HHS Public Access

Author manuscript

Child Abuse Negl. Author manuscript; available in PMC 2023 June 01.

Published in final edited form as:

Child Abuse Negl. 2022 December ; 134: 105880. doi:10.1016/j.chiabu.2022.105880.

Do County Mental Health, Physical Health, and Care Provider Availability Predict Child Maltreatment Report Rates?

Hyunil Kim[1,*], **Chien-Jen Chiang**[2], **Eun-Jee Song**[1], **Liliane Windsor**[1]

[1]School of Social Work, University of Illinois at Urbana-Champaign, Urbana, Illinois.

[2]School of Social Work, Louisiana State University, Baton Rouge, Louisiana.

Abstract

Background: Research on community-level relationships between mental/physical health and child maltreatment is sparse.

Objective: We examined how rates of mental distress, physical distress, mental health professionals, and primary care physicians were related to child maltreatment report rates at the county level.

Participants and Setting: U.S. counties from 2014–2017.

Methods: Within-between random effects models estimated both within-effects (i.e., longitudinal changes) and between-effects (i.e., inter-county differences) of mental distress rates, physical distress rates, mental health professional rates, and primary care physician rates and their associations with overall and age-specific maltreatment report rates, while adjusting for potential confounders.

Results: Longitudinal increases of mental distress rates marginally significantly ($p<.10$) increased overall maltreatment report rates ($\beta=0.50$) and significantly ($p<.05$) increased age 0–5 maltreatment report rates ($\beta=0.84$). Conversely, longitudinal increases of mental health professional rates significantly decreased overall ($\beta=-0.38$), age 0–5 ($\beta=-0.59$), and age 6–11 ($\beta=-0.31$) maltreatment report rates and marginally significantly decreased age 12–17 maltreatment report rates ($\beta=-0.13$). Between-effects of metal distress rates and mental health professional rates were mostly not significant. Neither within-effects nor between-effects of physical distress rates and primary care physician rates were significant.

Conclusions: Our findings suggest that community mental distress is a risk factor for child maltreatment reports and that community availability of mental health professionals is a protective factor. Community-based strategies to address mental distress and human resource approaches to supply sufficient mental health professionals in communities may help reduce maltreatment report rates in communities. Further research is required to confirm our findings and to better understand underlying mechanisms.

[*]Corresponding Author: Hyunil Kim (hyunil@illinois.edu, T. 217-300-8122; address: 1010 W Nevada St, Urbana, IL 61801).

Declarations of interest: none

Keywords

child maltreatment; child abuse; mental health; physical health; provider availability; within-between random effects

Introduction

Child maltreatment is a national concern in the United States. Child maltreatment has been related to a long list of developmental, cognitive, psychological, behavioral, and health problems during childhood and continuing into adulthood (Anda et al., 2006; Cabrera et al., 2020; Lansford et al., 2002; Vaithianathan et al., 2018). In 2019, 4.7% of U.S. children had a child maltreatment report that was screened-in for an investigation or assessment by child protective services (U.S. Department of Health and Human Services, 2021). Estimates suggest that 37.4% of U.S. children will have at least one investigated maltreatment report by age 18 (Kim et al., 2017). A recent study estimated that the lifetime costs for all the children with an investigated maltreatment report in the United States in a year amounted to $2 trillion (Peterson et al., 2018).

To inform prevention efforts, studies have identified a range of risk and protective factors, and review studies have indicated that parental mental distress increased risk of child maltreatment (Austin et al., 2020; Ayers et al., 2019; Mulder et al., 2018; Stith et al., 2009; White et al., 2015). A meta-analysis study identified that parental stress, anger/hyper-reactivity, psychopathology, and depression increased both neglect and physical abuse risks, and parental anxiety, alcohol abuse, and drug abuse further increased physical abuse risk (Stith et al., 2009). A California birth cohort study confirmed the meta-analysis findings, showing that medically diagnosed maternal mental health disorders, such as psychosis, mood, anxiety, adjustment, behavioral, cognitive, developmental, impulse control, personality, alcohol/drug-related substance abuse, and other mental health disorders increased maltreatment report risk (Hammond et al., 2017). Parental mental health problems also increased recurrence risk of child maltreatment. A national study indicated that caregivers' mental health problems increased their children's recurrence risk of maltreatment reporting (Casanueva et al., 2015). A study based in a Midwestern metropolitan area found that mood and anxiety disorders increased recurrence risk of maltreatment reporting (Kohl et al., 2011).

