The Neglected Ones: Time at Home During COVID-19 and Child Maltreatment

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Abstract. The ongoing COVID-19 pandemic has led to extreme social isolation, precarious employment and job loss, working from home while tending to children, and limited access to public services. The confluence of these factors likely affects child health and well-being. We combine early release child maltreatment reports in Indiana with unique and newly available mobile phone movement data to better understand the relationship between staying at home intensively during the COVID-19 pandemic and child maltreatment. Our findings indicate that the prolonged stays at home promoted by the public health response to COVID-19 resulted in reductions in child maltreatment reports overall and in substantiated reports of maltreatment. However, relative to areas that stayed home less, children in areas that stayed home more were more likely to be both reported for and a confirmed victim of maltreatment, particularly neglect. These areas have historically been socioeconomically advantaged and experienced lower rates of maltreatment. We only observe increases in confirmed child maltreatment in metropolitan counties, suggesting that the effects of staying home on child maltreatment may reflect both the differential risk of leaving home and access to services in metropolitan–rather than non-metropolitan–counties. Policymakers should consider the impacts of stay-at-home orders on child well-being when determining the appropriate public health and re-opening responses.

Keywords: child abuse and neglect; COVID-19; stay-at-home orders

JEL codes: J12, J13, I18

1. INTRODUCTION

In the spring of 2020, nearly 95% of Americans were under instructions to "stay-at-home" to curtail the spread of the Sars-Cov-2 (or the novel coronavirus known as COVID-19). Staying home exclusively, which is one key element of social distancing, presented families with a host of new challenges, and as a result, American family life changed dramatically and abruptly. Working parents faced stress surrounding any combination of the following: unemployment, meeting the in-person expectations of an essential job that did not allow for staying at home, working from home, a shift in employment responsibilities, and/or other acute employment pressures. Parents had to navigate this new employment landscape with one additional complication: as a result of school and daycare closures due to public health precautions, their children were home, too. Beyond the employment changes, COVID-19 has imposed other substantial challenges to parenting including providing constant care and safety to children, lack of daily routines and normalcy, limited hours for essential services (e.g., grocery stores), increased parental stress, and social isolation. Each of these factors are important for navigating parenthood and caregiving, and the compounding of these experiences are particularly concerning to child health and welfare professionals (Abramson, 2020; American Academy of Pediatrics, 2020).

In this paper, we present early evidence regarding how staying at home due to COVID-19 affects child maltreatment. Child maltreatment, which includes sexual abuse, physical abuse, and neglect, is a pervasive problem in the United States. In 2018, 678,000 children were victims of substantiated child maltreatment (U.S. Department of Health & Human Services [DHHS], 2020). At some point in their childhoods, 37% of all children are the subject of a Child Protective Service (CPS) investigation (Kim et al., 2017). Neglect, which is characterized by inadequate supervision and failure to provide a child with basic necessities, including safety, is the most common form of child maltreatment. It accounts for approximately 75% of child

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maltreatment reports and is present in nearly 80% of child maltreatment related deaths (DHHS, 2020).

Ex ante, the effects on children of spending more time at home with their parents or primary caregivers are unclear. If this increased time translates into quality "family time," then children might be better off. However, the popular press is replete with stories of parents experiencing heightened fatigue and providing distracted or disengaged supervision as they juggle childcare, homeschooling, and their formal employment responsibilities in the wake of COVID-19 stay-at-home orders (see e.g., Edwards & Snyder, 2020). Moreover, many of the typical resources (local public services, places of worship, daycare, etc.) available to families were either stressed due to high demand or also temporarily closed due to stay-at-home orders. Stated differently, COVID-19 created stressors at both the family and community levels. Contractions of resources – such as those brought about by COVID-19 – could put children at an increased risk of maltreatment.

Given the emergent nature of COVID-19 research, data for answering questions surrounding COVID-19 and outcomes, like child maltreatment, are limited – despite its immediate importance. Common sources of child maltreatment information (e.g. formal child maltreatment reports to Child Protective Services (CPS) nationwide, medical records, parent- and child-reported measures) are not yet available or are slowly becoming available to the research community. For example, the National Child Abuse and Neglect Data System (NCANDS): Child File usually releases data to the research community with a roughly two-year lag.

Therefore, to understand the effects of COVID-19 on child maltreatment in "real-time", we use early release child maltreatment report data made publicly available by one state agency: Indiana's Department of Child Services (DCS). We combine these data with proprietary mobile phone movement data on Indiana residents. We take great care to confirm

the validity of the data, as they are unique and novel, and we are confident that they are well suited to shed light on COVID-19's effect on child maltreatment.

Our findings show that across Indiana (and consistent with other jurisdictions' experiences across the United States as reported by media outlets), substantiated reports of maltreatment have declined in April and May 2020, likely due to school closures (Baron et al., 2020). However, counties with the largest increases in time spent at home between early March 2020 and early April 2020 experienced significantly more maltreatment reports and substantiated cases of maltreatment relative to counties whose residents stayed home less. The results are driven by substantiated child neglect. Areas with relatively more substantiated maltreatment have lower rates of maltreatment and are generally socioeconomically advantaged. Finally, this finding is unique to metropolitan counties.

Our findings represent a deviation from typical trends in child maltreatment research. The counties for which we observe the highest relative increase of substantiated maltreatment have the lowest substantiation rates and the fewest traditional risk factors for reported child maltreatment (these counties have the lowest poverty rate, highest median income, and a larger share of the population identifying as Non-Hispanic white). Policymakers should consider the unique challenges to providing safe and consistent care for all children during a pandemic while implementing appropriate public health, closure, and re-opening responses. Closures may need to be complemented by policies or services to off-set or mitigate the challenges families face in light of families' new time constraints.

2. THEORIES RELATED TO CHILD MALTREATMENT

2.1 Primary causes of child maltreatment

Extant research has focused on two primary causes of child maltreatment. An extensive literature has examined the ways in which parental psychopathology, including stress and depression, are associated with increased risk for child maltreatment (Kempe et al., 1962;

Pinderhughes et al., 2000; Taylor et al., 2009). A second line of research has sought to understand the ways in which economic hardship increases the risk for child maltreatment (Berger, 2004; Bullinger, Feely, et al., 2020). Psychopathology and economic hardship likely work both independently and in tandem to increase the risk for child maltreatment. Economic hardship, for example, may exacerbate or instigate mental health problems, increasing the risk for child maltreatment. Economic hardship and mental health problems diminish two resources that are paramount for positive parenting involvement: time investments in children (Sandberg & Hofferth, 2001) and economic resources, namely income (Yeung et al., 2002).

