differential change in the number of child maltreatment allegations in March and April 2020, relative to counties with previously below-median expenditures. This evidence implies that districts with greater overall resources do not necessarily exhibit greater reductions in the number of maltreatment allegations.




(a) Heterogeneity by Staff-Student Ratios




(b) Heterogeneity by Previous School Spending

**Fig. 4.** Heterogeneity by school district characteristics. Notes: The figure plots estimates of $\delta$ from the estimation of Eq. (3), along with 95% confidence intervals. Standard errors used in the construction of the confidence intervals were two-way clustered at the county and month levels. Panel (a) presents estimates of $\delta$ from five separate regressions, each exploring heterogeneity by a specific staff-student ratio. Panel (b) presents estimates of $\delta$ from five additional regressions, each exploring heterogeneity by a specific expenditure account.

These findings yield two important policy implications. First, these results reinforce the role of school personnel as reporters of child maltreatment. The fact that most of the reductions come from counties with disproportionately higher numbers of staff trained to identify and report child maltreatment strengthens our claim that the reductions in the number of child maltreatment allegations observed in March and April 2020 stem largely from school closures.

Still, we acknowledge that the observed decline in the number of maltreatment allegations is likely not the consequence of school closures alone. While we have provided compelling evidence that school closures likely played a large role in the observed decline in reporting during March and April 2020, we cannot rule out the possibility that other factors besides school closures may have affected reporting during this time. The dramatic decline of social interactions resulting from official stay-at-home orders and voluntary sheltering in place likely limited the exposure of children to a wide range of potential reporters of child maltreatment such as law enforcement personnel, pediatricians, and extended family members. In fact, preliminary data on the number of child maltreatment allegations in Florida during May 2020 show an increase of roughly 12% relative to the number of allegations made in April 2020. That the number of allegations increased even while schools in Florida remained closed supports the idea that changes in factors outside of schools continue to impact child maltreatment reporting during the pandemic. Thus, although school personnel are the number one source of child maltreatment reports, we do not claim that school closures account for the entirety of the observed decline in reports.

Second, as previously mentioned, economists have only recently started to explore the role of school personnel as reporters of child maltreatment (Fitzpatrick et al., 2020). The findings in this section provide evidence that the ability of school districts to effectively identify and report child maltreatment may depend on the composition of school personnel. We note that fully understanding the complementarities among school personnel in identifying child maltreatment is beyond the scope of our paper. Identifying the individual contribution of specific staff types to child maltreatment reporting requires exogenous variation in a school district's staff composition. As such, the results in this section should be viewed only as suggestive evidence that support staff, such as school psychologists and nurses, may play a key role in child maltreatment reporting.

## 5. Discussion and conclusion

The rapid spread of COVID-19 has generated immediate challenges for policymakers across multiple areas including health, fiscal, environmental, and educational policy. To contribute to ongoing policy discussions, recent academic work has sought to understand the impact of COVID-19 policy responses on outcomes ranging from mortality to pollution. This study focuses on a common COVID-19 public health response—school closures.

Nearly all K-12 schools in the U.S. closed to slow the spread of COVID-19, effectively ending the 2019–20 school year early. While ongoing research has focused on the potential impacts of school closures on learning losses, we examine a much less explored consequence: a loss of in-person interaction between mandated reporters and victims of child maltreatment.

Using current, county-level data from Florida, we estimate a counterfactual distribution of child maltreatment allegations for March and April 2020, the first two months in which Florida schools closed. While one might expect the financial, mental, and physical stress due

to COVID-19 to lead to increases in child maltreatment, our findings indicate that approximately 15,000 fewer allegations were reported during these two months in Florida. Scaling up our estimates to the entire U.S. translates to 212,500 unreported allegations.[12]

These results yield important policy implications for the debate on whether or not to reopen schools in the fall of 2020. Throughout the last few months, policymakers around the country have grappled with the difficult decision of when to resume in-person learning. On the one hand, research has shown that COVID-19 school closures will generate substantial learning losses, particularly for the lowest-achieving students (Bacher-Hicks et al., 2020; Chetty et al., 2020; Kuhfeld et al., 2020). Furthermore, school shutdowns have left the most vulnerable children without access to federal nutrition programs such as the National School Lunch Program.[13] Finally, many parents rely on school buildings to act as daycare facilities, and without schools reopening parents face a tradeoff between work and adequate child care.