While not as strong as the evidence for mental distress, some evidence suggests that parental physical distress may increase child maltreatment risk. An early preliminary study found that parents with child protective services involvement were more likely to have self-reported physical and emotional health problems (Conger et al., 1979). A recent national study supported this finding, revealing that physical health of a caregiver with child protective services involvement was generally worse than that of the general population (Burgess & Borowsky, 2010). A few other studies examined this relationship using multivariate modeling. A study of sampled low-income families in large U.S. cities and several New York regions found that caregiver health problems increased risks of surveyed and officially reported neglect (Slack et al., 2011). A different study based on

national and Midwest urban data also found that caregiver's physical health increased risk of neglect reporting and recurrence risk of maltreatment reporting (Chiang et al., 2020).

Communities with a concentration of disadvantages, such as mental and physical health problems, which are vital components of well-being, may experience high rates of child maltreatment. From a psychological perspective, concentrated disadvantages in communities can be sources of environmental stressors, which can increase child maltreatment risk among residents, especially those with low social supports (Coulton et al., 2007; Freisthler et al., 2006; Maguire-Jack, 2014a). From a sociological perspective, concentrated disadvantages in communities can impede positive social processes (e.g., collective efficacy and engagement) that help promote positive parenting practices and prevent child maltreatment (Coulton et al., 2007; Freisthler et al., 2006; Maguire-Jack, 2014a). Despite some theoretical supports, empirical evidence on community-level relationships between mental distress, physical distress, and child maltreatment is sparse, while evidence regarding community drug and alcohol availability and activities as risk factors for child maltreatment is relatively well established (Freisthler et al., 2006; Kepple et al., 2022).

Community availability (i.e., simple presence) of mental and physical health professionals can be protective against child maltreatment. Supplying these professionals in communities may facilitate early screening and detection of mental and physical health issues and utilization of preventive services before escalation of problems (Continelli et al., 2010; Flaherty & Stirling, 2010; Pignone et al., 2002; Shaw & De Jong, 2012). This may address parental mental and physical distress directly, as well as reduce concentration of these problems in communities, which in turn may reduce child maltreatment in communities. The current literature lacks, to our knowledge, evidence on community-level relationships between availability of mental and physical health professionals and child maltreatment. Yet, some evidence exists on availability of community services. A Los Angeles County study found that parents residing nearer to prevention services for mental health (including substance abuse) reported fewer neglectful behaviors (Maguire-Jack & Klein, 2015). Other studies examined a broader range of community services, including services for mental health, physical health, and other issues, such as financial/material, parenting, and childcare issues. A Wisconsin study found that families in communities with higher spending on such community services had lower risks of maltreatment reports (Maguire-Jack, 2014b). A study based in Franklin County, OH, found that higher availability and accessibility of such community services were related to lower risks of self-reported neglect and physical abuse among residents (Maguire-Jack & Negash, 2016).