2.2 How stress and mental health affect child maltreatment

According to prior research, stress, depression, and related mental health problems increase the risk for child maltreatment by reducing parents' ability to cope with the rigors of parenting (Easterbrooks et al., 2013). Depression, for example, may influence parents' perceptions of children's behavior leading to harsher parenting and potentially increased child maltreatment (Bugental & Happaney, 2004). Research drawing on the Family Stress Model (Conger et al., 2000) indicates that parental stress is linked to increased conflict between parents, which in turn is associated with increased harsh and detached parenting. Moreover, prolonged intense parenting – especially when few respite or support resources are available – may lead to parental burnout, which can increase the risk of neglect and abuse (Griffith, 2020).

2.3 How economic hardship affects child maltreatment

Economic hardship has increasingly been identified as a primary causal factor in child maltreatment, particularly child neglect (Bullinger, Feely, et al., 2020; Feely et al., 2020). This work often argues that economic hardship may diminish parents' ability to provide safe and consistent care for children by increasing their exposure to unstable and unsafe environments, reducing parents' ability to provide materially for children, and increasing stress, depression,

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and other mental health problems (Feely et al., 2020; Pelton, 2015). Emerging work investigating the causal effects of income on child maltreatment largely finds that income support programs reduce the risk for child maltreatment (Berger et al., 2017; Cancian et al., 2013; K. Raissian & Bullinger, 2017), while negative economic shocks increase the risk (Lindo et al., 2018; Schenck-Fontaine et al., 2017; Schenck-Fontaine & Gassman-Pines, 2020; Schneider et al., 2017).

Though employment is traditionally considered a way for families to obtain economic resources (which promotes child well-being), it also introduces competing and potentially off-setting demands for caregivers' time. Although some research indicates that rising unemployment is associated with increased child maltreatment (Brown & De Cao, 2020; Frioux et al., 2014). Other studies imply that unemployment may actually be protective against child maltreatment if it provides children with greater supervision and increased access to caregivers (Paxson & Waldfogel, 2002; K. M. Raissian, 2015). Lindo and colleagues (2018), for example, find that rising male unemployment is associated with increased child maltreatment while rising female unemployment is associated with decreased child maltreatment.

2.4 Parental resources: pathways to safe and consistent care

A robust sociological and economic literature has investigated the important role that parental resources, including time and income, play in providing parents with the means to parent effectively (Becker, 1981; Brooks-Gunn & Duncan, 1997). This literature demonstrates that income influences child wellbeing through its effect on parents, namely, less parenting stress more parental warmth, and less use of harsh discipline (Linver et al., 2002; Mistry et al., 2002).

Financial resources can also affect child maltreatment through pathways related to the availability of time. Market work may then decrease the risk for child maltreatment if it effectively provides parents with the ability to purchase additional resources that enable them

to provide safe and consistent care of their children (e.g., childcare). Alternatively, employment may increase the risk for child maltreatment if it is unstable or in other ways reduces parents' ability to ensure their children's safety (Paxson & Waldfogel, 2002) (e.g., if parents are unable to purchase or afford quality childcare).

Theory and prior work suggest that when employment is combined with potential economic and psychological distress, the risk for child abuse or neglect increases if there are no appropriate child supervision options. Without access to traditional supports the FAAR model indicates that child neglect may increase as parents are forced into imbalance. In this regard, the inability to purchase childcare services may shift the risk for neglect to higher income parents, particularly if parents remain employed. Available time and emotional energy to invest in children, may substantially decrease in the face of these circumstances, leading to increased neglect.

3. COVID-19 POLICY RESPONSES AND CHILD MALTREATMENT

The public health threat from COVID-19 has had a clear effect on parents' economic resources and implications for time allocations and investments in their children. Indiana's Governor, Eric Holcomb, was among the first to declare a public health emergency on March 6, 2020. This declaration coincided with the diagnosis of the first known COVID-19 positive case in the state. In addition, 46 counties in Indiana declared independent public health emergencies (authors' calculations)[1]. Other public policy responses to reduce the spread of COVID-19 include stay-at-home orders, school closures, and face mask mandates, among others. For example, public schools were closed on March 19, 2002, at first temporarily, and then for the remainder of the 2019-2020 Academic Year. Many daycares also closed – especially

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[1] These data were collected by the authors. They consulted media accounts, called county offices, and consulted data from the National Association of Counties Data Explorer.

those that suffered from low enrollment or due to the cost of adhering to new regulations (for example, lower child to staff ratios, cleaning, etc.) (Rickert, 2020).

These policies may be related to child maltreatment through strains on household financial resources, parental time, and mental health. First, the pandemic has introduced unprecedented increases in unemployment and financial hardship throughout the U.S. (Bureau of Labor Statistics, 2020). In compliance with Indiana's stay-at-home order, effective March 25, 2020, non-essential businesses closed, which rendered many parents furloughed, unemployed, or working from home. This sudden economic shock may have increased child maltreatment through the inability to purchase goods and services that serve to reduce the risk for maltreatment (e.g., housing, food, childcare). Even among parents who remained employed, families may face more economic hardships from reduced work hours, pay cuts, or unpaid leave from work.

Second, parents who remained employed and continued earning stable incomes were largely expected to work-from-home to fulfill their employment responsibilities. This work arrangement placed parents under substantial pressure to split their time between market work and childcare. Because of the need to work and care for children simultaneously, the pandemic may have increased child neglect, supervisory neglect in particular, as employed parents were forced to manage the conflicting requirements of work and childcare without the support of childcare centers and schools.

Finally, parents who are essential workers and were required to leave their homes for work, were confronted by a lack of traditional out of home childcare and school, and generally faced challenges in navigating childcare while they continued to work. The pandemic also heightened the risk of their employment, often without appropriate compensation.

For parents and caregivers in each of these scenarios, the pandemic has likely imposed additional mental health strain. The widespread uncertainty associated with the spread of COVID-19 itself, social isolation from social distancing, and absence of regular resources

(including childcare) have all contributed to difficulties in coping with everyday life. Prescriptions for antidepressants are reported to have increased by 12 percent over previous years (Edney, 2020) and are also in short supply. Due to both increases in demand and disruptions in the supply chain, the Food and Drug Administration has added commonly prescribed tablets to a list of drugs experiencing a shortage.