On the other hand, research shows that the virus is most easily transmitted in crowded indoor spaces, a description that fits public school buildings throughout the country.[14] While early evidence regarding the spread of the virus in schools is limited, reopening schools will likely expose both students and staff to the virus, particularly endangering those at increased risk of severe illness from COVID-19. The fact that cases of COVID-19 continue to increase throughout the country further complicates plans of reopening schools. Moreover, many states around the country have already announced upcoming, dramatic budget cuts, which will substantially hinder public schools' ability to hire and retain teachers and other school personnel.[15] Therefore, K-12 public schools may not be adequately funded to hire enough personnel and technical assistance to redesign campuses to accommodate social distancing or to implement regular testing and contact tracing.

While the above points are often highlighted in the debate surrounding school reopenings during the pandemic, this study documents a less salient cost of keeping schools closed. Our findings suggest that a vulnerable population—children at risk of maltreatment—are separated from a valuable resource when schools close, and this separation manifests as a reduction in maltreatment allegations. When schools are not in session, cases of child maltreatment are more likely to go unnoticed and unreported. While closures may be effective at halting the spread of the disease, policymakers should consider the under-reporting of child maltreatment when evaluating cost-benefit analyses of school reopenings.

Should policymakers decide to keep schools closed in the fall, multiple steps could be taken to potentially mitigate the under-reporting of child maltreatment. First, the pandemic may require the development and use of new strategies to ensure that children are safe. For instance, school districts could coordinate virtual check-ins between school personnel trained to recognize signs of abuse and high-risk children. Second, government agencies should ensure that maltreatment reporting resources are easily accessible and promoted. Nonprofessional reporters including family members and neighbors submitted roughly 17% of all child maltreatment reports in 2018 (Administration for Children and Families, 2020). When schools are not in session this group plays an important role in identifying and reporting maltreatment. However, many individuals may not understand that tools such as a reporting hotline exist and may also have concerns regarding what constitutes abuse, confidentiality, or potential steps to be taken by state agencies. Government agencies could use social media and online school platforms to distribute information regarding assistance on these matters.

The conversation regarding if and when to return to in-person instruction will continue. Our study adds to this complex discussion, underscoring an important cost of keeping schools closed: a broken link between victims and reporters of child maltreatment.

## Declaration of competing interest

The authors have no conflicts of interest to declare.