Research has reported an increasing emphasis on community-based strategies for preventing and reducing child maltreatment (Daro & Dodge, 2009; Fortson et al., 2016). In this respect, understanding community risk and protective factors for child maltreatment is important for theory, as well as policy and practice. Even though mental and physical health conditions and providers are crucial for the well-being of individuals and communities, research on community-level relationships between mental/physical distress, mental/physical health provider availability, and child maltreatment is sparse. To close this gap, we address the following two questions at the county level, using U.S.-national longitudinal data from 2014–2017: (1) whether mental distress rates and mental health professional presence are

associated with child maltreatment report rates and (2) whether physical distress rates and primary care physician presence are associated with child maltreatment report rates. We conduct separate analyses for each question, rather than together, due to multicollinearity between mental and physical distress rates. We expect that higher rates of mental and physical distress in counties increase their maltreatment report rates, but more mental health professionals and primary care physicians in counties may reduce their maltreatment report rates. We examine both within- and between-effects of these relationships to consider both longitudinal changes within communities (i.e., within-effects) and inter-county differences across a broad social spectrum (i.e., between-effects). We examine these relationships overall, as well as within child age subgroups (i.e., 0–5, 6–11, and 12–17 years). As child maltreatment risks sharply differ by child age (Kim et al., 2017; U.S. Department of Health and Human Services, 2021), the relationships of interest can differ by child age. We also examine whether these relationships differ by urbanicity, as prior research suggests significant differences in child maltreatment contexts between urban and rural areas (Maguire-Jack & Kim, 2021).

Methods

We linked multiple national datasets (i.e., population-level records of child maltreatment reports, U.S. Census data, and county-level health data) at the county level for 2014–2017 to examine research questions while controlling for a range of confounders. Linkage between these national datasets was possible neither at the individual level nor at a subcounty geographic level (e.g., tracts). Yet, we were able to link them by county. While area units smaller than counties might offer greater homogeneity of community experiences among residents (Aron et al., 2010), prior research demonstrated that county-level data could be useful to understand community risk and protective factors of child maltreatment (Kim & Drake, 2018; Maguire-Jack, 2014b). We used 2014–2017 data because mental/physical health variables were available in this timeframe. For analysis, we used within-between random effects models.

Data and Sample

We used all child maltreatment reports that were investigated or assessed by child protective services in the 50 states and the District of Columbia during 2014–2017, obtained from the National Child Abuse and Neglect Data System (NCANDS) Child Files. We aggregated original child/case-level data into county-level data. Before aggregation, we excluded the following records: fatal cases (0.03%), duplicate records (0.06%), missing or out-of-range age cases (0.72%), and records with missing county identifiers (0.25%). We counted a child once per year to compute annual rates of child maltreatment reports. We aggregated 13,401,653 reported children into county-years.

There were 12,568 county-year observations in 2014–2017 (= 3142 counties × 4 years) in the United States. We excluded four Rhode Island counties in 2014–2017 (16 county-years) and three Massachusetts counties in 2014–2017 (12 county-years) because of no NCANDS data for these county-years. All Pennsylvania counties in 2014 (67 county-years) were excluded due to potential errors in county identifier entry. We also excluded one Missouri

county that did not have primary care physician rates for any of the years in the study period (4 county-years). The final data consisted 12,469 county-years, covering 99.21% of U.S. counties and 98.88% of children in the United States in 2014–2017.

To protect confidentiality, the NCANDS Child Files suppressed county identifiers of records from counties with <1,000 maltreatment reports per year, but state identifiers of those records were still available. This allowed us to combine suppressed counties into a joint county area per state, following prior research (Kim et al., 2022; Kim & Drake, 2018). Accordingly, 2,353 county-years were identified while 10,116 county-years were suppressed and combined into 187 joint county-years. Altogether, we used 2,540 county-years (= 2,353 identified + 187 joint) for analysis. Suppressed counties were low-populated and mostly rural areas. No records were excluded in the process of combining suppressed counties.

The data for mental distress, mental health professional, physical distress, and primary care physician rates were obtained from the County Health Rankings. The data for control variables were obtained from the U.S. Census American Community Surveys. All these data were provided at the county level. For linkage, we combined these data from counties suppressed in maltreatment report data into joint county-years. That is, we computed population-weighted means of these data from suppressed counties for each joint county-year.