Importantly, theory indicates that – as is the case with COVID-19 – these processes need not occur in isolation, but are likely mutually re-enforcing. Stay-at-home orders may have simultaneously increased economic hardship, mental health problems, and time constraints which together may further increase the risk for child maltreatment. The Family Stress Model, for example, indicates that economic hardship increases parental stress, resulting in parental conflict and harsh parenting. Similarly, the Family Adjustment and Adaptation Response Model (FAAR) predicts that economic hardship may increase stress. The FAAR model describes a process through which families draw on their resources and capabilities to balance and adjust to demands and crises. In the context of COVID-19, new employment demands emerged, traditional resources disappeared, and no substitute childcare resources materialized. Such a dynamic could increase familial conflict and stress and parental burnout and withdrawal, resulting in child maltreatment. Indeed, early evidence indicates increases in domestic violence across the U.S. as a result of stay-at-home orders (Bullinger, Carr, et al., 2020; Leslie & Wilson, 2020; Sanga & McCrary, 2020).

In sum, theory and prior empirical research indicate that stay-at-home orders may increase child maltreatment through three potentially interactive pathways. First, if parents become unemployed as a result of the crisis then increased economic hardship might result in child maltreatment. Second, the challenges associated with staying home intensively might increase psychological distress leading to child maltreatment, regardless of unemployment status. Third, among parents who remained employed, the competing demands of work and childcare may have resulted in increased child neglect as parents were unable to provide safe

and consistent childcare in the face of simultaneous work and lack of out-of-home childcare and school.

4. STUDY DATA AND METHODS

4.1 Child Maltreatment Reports

To examine the relationship between time at home during the pandemic and child maltreatment, we use two primary sources of unique and newly available data. First, to measure child maltreatment, we use early release, administrative records of child maltreatment reports to Indiana Child Protective Services (CPS) from January 2013 through May 2020. These records document the number of assessed reports of child abuse, including sexual abuse, physical abuse, and neglect, for each month in all counties, by disposition (substantiated or unsubstantiated). The sample consists of all 92 Indiana counties from January 2013 through May 2020 (89 month-years) measured monthly (N=8,188).

The primary outcome measure is the monthly incidence of substantiated reports of maltreatment made to the Indiana Department of Child Services (DCS) (i.e., confirmed maltreatment following a CPS investigation). We constructed a rate per 10,000 children. We focus on substantiations – as opposed to total child maltreatment reports – because reports have dropped precipitously across the country following stay-at-home orders. Although overall reports are good indicators of child *risk* and *exposure* to maltreatment in the aggregate (Drake, 1996; Hussey et al., 2005), educational personnel account for about 20% of reports both nationally and in Indiana (authors' calculations). Substantiation rates (1) offer a less volatile measure of child maltreatment, and (2) require evidence of harm. Therefore, substantiation rates allow us to understand if children experiencing confirmed maltreatment changed following stay-at-home orders. We also report results for child maltreatment report rates, and our findings are robust to outcome variables of choice.

4.2 Time Spent at Home

Data on social distancing and physical movement come from SafeGraph, Inc. a data company that aggregates anonymized location data from smartphone devices. In April 2020, SafeGraph, Inc. provided their "Social Distancing Metrics" to researchers through free, non-commercial agreements. SafeGraph reports that it tracks 35 million unique devices per month that have turned on their location services with exact known location in the United States. This database assigns each device to a home location (a 153-meter by 153-meter area that receives the most frequent GPS pings) using its nighttime (6pm to 7am) location. Among other measures, the data track the percent of each day that a device dwells at its home location. The data reported to researchers reflect the median percent of the day that devices spend at home at the Census block group level. For confidentiality reasons, SafeGraph excludes Census block groups with fewer than 5 devices. For a balanced panel, we drop block groups that are not in the panel every day during our time period (0.04% of block groups). We then aggregate the data to the county-month level to merge with the county-month maltreatment data. These data have been used in recent analyses examining the effect of state government restrictions due to COVID-19 on mobility (Dave et al., 2020; Farboodi et al., 2020; Friedson et al., 2020; Gupta et al., 2020).

4.3 Analytical Approach

To assess whether prolonged stays at home during the COVID-19 pandemic affected child maltreatment, we first calculate the change in the time spent at home between the beginning of March and the beginning of April for each county.[2] Then we divide counties into four quartiles based on the change. Figure 1 shows the differences in both the percent of the day spent at home and the percent of devices that spent the entire day at home across quartiles. On average, counties in Indiana increased their time at home by 26.8 percentage points, or

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[2] Specifically, we take the difference in time at home from April 1-15 and March 1-15.

roughly 6.4 hours between weeks 10 and 14 of 2020. During that same time, the percent of devices staying completely at home increased by 19 percentage points, a 90 percent increase. Counties that had the most dramatic increase in their time spent at home during this time period increased by 7.3 hours, on average, compared to 5.3 hours on average among the lowest quartile. We use this variation in the increase in time spent at home to construct four different groups of counties.[3]

We compare trends in child maltreatment report rates before and after Indiana's Governor declared an emergency due to COVID-19 on March 6, 2020 across changes in the time spent at home among these four groups. Specifically, we estimate the following equation:

$$Y_{cmy} = \alpha + \beta_1 Q2_c * Post_{my} + \beta_2 Q3_c * Post_{my} + \beta_3 Q4_c * Post_{my} + \log(adultpop)_{cy} +$$
$$\delta_c + \gamma_{my} + \varepsilon_{cmy} \qquad (1)$$

Where Y is the child maltreatment substantiation rate for county c in month m during year y. $Q2$=1 if county c was in the second quartile of increased time at home and zero otherwise. $Q3$=1 if county c was in the third quartile of increased time at home, and $Q4$=1 if the county was in the fourth quartile. The first quartile (i.e. the group of counties that increased their time at home the least) is the reference group. *Post* represents the quarantine effects and equals 1 if m=April or May and y=2020, and zero otherwise.[4] The coefficients of interest are β_{1-3}, the interactions between each quartile binary variable and the *Post* binary variable. This approach is akin to a difference-in-differences model with three treatment groups, or a treatment intensity model, where each of the top three quartiles is a treatment

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[3] There are several reasons why a household may have increased their time at home and there are likely different implications for these reasons for child maltreatment. For example, a household could increase time at home due to job loss (even temporarily) which would have both employment and financial implications for child well-being. Alternatively, a household could be working from home, and therefore experience changes to everyday routines, but less dramatic of changes in financial well-being. We are unable to distinguish between these two reasons for the increases in staying at home.

[4] The results are not sensitive to omitting March 2020.

group. The reference (control) group is the first quartile: those counties that had the smallest change in their time at home.