## Appendix A. Additional figures and tables

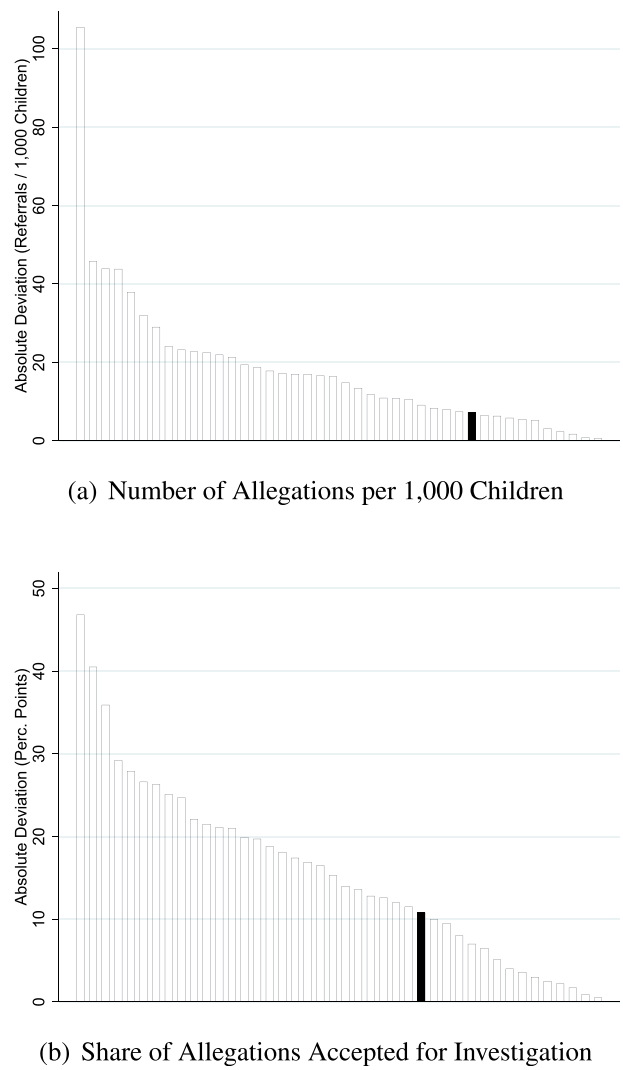


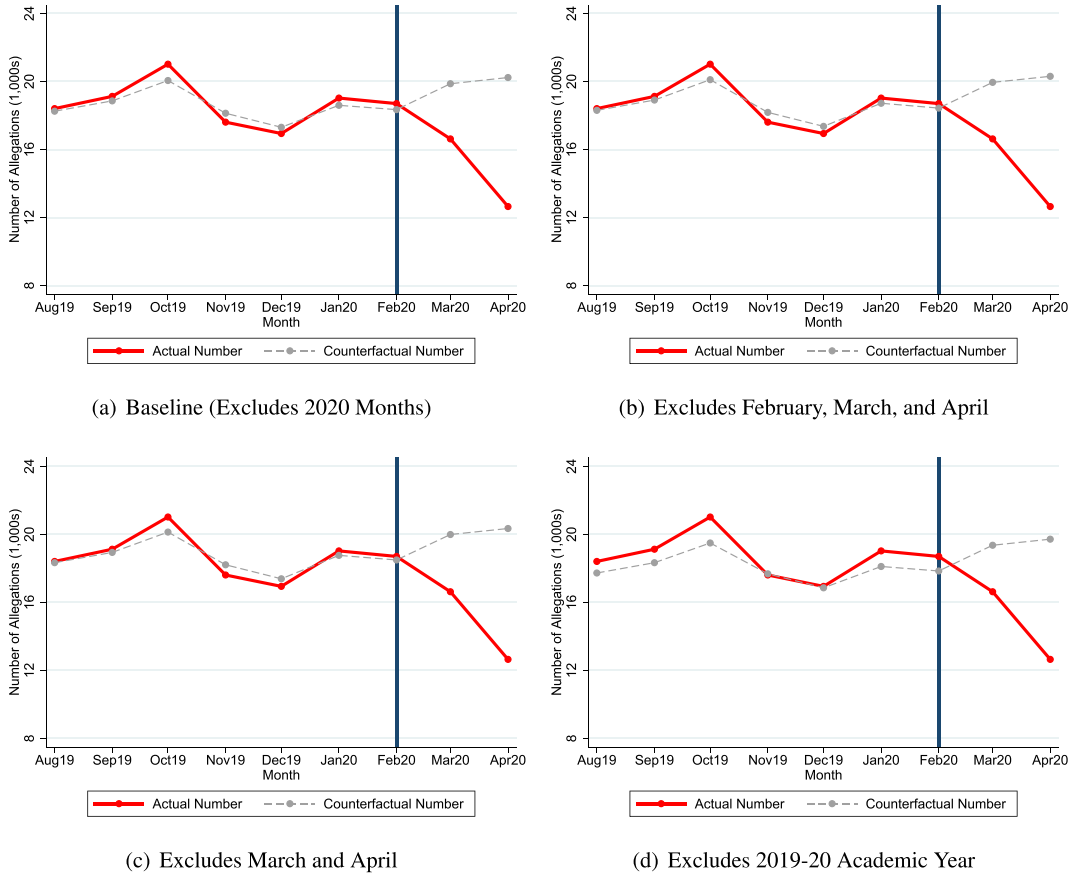

**Fig. A.1.** State deviations from the national average. Notes: The figure shows absolute deviations from the national average in the number of allegations per 1000 children (Panel (a)) and the share of allegations accepted for investigation (Panel (b)) by state. The solid black bar represents the state of Florida. Unfilled bars represent the remaining states in the contiguous U.S., with the exception of Illinois, New Jersey, New York, North Carolina, North Dakota, and Pennsylvania, for which these data were unavailable. Data on each state's child maltreatment allegations come from the 2018 Child Maltreatment Report (Administration for Children and Families, 2020).