Measures

All dependent variables were measured as rates per county per year (see Table 1). We measured four dependent variables per 1,000 children in each category: overall maltreatment report rates, age 0–5 maltreatment report rates, age 6–11 maltreatment report rates, and age 12–17 maltreatment report rates. We estimated models separately for each dependent variable.

We used four independent variables, obtained from the County Health Rankings: age-adjusted mental distress rates (i.e., percentages of adults reporting ≥14 days of poor mental health, including stress, depression, and emotional problems, per month), age-adjusted physical distress rates (i.e., percentages of adults reporting ≥14 days of poor physical health, including physical illness and injury, per month), mental health professional rates (i.e., numbers of mental health professionals per 10,000 population), and primary care physician rates (i.e., numbers of primary care physicians per 10,000 population). Mental distress and physical distress rates were model-based estimates based on statistical modeling of the Behavioral Risk Factor Surveillance System data, which the data sources had already done (County Health Rankings, n.d.-a, n.d.-b). Model-based estimates could provide reliable rates for all counties, but rates of lower populated counties were based more on statistical modeling and less on direct survey measures (County Health Rankings, n.d.-a, n.d.-b). Mental health professionals included “psychiatrists, psychologists, licensed clinical social workers, counselors, marriage and family therapists, and mental health providers that treat alcohol and other drug abuse, as well as advanced practice nurses specializing in mental health care” (County Health Rankings, n.d.-c, para. 8). Primary care physicians included “practicing non-federal physicians (M.D.s and D.O.s) under age 75 specializing in general

practice medicine, family medicine, internal medicine, and pediatrics" (County Health Rankings, n.d.-d, para. 7).

We adjusted for a range of socioeconomic, demographic, care burden, and residential instability conditions (see Table 1), guided by prior research on ecological factors of child maltreatment (Coulton et al., 2007; Freisthler et al., 2006; Maguire-Jack, 2014a). Specifically, we used the following control variables from the American Community Surveys data: median household income (socioeconomic), % single-parent households (socioeconomic), % Black children (demographic), % Latino children (demographic), % foreign-born (demographic), % children among residents (care burden), % children with disabilities (care burden), and % moved (residential instability). We used the U.S. Department of Agriculture's 2013 Rural-Urban Continuum Codes to adjust for the level of urbanicity. We collapsed the original nine codes into the following three categories for parsimony: large urban (code 1), small urban (codes 2–3), and rural (codes 4–9). We also controlled for year fixed effects to consider overall longitudinal trends.

Analysis

We used within-between random effects models (Bell et al., 2019; Schunck, 2013) to examine how within-effects (i.e., longitudinal changes) and between-effects (i.e., inter-county differences) of independent variables were associated with maltreatment report rates at the county level. The models adjusted for controls and handled the nested data structure (i.e., county-years in counties in states). The within-effect estimates are methodologically equivalent to the fixed-effect estimates that control for time-invariant confounders, and the between-effect estimates are useful to understand relationships in wider social contexts between counties (Bell et al., 2019; Schunck, 2013). Due to multicollinearity between mental and physical distress rates (r=0.88), we estimated separate models for mental health variables (i.e., mental distress rates and mental health professional rates) and physical health variables (i.e., physical distress rates and primary care physician rates). We also built models separately for each dependent variable. The basic mental health model is:

$$Y_{tij} = \beta_0 + \beta_1\left(MD_{tij} - \overline{MD}_{ij}\right) + \beta_2\overline{MD}_{ij} + \beta_3\left(MHP_{tij} - \overline{MHP}_{ij}\right) + \beta_4\overline{MHP}_{ij} + \beta_5 X + \beta_6 Year + V_{0j} + U_{0ij} + R_{tij}.$$