Additional components of the main model include county fixed effects, δ_c, which account for characteristics of a county that may be correlated with both substantiated child maltreatment rates and whether residents of a county stayed home, such as a county's culture or attitude toward aggressive parenting behaviors. Month-year, γ_{my}, fixed effects account for seasonality and general trends in reports over time, such as drops that might have occurred statewide due to school closures, allowing for month-to-month comparisons. We also adjust for the log of the adult population. Due to the recency of data, we are limited in our ability to adjust for potential confounders. However, studying changes over time in the same geographical area helps to account for within-county, statewide, and seasonal changes in parenting behaviors. All regressions are weighted by child population, and standard errors are clustered at the county-level to account for serial correlation.

4.4 Challenges with Using Child Maltreatment Reports

The month in which the data are reported reflect cases that were closed in that month. Indiana's DCS policy requires that cases be closed within 45 days from the date of the initial report to the assessment (i.e., a decision on whether the report is substantiated or not). To determine the proportion of cases that were initially reported in the same month in which they closed, we compared the Indiana early release data to the National Child Abuse and Neglect Data System: Child File (NCANDS)–the national data repository–in Indiana for March 2017 (the latest year available for NCANDS at the time of the analysis). It took approximately 33 days to close a substantiated case of neglect in both metropolitan counties and non-metropolitan counties (authors' calculations). Therefore, it is possible that some reports in April 2020 could have been made initially in March 2020 and that some reports initially made

in April 2020 were not closed until May 2020. We have taken three steps to mitigate this concern.

First, we use April and May 2020 data as the post-COVID time periods. Due to the 45-day requirement by DCS, we are confident that nearly all reports closed in the post-period were initially reported in the post-period, as well.

Second, the closure date in these early release reports and the initial report date in the final data the state of Indiana submits to NCANDS are highly correlated; historical data from January to May 2017 indicate a correlation of 0.82 for all substantiations and 0.86 for neglect substantiations. Using these correlations, we surmise that approximately 82 percent of substantiations closed in a given month were also initially reported in that same month.

Finally, since we compare counties to themselves in earlier time periods, methodologically these differences should not affect our results. As long as the distance between initial report and case closure *within counties* are not substantially different in April and May 2020 compared to earlier months, the results from this study reflect differential trends in April and May 2020 relative to preceding trends.

5. RESULTS

5.1 Descriptive Statistics

Before presenting our main results, we first present descriptive statistics. Figure 2 shows trends in the total report rate and the total substantiation rate for the most recent 12 months of our study period, split across the increase in time spent at home quartiles. These trends demonstrate several noteworthy points. First, both reports and substantiations fell during April and May 2020 for all counties in Indiana. This trend is consistent with early evidence from Florida (Baron et al., 2020), news reports that calls to child maltreatment hotlines are down in neighboring Illinois (Jackson, 2020), and declines in 911 calls reporting child abuse in Chicago, Illinois (Bullinger, Carr, et al., 2020). Second, counties that increased time at home

the least (quartile 1) consistently have the highest rate of reports and substantiations of all groups. Similarly, the group of counties that increased their time at home the most (quartile 4) consistently has the lowest rate of reports and substantiations. Quartiles 2 and 3 are generally in between these two groups. Finally, between June 2019 and March 2020, trends in both report and substantiation rates across the four quartiles are similar, lending support for our analytical approach.

Table 1 presents descriptive statistics (based on 2017 data) for each quartile. Approximately 53% of children in Indiana reside in the top two quartiles. Counties that increased their time at home the most (quartile 4) tend to be relatively less populous, have higher incomes and lower poverty rates, and have a larger share of the population identifying as non-Hispanic white. In addition, children in these counties are historically less likely to be confirmed victims of maltreatment.

5.2 Main Results

Moving to the main results, Table 2 presents the fully adjusted models, based on equation 1. Table 2 shows how trends in maltreatment reports changed in April and May 2020 relative to the trends before COVID-19 (January 2013-March 2020) differentially across counties by the increase in time spent at home. In Indiana, substantiated reports for sexual abuse and physical abuse did not significantly change in April and May 2020 for counties in any of the top three quartiles when compared to the change that occurred in quartile 1 counties. In contrast, substantiated reports of neglect are higher in quartile 4 during April and May 2020 relative to the same period for quartile 1 counties. Specifically, there are 2.45 more reports per 10,000 children in these counties. Compared to the pre-COVID-19 mean of 12.34 reports per 10,000 children, this estimate reflects an increase of about 20 percent. Similarly, the overall substantiation rate is higher in these counties by 2.67 reports per 10,000 children, or about an 18 percent increase. Importantly, these results imply that relative to the large reduction in

substantiated reports experienced in quartile 1, counties in quartile 4 experienced a much smaller reduction.

Although we focus on substantiated reports due to the reporting issues addressed earlier, in the last column of Table 2, we show that the overall report rate also increased in quartile 4 by 24 percent, relative to quartile 1. We also observe relative increases in the total report rate for counties in the quartile 3 of about 6 percent. Further analysis shows that increases in neglect reports are driving the effect in the total report rate. Our analyses also show relative increases in sexual and physical report rates among quartile 4 counties. These results are available upon request.

The nature of the COVID-19 pandemic is such that population density plays a large role in infectious disease transmission. Further, the macroeconomic context has different implications for child maltreatment across metropolitan and non-metropolitan areas (Raissian, 2015). Therefore, we next determine whether there are differences in the role of staying at home on child maltreatment across metropolitan status. Table 3 reports these results. The relative increases in neglect and overall substantiations in quartile 4 counties are driven by metropolitan counties. Further, when split by metropolitan status, all three quartiles have significantly more maltreatment reports in April and May 2020 relative to quartile 1. Figure 3 is a visual depiction of Table 3. As in Table 2, the increases in substantiations are driven by neglect, which may suggest child suffering due to job loss, precarious employment, or less supervision while parents work (either inside or outside of the home) (Moyer, 2020).

5.3 Robustness Checks

Thus far our results indicate that children in counties that increased their time at home the most between March and April 2020 were more likely to be confirmed victims of maltreatment than children in counties that were less likely to increase their time at home.

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We next test the sensitivity of our results to changes in functional form and study time period. We report these results in Appendix A.