[12] Approximately 4.3 million allegations of child maltreatment were reported in the U.S. in 2018 (Administration for Children and Families, 2020). Based on estimates from Florida, we calculate that roughly 786,900 (18.3%) of the 4.3 million allegations were reported during March and April 2018. Assuming our estimated 27% decline is externally valid, we calculate that roughly 212,500 allegations ($0.27 \times 786{,}900$) went unreported nationwide in March and April 2020.

[13] See, for example, Bauer, L. (2020), *The COVID-19 Crisis Has Already Left Too Many Children Hungry in America*, Brookings. Accessed at: https://brookings.edu (July 27, 2020).

[14] See, for example, Belluck, P. et al. (2020), *How to Reopen Schools: What Science and Other Countries Teach Us*, The New York Times. Accessed at: https://www.nytimes.com/ (July 27, 2020).

[15] See, for example, Vielkind, J. (2020), *New York Schools Prepare for Cuts as Coronavirus Hurts State Revenue*, The Wall Street Journal. Accessed at: https://wsj.com (May 6, 2020).




(a) Baseline (Excludes 2020 Months)

(b) Excludes February, March, and April

(c) Excludes March and April

(d) Excludes 2019-20 Academic Year

**Fig. A.2.** Alternative definitions of local months. Notes: The figure shows the difference between the actual and predicted counterfactual number of accepted allegations for each month of the 2019–20 academic year. The counterfactual number of accepted allegations comes from estimating Eq. (1) and specifying $f(\cdot)$ as a third-order polynomial. Panel (a) shows our baseline specification which excludes the months of January, February, March, and April 2020 when estimating Eq. (1). Panels (b), (c), and (d) display the results obtained when instead excluding only February, March, and April 2020; March and April 2020; and all available months in the 2019–20 academic year, respectively.