The basic physical health model is:

$$Y_{tij} = \beta_0 + \beta_1\left(PD_{tij} - \overline{PD}_{ij}\right) + \beta_2\overline{PD}_{ij} + \beta_3\left(PCP_{tij} - \overline{PCP}_{ij}\right) + \beta_4\overline{PCP}_{ij} + \beta_5 X + \beta_6 Year + V_{0j} + U_{0ij} + R_{tij}.$$

Here, Y_{tij} is the child maltreatment report rate for the tth county-year in the ith county in the jth state. MD_{tij} is the mental distress rate. $\overline{MD}_{ij}$ is the mean mental distress rate from 2014–2017 for the ith county in the jth state. MHP_{tij} is the mental health professional rate. $\overline{MHP}_{ij}$ is the mean mental health professional rate. PD_{tij} is the physical distress rate. $\overline{PD}_{ij}$ is the mean physical distress rate. PCP_{tij} is the primary care physician rate. $\overline{PCP}_{ij}$ is the mean primary care physician rate. X is the vector of the control variables. β_0 is the intercept. β_1 is the within-effect of the mental (or physical) distress rate. β_2 is the between-effect of the mental (or physical) distress rate. β_3 is the within-effect of the mental health professional

(or primary care physician) rate. β_4 is the between-effect of the mental health professional (or primary care physician) rate. β_5 is the vector of the coefficients for the control variables. $\beta_6 Year$ is the vector of year-fixed effects. V_{0j} is the state-level random intercept. U_{0ij} is the county-level random intercept. R_{ij} is the observation-level error.

We used the *lme4* package in R for analysis. The residuals of all fitted models were almost normally distributed (skewness< 0.5). Sensitivity analysis demonstrated similar estimates between linear and negative binomial models. We report the linear models' results.

Results

Table 1 reports descriptive statistics. On average, 58.4 per 1,000 children had a maltreatment report in a county each year. Within age groups, mean maltreatment report rates were highest for age 0–5 (71.9 per 1,000 children aged 0–5) followed by age 6–11 (60.8 per 1,000 children aged 6–11) and age 12–17 (44.3 per 1,000 children aged 12–17). Regarding mental distress rates, on average, 11.8% of adults per county reported ≥14 days of poor mental health per month annually. On average, there were 18.3 mental health professionals per 10,000 people per county-year. For physical distress rates, an average of 11.5% of adults per county reported ≥14 days of poor physical health per month annually. Counties had an average of 7.1 primary care physicians per 10,000 people per county-year.

Table 2 reports multivariate results for overall maltreatment report rates. The first three columns report the mental health models' results. In both unadjusted (without controls) and adjusted (with controls) random intercept models, the within-effect (i.e., longitudinal change) and the between-effect (i.e., inter-county difference) of mental distress rates were significantly ($p<.05$) associated with *increased* maltreatment report rates. Conversely, the within-effect of mental health professional rate was significantly associated with *decreased* maltreatment report rates. The between-effect of mental health professional rate was not significant without controls. Yet, it became significant after adjusting for controls and showed, unexpectedly, a *positive* association with maltreatment report rates. Following Bell and colleagues' simulation study (Bell et al., 2019), we further considered random slopes to have conservative standard errors. The following three random slopes significantly improved model fit and were included in the final adjusted random slope model: (1) the county-level random slope of the within-effect of mental distress rate, (2) the county-level random slope of the within-effect of mental health professional rate, and (3) the state-level random slope of the between-effect of mental distress rate. That is, the within-effects of mental distress rate and mental health professional rate significantly varied by county, and the between-effect of mental distress rate significantly varied by state, rather than being held constant across counties or states. The final model showed that the within-effect of mental distress rate was marginally significantly ($p<.10$) associated with *increased* maltreatment report rates while the within-effect of mental health professional rate was significantly associated with *decreased* maltreatment report rates. Unexpectedly, the between-effect of mental health professional rate was marginally significantly ($p<.10$) associated with *increased* maltreatment report rates. Specifically, a longitudinal increase of mental distress rates by one unit (1-percentage-point) was marginally significantly associated with a 0.5 per 1,000 children increase in maltreatment report rates (coefficient: 0.50; 95% CI: −0.13,

1.11). When mental health professional rates longitudinally increased by one unit (1 per 10,000 population) in counties, their maltreatment report rates significantly decreased by 0.38 per 1,000 children (coefficient: −0.38; 95% CI: −0.63, −0.14). Finally, compared with other counties, counties with one more mental health professional per 10,000 people had maltreatment report rates higher by 0.11 per 1,000 children (coefficient: 0.11; 95% CI: −0.02, 0.22), which was marginally significant.