First, the public health response to the COVID-19 pandemic began dramatically changing in mid-March. For example, Indiana Governor Holcomb ordered K-12 schools to close beginning on March 19, 2020. Since we have data aggregated to the monthly level, we are limited in our ability to look more carefully at March 2020, when COVID-19 precautions were going into effect (e.g., at the weekly or daily level). In the main results, March 2020 is treated as a non-COVID-19 month; in other words, the *Post* binary variable equals zero. However, column 2 of Appendix A shows that when we drop March 2020 from the analysis–thereby comparing April and May 2020 to January 2013 through February 2020–the results are nearly identical for both substantiation rates (Panel A) and overall report rates (Panel B).

Second, the time period in our main model consists of January 2013 to May 2020. For our primary analysis, we opt for more statistical power since the recency of the data make us unable to adjust for potential confounders. When we limit the sample to May 2019 through May 2020 (12 months of data), results are less precise, but substantively similar for both substantiations and total reports.

Third, most counties have non-zero substantiation rates. Nonetheless, to account for both counties that have zero substantiations in a given month and the possible compression in maltreatment trends among quartile 4 counties, we show in the last column of Appendix A that logging substantiation and report rates is not consequential for our results. Although we lose precision in the substantiation result, the point estimate is similar (18 percent for quartile 4 relative to 20 percent in the main model).

Finally, instead of the quartile-based analysis, we also explore nonlinearities using the amount of time spent at home and the quadratic form. The results from this analysis are consistent with our main results. Specifically, the substantiation rate decreases at an increasing rate by time spent at home (results available upon request).

6. LIMITATIONS

This study has limitations, which should be taken into account when interpreting the results and also addressed further when conducting future research. COVID-19 has affected families throughout the country (and world). While there has been differential spread in the disease across geographic areas, there are concerns about data quality related to infection and community transmission rates. Furthermore, the indirect consequences of the disease are more likely to affect children than the direct consequences of the illness. Therefore, we use the change in hours spent at home to capture how a community is responding to COVID-19. To be sure, a community's ability and desire to stay home are likely endogenous, and all counties in Indiana increased their time at home in the initial phase of COVID-19 lockdown. Our estimates are a measure of that intensity, and should be interpreted as such.

We use early release maltreatment data that are reported monthly at the county level. The data do not include detailed information on victim, reporter, perpetrator, or the date the report was made. Further, the measures of child maltreatment reports are cases where the assessment closed in a given month. Therefore, they reflect the month that a decision was made by a CPS worker, and for some cases may not be the same as the month the report was made. To confirm that our results are not sensitive to the timing of assessment decisions, we additionally test multiple time periods including ending the sample period in (1) April 2020, (2) May 2020, and (3) June 2020, and our results are robust to each of these time periods (results available upon request). Further, counties that increased their time at home between early March and early April are generally the same counties that continued to say home throughout the rest of April 2020 (authors' calculations). Because of the methodological choice to determine changes at home at the start of the COVID-19 public health response and the average time between initial report and assessment decision of 33 days, we opt to include April and May 2020 in the main results. However, our general conclusions about how families fared after COVID-19 related policies were implemented are robust to this decision.

All states (including Indiana) are expected to make their child maltreatment data available to the National Child Abuse and Neglect Data System: Child File. Once these data are available, researchers can probe more nuanced questions. As noted before, historically, the early release reports used in this study and the final data Indiana submits to the National Child Abuse and Neglect Data System: Child File–the national data repository–based on date of initial report are strongly correlated. While we do not doubt the veracity of the data, extensions around subgroups and external validity to other states are warranted by the research community.

The data we use are at the county-level, and there is likely within-county variation in both maltreatment rates and staying home. Moreover, when using aggregate data, one should worry about an ecological fallacy, though using aggregate data to study child maltreatment is not uncommon due to data access limitations.

The smartphone mobility data are a new data source for social policy research. Though they are a convenience sample based on a panel of smartphone devices, the sample of 35 million users is well-balanced across demographics and geographies (Farboodi et al., 2020), and represents a proxy for how counties responded to COVID-19, on average. However, we cannot distinguish between essential and non-essential mobility.

Finally, we are limited in our ability to adjust for potential confounders due to the recency of data. Studying changes over time in the same geographical area helps to account for within-county, statewide, and seasonal changes in parenting behaviors. However, given the quick nature of the change in time spent home, it is unlikely that many covariates varied at the county level between the April to May 2020 timeframe, and so this is unlikely to be a major – if any – source of bias.

7. DISCUSSION & CONCLUSION

Our findings indicate that, relative to areas that stayed home less, children in counties that stayed home more in response to COVID-19 policies were more likely to be both reported for and a confirmed victim of maltreatment, particularly for neglect. Further, the sizable relationships are likely conservative estimates due to statewide declines in overall reports to CPS. These findings are driven by metropolitan counties that typically have lower rates of maltreatment, higher incomes, and more non-Hispanic white residents. This latter finding is consistent with recent evidence on the effect of stay-at-home orders on domestic violence in that increases in domestic violence are driven by households without a history of domestic violence and among married households with children (Bullinger, Carr, et al., 2020; Leslie & Wilson, 2020; Sanga & McCrary, 2020).

At first glance, this result may be somewhat surprising based on the assumptions of the etiology of child maltreatment. However, our results are consistent with the experiences of working parents and are plausible when interpreted in the context of their COVID-19 experiences. These experiences are emerging via several outlets, and the narrative and evidence is consistent across multiple sources. These accounts demonstrate that children of working parents are at an increased risk for supervisory neglect. One *New York Times* article reports that although children's overall emergency department visits have fallen during the pandemic (much like overall reports to CPS), physicians report seeing an increase in accidental injuries from trampolines, scooters, bicycles, and inflatable pools because "parents [are] often unable to provide constant supervision because of work and other obligations" (O'Connor, 2020). Yet another piece details how parents who engaged in "intense hovering" pre-pandemic are now unable to watch their children while they work. Though this may allow children to explore and develop independence, it has also been associated with spikes in injuries (Caron, 2020).

Related but distinct from employment pressures is the increase in parental stress due to the sudden concurrent and unprecedented obligations of providing childcare or supervision while working from home. Parallel accounts of children resisting new routines combined with

added expectations from virtual or homeschooling increased parental burden and likely exacerbated parental fatigue. As early as April 2020 (Cooney, 2020; Manjoo, 2020), there were accounts of parents in many different situations feeling stressed, overwhelmed, and guilty for being alternately consumed by parenting responsibilities and trying to ignore them altogether. The prolonged parental burden leading to a range of responses from fatigue to (at the more extreme) parental burnout could explain the relatively higher rates of substantiated neglect cases (Griffith, 2020), especially among families that have experienced the largest increase in time at home. Simply put, parents may be worn down by the constant and elevated demands of childcare and need a respite from childcare responsibilities. With no alternate childcare provider, children are at risk for maltreatment.