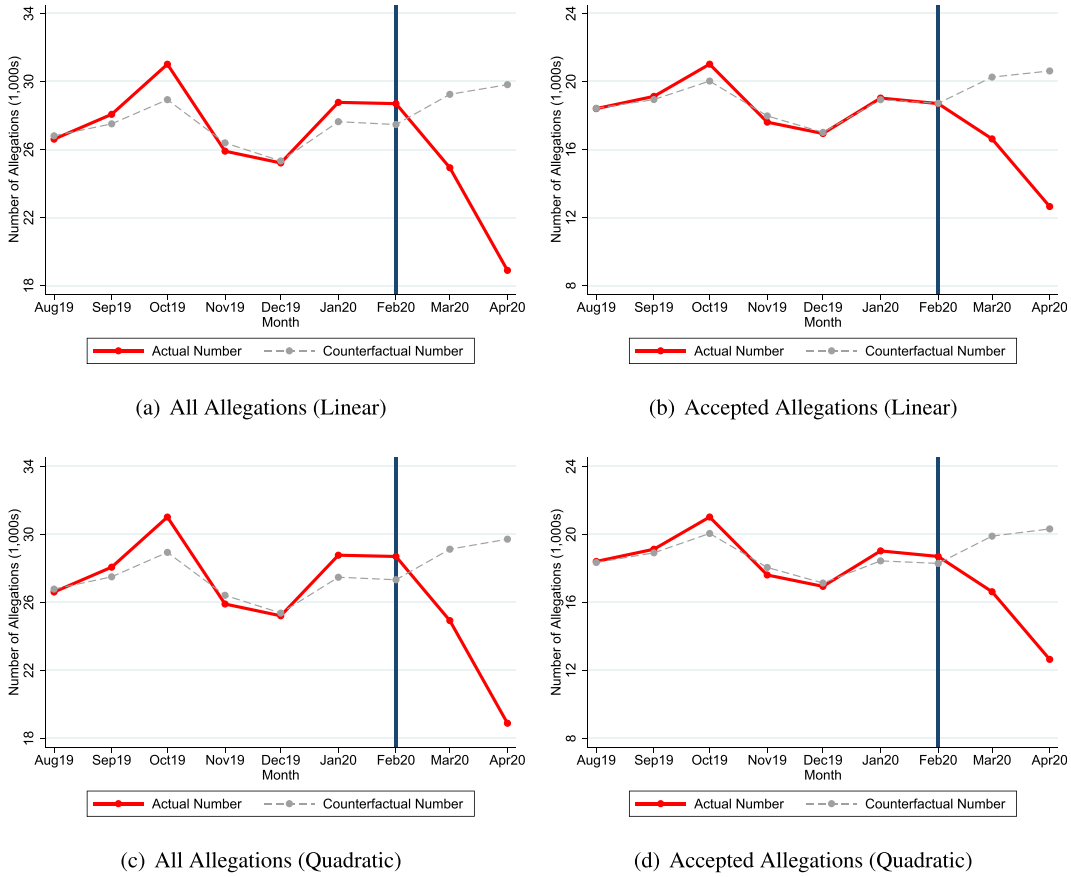
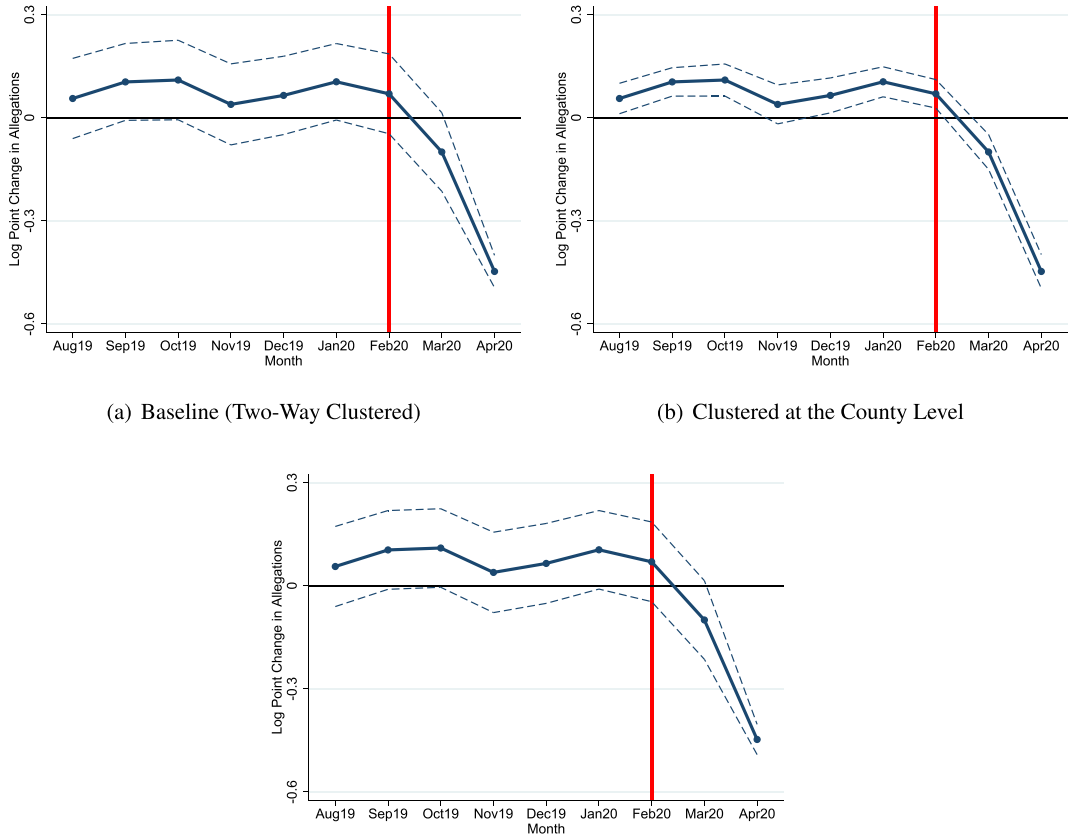



**Fig. A.3.** Actual vs counterfactual (linear and quadratic). Notes: The figure shows the difference between the actual and predicted counterfactual number of allegations for each month of the 2019–20 academic year and separately for the total number of allegations and for the total number of allegations accepted for investigation. The counterfactual number of allegations comes from estimating Eq. (1) excluding January, February, March, and April 2020. Panels (a) and (b) display the results obtained when specifying $f(\cdot)$ as a first-order polynomial, while Panels (c) and (d) show the results when specifying $f(\cdot)$ as a second-order polynomial instead.