The last three columns of Table 2 report the physical health models' results. The between-effect of physical distress rate showed a significant positive association with maltreatment report rates in the unadjusted and adjusted random intercept models. Yet, it became nonsignificant when its state-level random slope (i.e., the adjusted random slope model) was considered. No other physical health variables were significant in any of the models.

Table 3 reports the results of adjusted random slope models for age-specific maltreatment report rates. The within-effect of mental distress rate was significantly associated with increased maltreatment report rates among children aged 0–5, but this association was not significant among children aged 6–11 or 12–17. Specifically, a longitudinal increase of 1-percentage-point in mental distress rates was significantly associated with a 0.84 per 1,000 children increase in maltreatment report rates among children aged 0–5 (coefficient: 0.84; 95% CI: 0.01, 1.66). The between-effect of mental distress rate was not significant for any of age groups. The within-effect of mental health professional rate was associated with maltreatment report rates significantly among children aged 0–5 and 6–11 and marginally significantly among children aged 12–17. That is, for every one mental health professional increase per 10,000 population in counties, their maltreatment report rates decreased significantly by 0.59 per 1,000 children aged 0–5 (coefficient: −0.59; 95% CI: −0.95, −0.27) and 0.31 per 1,000 children aged 6–11 (coefficient: −0.31; 95% CI: −0.48, −0.11) and marginally significantly by 0.13 per 1,000 children aged 12–17 (coefficient: −0.13; 95% CI: −0.30, 0.03). The between-effect of mental health professional rate was significantly associated with *increased* maltreatment report rates among children aged 12–17, inconsistent with our expectation. Specifically, when counties had one more mental health professional per 10,000 population compared with other counties, their maltreatment report rates among children aged 12–17 were higher by 0.13 per 1,000 than those of other counties (coefficient: 0.13, 95% CI: 0.04, 0.23). The between-effect of mental health professional rate was not significant for age 0–5 and age 6–11 maltreatment report rates. None of the physical health variables had a significant association with any of the age-specific maltreatment report rates.

We further examined any interaction effects by urbanicity. We found that none of the above-reported associations significantly differed by urbanicity (results not shown).

Discussion

This study examined how mental distress rates, mental health professional rates, physical distress rates, and primary care physician rates were associated with maltreatment report rates at the county level, using U.S. national data from 2014–2017, while adjusting for a range of controls. We mainly found that, in longitudinal dynamics (i.e., within-effects), community mental distress was a risk factor, whereas community availability of mental

health professionals was a protective factor of community maltreatment report rates. That is, when county mental distress rates increased longitudinally, county maltreatment report rates also increased, especially among younger children. Conversely, when mental health professional rates increased in counties over time, maltreatment report rates in those counties decreased, not only overall, but also for younger and middle-age children, as well as marginally for older children. In inter-county comparisons (i.e., between-effects), counties with more mental health professionals showed somewhat higher maltreatment report rates than other counties, especially among older children. This is unexpected and discussed further below. Neither county physical distress nor county availability of primary care physicians were significant factors for county maltreatment report rates.