Early research from the medical literature supports these claims. For example, the National Poison Data System has reported sharp increases in daily calls to poison centers regarding ingestions and inhalation in 2020 relative to the same period in 2019 (Chang et al., 2020). Calls increased the most regarding children aged 5 and under. Bram et al., (2020) show that while childhood injuries related to sports have decreased between March and April 2020 compared to earlier years, fractures and injuries occurring in the home, such as bicycle injuries, have increased. Finally, Chaiyachati et al., (2020) demonstrate an overall decrease in pediatric emergency department visits, but show an increase in high acuity trauma in 2020 relative to 2018 and 2019. Chaiyachati and colleagues also note that the demographics of patients seeking care is different. They note a smaller proportion of African American patients and observe a decrease in patients using public insurance (with a shift to privately insured patients). This demographic shift is consistent with our findings that children not traditionally at risk for child maltreatment are at heightened risk during the COVID-19 pandemic. This shift reveals that all families – regardless of traditional risk factors – need services and policies to promote child well-being. This may be especially relevant as school closures and daycare shortages persist.

Though our main result – that substantiated neglect in counties with residents experiencing the largest change in time at home is higher relative to counties experiencing less of a change in time at home – is consistent with the challenges of providing safe and consistent care to children while they work from home, a few points deserve further examination. Like emergency department visits, substantiation rates (and overall report rates) are down for all counties. These results suggest that families are struggling universally, but going without the traditional resources available to them. There are adverse consequences for children when there is a shock to family demands and there are insufficient resources, in the form of money or time, to provide safe and consistent care for children. This is true even for families in communities who previously had been able to provide a high level of safe and consistent care. Of course, there remains a concern about which children are not being seen by CPS. If there are children not coming before CPS, this does not negate the findings of this paper, but it speaks to a need to continue to reach out to and serve all children in various communities.

We interpret our findings to mean that substantiated child maltreatment in quartile 4 increased relative to quartile 1 during the COVID-19 response. An alternative interpretation is that substantiated child maltreatment in quartile 1 declined much more than that in quartile 4 (see Figure 2). This distinction could be important if, for example, quartile 4 counties have more diverse resources to devote to child surveillance and protection, whereas counties in quartile 1 rely more exclusively on schools and education personnel for child protection. Since we do not have data on reporter type, these data limit our ability to dig deeper into this theory. Nonetheless, understanding the different implications of school closures on child maltreatment and inequality across communities is an important direction for future research.

More maltreated – specifically neglected – children may be an unintended and negative consequence of the public health response to the pandemic. Policymakers should increase outreach to families who may be at risk – including those who have not historically been considered at risk – and provide emergency social and economic supports (Bullinger et al.,

2019). Healthcare professionals working in areas with strict social distancing may consider prolonged durations of time spent at home an additional risk factor for child maltreatment, and should enhance bilateral contact with children, youth, and families throughout the crisis to identify families who are at increased risk. Finally, the results of this study are important when considering the risks and benefits of resuming children's activities such as schools, daycares, and camps.

The current crisis represents a unique challenge for child maltreatment prevention. Targeted intervention for families with prior CPS contact as well as those traditionally considered at-risk may help to reduce child maltreatment. It may also be that aspects of the CARES Act and related legislation providing extended and enhanced unemployment insurance benefits, one-time government transfers, and expanded access to paid family leave, may serve as a near-universal prevention strategy by increasing family income and relieving stress (Brown & De Cao, 2020). Unfortunately, access to childcare and formal schooling may remain unattainable for many families in the foreseeable future. This is particularly problematic for working parents who are forced to balance the competing demands of work and childcare which may result in increased risk for child neglect. Social distancing is a necessary public health approach to curtail the spread of COVID-19 in communities, but it may still create new problems that affect broad swaths of the population. In the event that childcare centers and schools cannot re-open, and working parents must maintain the demands of multiple roles, policymakers must address this crucial risk for parents and children.

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Figures and Tables

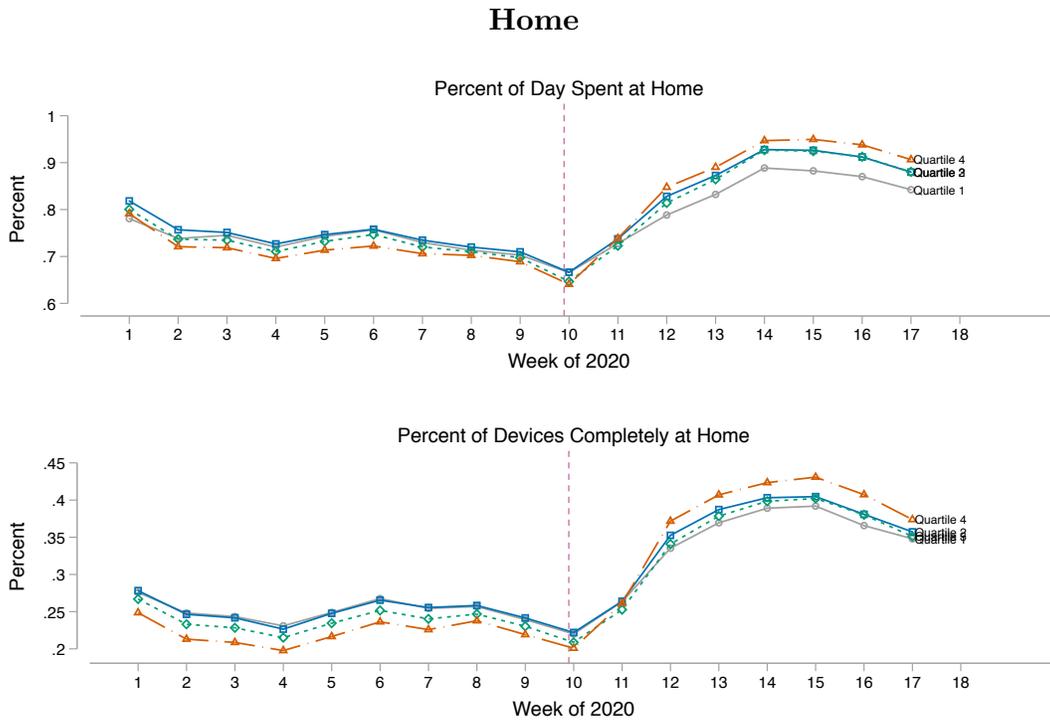## Figure 1. Trends in Time at Home by Quartile of Changes in Time Spent at Home