(a) Baseline (Two-Way Clustered)

(b) Clustered at the County Level

(c) Clustered at the Month Level

**Fig. A.4.** Alternative standard error specifications. Notes: The figure shows re-estimation of the results presented in Panel (b) of Fig. 3. Panel (a) displays the baseline estimates in which standard errors used in the construction of the 95% confidence intervals were two-way clustered at the county and month levels. Panels (b) and (c) show the estimates obtained when clustering standard errors at the county and month levels, respectively.

**Table A.1**
Summary statistics.

| | N | Mean | St. Dev. | Min | Max |
|---|---|---|---|---|---|
| Panel A: hotline allegations | | | | | |
| Total allegations | 13,132 | 330.55 | 451.49 | 1 | 3017 |
| Total accepted allegations | 13,132 | 276.71 | 367.89 | 1 | 2077 |
| Total initial allegations | 13,132 | 278.64 | 380.67 | 1 | 2599 |
| Total allegations per 1000 children | 13,132 | 5.97 | 2.27 | 1 | 21 |
| Total accepted allegations per 1000 children | 13,132 | 5.04 | 1.74 | 0 | 16 |
| Total initial allegations per 1000 children | 13,132 | 5.04 | 1.89 | 0 | 19 |
| Percent of accepted allegations | 13,132 | 86.20 | 12.13 | 33 | 100 |
| Panel B: economic conditions | | | | | |
| Unemployment rate (%) | 13,065 | 6.17 | 2.81 | 1 | 19 |
| Employment-population ratio (%) | 13,065 | 49.69 | 8.19 | 23 | 76 |
| Panel C: education variables | | | | | |
| Inst. staff per 1000 Pupils | 67 | 73.07 | 7.87 | 58 | 102 |
| Guidance counselors per 1000 pupils | 67 | 2.20 | 0.44 | 0 | 3 |
| Social workers per 1000 pupils | 67 | 0.39 | 0.37 | 0 | 2 |
| Nurses per 1000 pupils | 67 | 0.43 | 0.51 | 0 | 2 |
| Psych. per 1000 pupils | 67 | 0.36 | 0.24 | 0 | 1 |
| Expenditures on instruction | 67 | 5416.86 | 574.83 | 4513 | 8167 |
| Expenditures on administration | 67 | 513.99 | 87.07 | 338 | 841 |
| Expenditures for utilities | 67 | 253.04 | 66.54 | 137 | 480 |
| Expenditures on op. and maint. | 67 | 921.86 | 170.27 | 613 | 1379 |
| Expenditures on textbooks | 67 | 55.19 | 22.24 | 12 | 109 |

Notes: The table presents summary statistics. Panel A shows summary statistics for allegations of child maltreatment, while Panels B and C present summary statistics of variables capturing economic conditions and school district characteristics, respectively. Monthly child abuse allegations by county come from the Florida DCF and are available from January 2004 through April 2020. Population estimates used to calculate allegations of child maltreatment per 1000 children come from the U.S. Census Bureau Population Estimates Program. Each county's monthly employment figures come from the LAUS and are available from January 2004 through March 2020. 2019–20 K-12 staff data come from the Florida Department of Education. District-level K-12 expenditure data for the 2016–17 academic year come from the NCES.

**Table A.2**
Timing of COVID-19-related statewide policy responses.

| State | First confirmed case | Stay-at-home order | School closures |
|---|---|---|---|
| Florida | March 1 | April 3 | March 16 |
| New York | March 1 | March 22 | March 18 |
| California | January 26 | March 19 | March 19 |
| Texas | February 13 | March 31 | March 20 |

Notes: The table presents the date of the first confirmed COVID-19 case and the dates of significant statewide policy responses to COVID-19 for Florida and the three other most populous U.S. states (New York, California, and Texas). The second column shows the date of the first confirmed COVID-19 case in each state. The third column presents the date that the initial statewide stay-at-home order became effective. Lastly, the fourth column shows each state's date of statewide school shutdowns in response to COVID-19. We obtained the dates of each state's responses from a variety of sources including the National Academy for State Health Policy and local news organizations.

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