In line with our expectation, when mental distress rates among adults increased longitudinally in counties, we identified marginally significant increases in their maltreatment report rates. This community-level finding was consistent with prior individual-level findings (Austin et al., 2020; Casanueva et al., 2015; Hammond et al., 2017; Kohl et al., 2011; Stith et al., 2009), as well as theoretical perspectives (see the Introduction section) suggesting concentrated disadvantages as risk factors for child maltreatment (Coulton et al., 2007; Freisthler et al., 2006; Maguire-Jack, 2014a). This relationship was significant among younger children (age 0–5), but not among middle-age and older children, which was likely the reason for the marginal significance of the overall relationship. Due to the dearth of research on the moderating effect of child age on this relationship, we cannot fully explain these results. Yet, this pattern may suggest that younger children are more vulnerable to community mental distress. Parents of younger children face a wide range of parenting tasks and difficulties (O'Brien, 1996; Porter & Ispa, 2013). Younger children are more dependent on caregivers and at higher risk of child maltreatment in general (Kim et al., 2017; U.S. Department of Health and Human Services, 2021). These together may make younger children more vulnerable to community mental distress. While we cannot offer clear explanations or conclusions for possible differences by child age, our findings suggest the need for further research on age-specific relationships between mental distress and child maltreatment.

Consistent with our expectation, longitudinal increases of mental health professionals in counties were related to decreased maltreatment report rates. This was broadly consistent with prior findings on community service availability and accessibility as protective factors of child maltreatment (Maguire-Jack, 2014b; Maguire-Jack & Klein, 2015; Maguire-Jack & Negash, 2016). This study adds two new contributions to the existing evidence base. First, prior studies have focused on services in communities, such as presence or location of services, perceived availability and accessibility of services, and spending on services (Maguire-Jack, 2014b; Maguire-Jack & Klein, 2015; Maguire-Jack & Negash, 2016). Yet, this study provides direct evidence for numbers of mental health professionals in communities. Second, this study provides age-specific findings, which suggest that mental health professionals in communities may be protective against maltreatment report rates for younger and middle-age children, as well as marginally protective for older children. Altogether, this study's findings suggest a possibility that adequate supply of mental health professionals in communities may reduce maltreatment report rates. This study adds to the evidence that the nationwide shortage of mental health professionals is a critical area

for policy intervention (Andrilla et al., 2018; Beck et al., 2018; Thomas et al., 2009). Future research may strengthen this evidence and improve targeting of interventions by investigating specific protective mechanisms of community availability of mental health professionals.

The fact that no significant differences in the above relationships emerged by urbanicity suggests that potential risk and protective functions of community mental distress and community availability of mental health professionals may be largely similar between large urban, small urban, and rural areas. Given little difference in rates of mental disorders between urban and rural areas (Breslau et al., 2014) and widespread shortages of mental health professionals across U.S. communities (Andrilla et al., 2018; Thomas et al., 2009), interventions to address these issues should target all areas. However, more serious shortages in rural areas should prompt heightened efforts (Andrilla et al., 2018; Thomas et al., 2009).

While the within-effects (i.e., longitudinal changes) of county mental distress rates and county mental health professional rates were consistent with our expectation, their between-effects (i.e., inter-county differences) were inconsistent with our expectation. This might be because between-effects were methodologically less rigorous than within-effects (Bell et al., 2019; Schunck, 2013). Within-effects are equivalent to fixed effects, which can adjust for inter-county differences, including even unobserved differences (Bell et al., 2019; Schunck, 2013). However, between-effects can only control observed heterogeneity, similar to a cross-sectional approach (Bell et al., 2019; Schunck, 2013). We found that the between-effect of community mental distress rates was not significant while adjusting for controls. A possible reason was that uncontrolled risk and protective factors might offset the risk functions of community mental distress in between-effects. For example, preventive services such as home visiting could be provided more in communities with higher needs, such as mental distress. We also found unexpectedly that, in between-effects, counties with more mental health professionals showed significantly *higher* maltreatment report rates. This might be because we used adult mental distress while not considering child mental distress. There is a huge overlap between child maltreatment reports and juvenile justice cases (Herz et al., 2019), and counties with many mental health professionals for children in the juvenile justice system may have *higher* maltreatment report rates. While the findings based on a more rigorous approach (i.e., within-effects) were consistent with our expectations, further research is needed for a better understanding of these relationships in inter-community contexts.