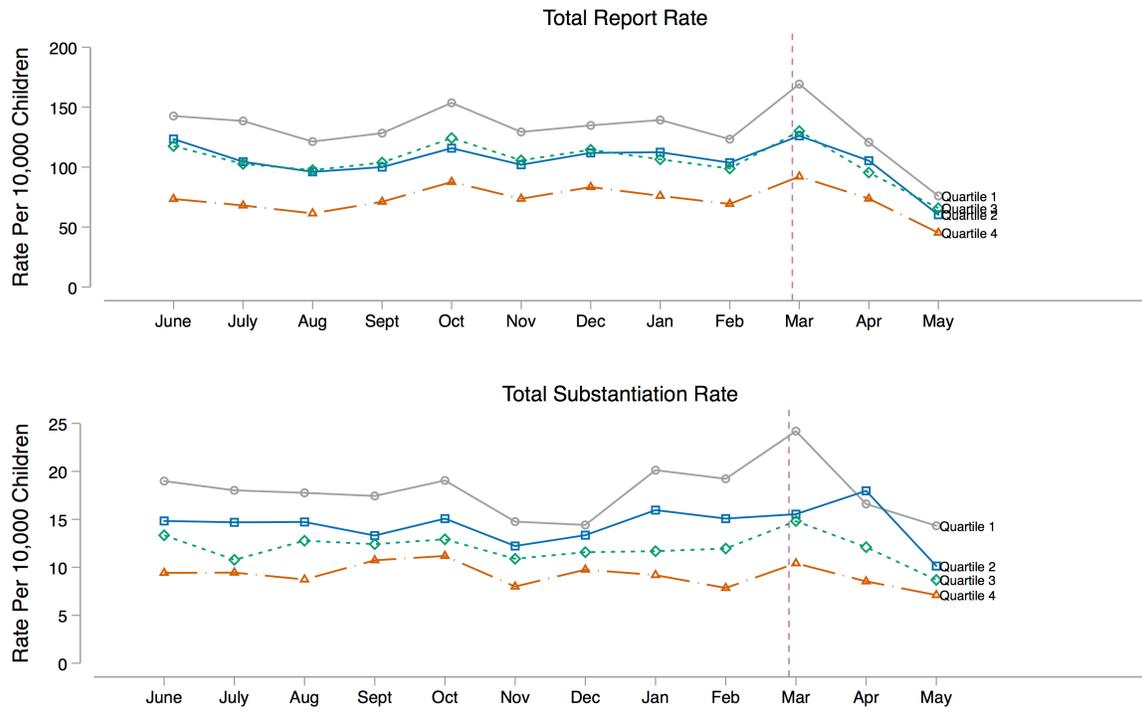# Figure 2. Trends in Maltreatment Report Rates by Quartile of Changes in Time Spent at Home

Figure 3. Effect of Staying at Home during COVID-19 Pandemic on Substantiated Child Maltreatment Reports
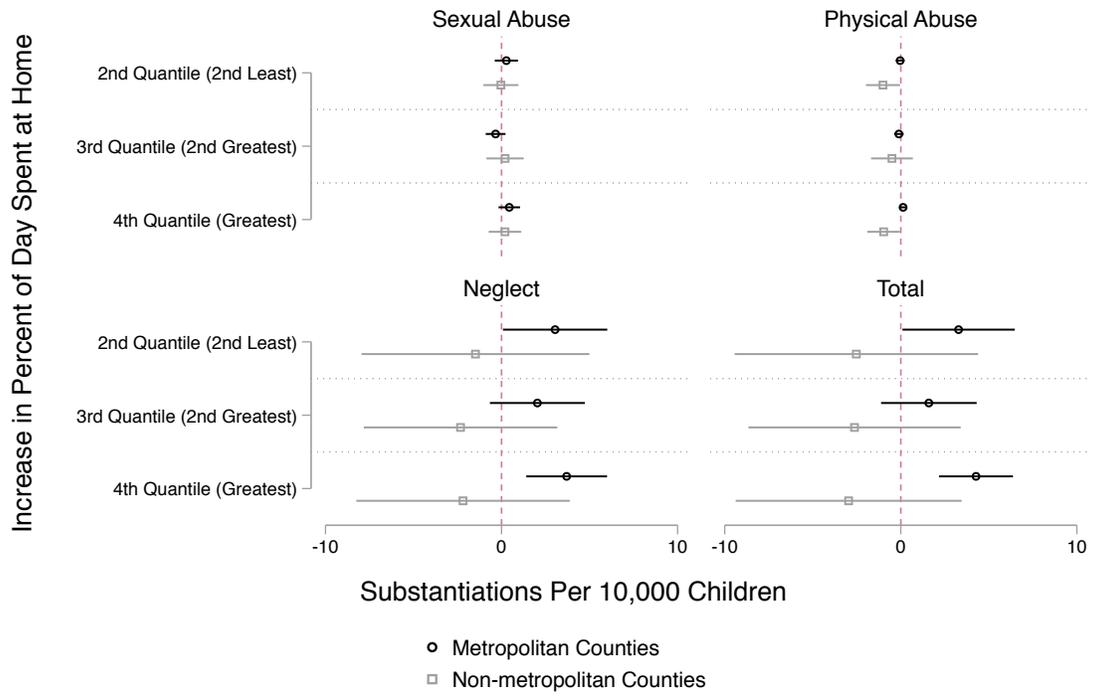
Table 1. Descriptive Statistics by Increases in Time Spent in the Home From March 1-15 to April 1-15

	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Average Increase in Hours Spent at Home Per Day	5.3	6.3	6.7	7.3
Sexual Abuse Substantiation Rate Per 10,000 Children	1.5	1.7	1.7	1.0
Physical Abuse Substantiation Rate Per 10,000 Children	1.1	1.3	0.9	0.8
Neglect Substantiation Rate Per 10,000 Children	17.9	16.0	13.4	9.8
Total Maltreatment Substantiation Rate Per 10,000 Children	20.6	19.0	16.1	11.6
Total Maltreatment Report Rate Per 10,000 Children	150.9	121.0	122.5	80.3
Metropolitan County (0/1)	0.80	0.71	0.84	0.74
Population	530339	229163	185609	146936
Poverty Rate (%)	0.17	0.14	0.13	0.08
Median Income ($)	48159	52530	55015	73064
Percent of the Population that is:				
Non-Hispanic White (%)	0.72	0.77	0.83	0.89
Non-Hispanic Black (%)	0.17	0.12	0.08	0.03
Hispanic (%)	0.08	0.10	0.07	0.05
Asian (%)	0.03	0.01	0.02	0.03
Aged 0-17 (%)	0.23	0.24	0.24	0.25
Aged 18-25 (%)	0.14	0.10	0.10	0.09
Aged 26-45 (%)	0.26	0.24	0.25	0.25
Aged 46-64 (%)	0.23	0.26	0.25	0.26
Aged 65+ (%)	0.14	0.17	0.16	0.15
Number of Counties (% of total child population)	23 (29.1)	23 (18.2)	23 (30.4)	23 (22.3)

Table 2. Social Distancing & Substantiated Child Maltreatment in Indiana

	Substantiation Rate				Report Rate
	Sexual Abuse	**Physical Abuse**	**Neglect**	**Total**	**Total**
Post*Quartile 2 (6.3 Hours More/Day)	0.16	-0.28	1.78	1.66	8.67
	(0.31)	(0.18)	(1.48)	(1.61)	(5.57)
Relative % Change	10.7%	-25.7%	14.4%	11.1%	8.3%
Post*Quartile 3 (6.7 Hours More/Day)	-0.24	-0.20	1.24	0.80	6.03*
	(0.26)	(0.17)	(1.34)	(1.36)	(3.59)
Relative % Change	-16.1%	-18.3%	10.0%	5.4%	5.8%
Post*Quartile 4 (7.3 Hours More/Day)	0.35	-0.13	2.45*	2.67*	25.15***
	(0.27)	(0.16)	(1.36)	(1.37)	(3.93)
Relative % Change	23.5%	-11.9%	19.9%	17.9%	24.1%
Mean Y Pre-Covid	1.49	1.09	12.34	14.93	104.37
R2	0.19	0.19	0.55	0.56	0.78
N	8188	8188	8188	8188	8188

Notes: Data from Indiana DCS January 2013-May 2020. Post=1 for April and May 2020. Outcome: Rates Per 10,000 Children. Models include log(adult population), county FE, and month-year FE, and are weighted by child population. Comparison group is Quartile 1: counties that stayed home 5.3 hours more/day. Robust standard errors are clustered at the county-level. *p<0.10, **p<0.05, ***p<0.01

Table 3. Social Distancing & Substantiated Child Maltreatment in Indiana, By Metropolitan Status

	Substantiation Rate				Report Rate	Relative % Change in Total
	Sexual Abuse	Physical Abuse	Neglect	Total	Total	Substantiation Rate
Panel 1: Metro (n=44)						
Post*Quartile 2 (6.3 Hours More/Day)	0.28	-0.04	3.04**	3.28**	14.50**	23.6%
	(0.33)	(0.12)	(1.47)	(1.58)	(5.59)	
Post*Quartile 3 (6.8 Hours More/Day)	-0.34	-0.11	2.04	1.59	8.96**	11.5%
	(0.28)	(0.13)	(1.34)	(1.35)	(3.58)	
Post*Quartile 4 (7.3 Hours More/Day)	0.44	0.13	3.70***	4.27***	30.39***	30.8%
	(0.30)	(0.11)	(1.14)	(1.04)	(3.13)	
Mean Y Pre-Covid	1.36	1.00	11.53	13.88	99.45	
R2	0.27	0.28	0.67	0.67	0.82	
N	3916	3916	3916	3916	3916	
Panel 2: Non-metro (n=48)						
Post*Quartile 2 (6.2 Hours More/Day)	-0.03	-1.01**	-1.48	-2.53	-3.77	-13.6%
	(0.49)	(0.48)	(3.22)	(3.44)	(11.64)	
Post*Quartile 3 (6.6 Hours More/Day)	0.20	-0.50	-2.33	-2.63	-7.03	-14.1%
	(0.53)	(0.59)	(2.73)	(3.00)	(9.16)	
Post*Quartile 4 (7.5 Hours More/Day)	0.20	-0.97**	-2.19	-2.96	8.31	-15.9%
	(0.46)	(0.46)	(3.01)	(3.19)	(10.28)	
Mean Y Pre-Covid	1.97	1.42	15.25	18.64	121.92	
R2	0.08	0.11	0.35	0.34	0.63	
N	4272	4272	4272	4272	4272	

Notes: Data from Indiana DCS January 2013-May 2020. Post=1 for April and May 2020. Outcome: Rates Per 10,000 Children. Models include log(adult population), county FE, and month-year FE, and are weighted by child population. Comparison group is Quartile 1. Robust standard errors are clustered at the county-level. *p<0.10, **p<0.05, ***p<0.01

Appendix

Appendix A. Social Distancing & Substantiated Child Maltreatment in Indiana, Robustness Checks

	Total Substantiation Rate			
	Main Model	Dropping March 2020	Limit Sample to 2019-2020	Log(Total Rate)
Panel A: Total Substantiation Rate				
Post*Quartile 2 (6.3 Hours More/Day)	1.66	1.59	2.51	0.06
	(1.61)	(1.60)	(1.63)	(0.13)
Post*Quartile 3 (6.7 Hours More/Day)	0.80	0.76	1.01	-0.05
	(1.36)	(1.37)	(1.16)	(0.10)
Post*Quartile 4 (7.3 Hours More/Day)	2.67*	2.64*	1.28	0.18
	(1.37)	(1.39)	(0.95)	(0.14)
Mean Y Pre-Covid	14.93	14.91	13.85	2.48
R2	0.56	0.56	0.67	0.68
N	8188	8096	1104	8019
Panel B: Total Report Rate				
Post*Quartile 2 (6.3 Hours More/Day)	8.67	8.43	12.95*	0.06
	(5.57)	(5.45)	(7.41)	(0.05)
Post*Quartile 3 (6.7 Hours More/Day)	6.03*	5.85	10.20**	0.01
	(3.59)	(3.60)	(4.29)	(0.04)
Post*Quartile 4 (7.3 Hours More/Day)	25.15***	25.04***	23.56***	0.14***
	(3.93)	(3.95)	(4.04)	(0.04)
Mean Y Pre-Covid	104.37	104.05	110.46	4.54
R2	0.78	0.77	0.82	0.84
N	8188	8096	1104	8188

Notes: Data from Indiana DCS January 2013-May 2020. Post=1 for April and May 2020. Outcome: Rates Per 10,000 Children. Models include log(adult population), county FE, and month-year FE, and are weighted by child population. Comparison group is Quartile 1: counties that stayed home 3.0 hours more/day. Robust standard errors are clustered at the county-level. $*p<0.10$, $**p<0.05$, $***p<0.01$