Neither community physical distress rates nor community primary care physician rates were significant for either within- or between-effects. We have several speculations about these null findings. First, the null findings might be because this study's physical distress measure differed from those of prior studies. Prior multivariate research mostly examined chronic and serious health problems, such as cancers, diabetes, and cardiac problems (Chiang et al., 2020; Slack et al., 2011). Yet, this study's measure might reflect more short-term and moderate physical illnesses and injuries. Second, only a few multivariate studies identified individual-level relationships between parental physical distress and child maltreatment risks (Chiang et al., 2020; Slack et al., 2011). The null findings might be simply because no community-level relationship existed between physical distress and child maltreatment.

Third, regarding primary care physicians, this study's measure was limited to primary care physicians (i.e., M.D.s and D.O.s) and did not consider other providers for physical health (e.g., nurse practitioners). This might have led to the null findings. It was also entirely possible that community availability of primary care physicians had no impact on community maltreatment report rates. Unlike the widespread shortages of mental health professionals, many communities might have enough primary care physicians available, especially for children (Felice, 2011). In addition, accessibility could be a greater concern than availability of primary care physicians. For example, child protective services agencies often supported mental health services (including substance abuse services) for parents but usually provided no support for medical services. Lack of insurance might also impede parental access to primary care physicians such that even in counties with high numbers of primary care physicians, parents might not have access. Future research should investigate these dynamics.

Strengths and Limitations

This study's use of national county-level data is a clear strength for community-level research and generalizability. The use of within-between random effects modeling is another strength. It allowed us to examine both longitudinal changes and inter-community differences simultaneously in the same model.

This study also has several limitations, which require caution when interpreting its findings. First, the outcome of this study is about *reported* incidents rather than all child maltreatment incidents. Considering that many incidents are unreported in the United States (Sedlak et al., 2010), caution is warranted to draw implications for all incidents from this study's findings. Nevertheless, findings for reported incidents have useful implications for theory, research, policy, and practice. Second, child maltreatment reports may be vulnerable to surveillance bias. About 10% of child maltreatment reports in the United States are made by medical professionals and about 6% are made by mental health professionals (U.S. Department of Health and Human Services, 2021). It is possible that children in communities with more of these professionals are more visible to child protective services. However, the best available evidence suggests that surveillance bias may exist, but its effect size is trivial (Chaffin & Bard, 2006; Drake et al., 2017). In any case, if surveillance bias affects the maltreatment report rates in the presence of a greater number of mental health professionals, this only means that the significant decreases in maltreatment report rates we found with the longitudinal increase of mental health professionals underestimates their potential protective effects. The third reason for caution in interpreting the findings is that the measures of mental health professionals and primary care physicians we used have some limitations. Both measures were about availability did not address accessibility or utilization. The measure of primary care physicians was further limited to physicians while the measure of mental health professionals covered professionals from all relevant discipline areas, including medicine, nursing, psychology, and social work. More research with different or better measures is necessary to further advance our knowledge. The fourth limitation is that mental and physical distress rates were estimated values based on statistical modeling rather than direct measures, especially for low-populated counties. While no national community-level data provide such direct measures today, future research may confirm our

findings based on local data with direct measures. Finally, although within-effects controlled for time-invariant inter-county differences, they were still vulnerable to unobserved time-varying confounders. Further research is required for more convincing evidence of causality.

Conclusion

This study's findings contribute to the existing knowledge base in two important ways despite the above limitations. First, they expand prior individual-level evidence on this topic (Austin et al., 2020; Burgess & Borowsky, 2010; Casanueva et al., 2015; Chiang et al., 2020; Conger et al., 1979; Hammond et al., 2017; Kohl et al., 2011; Slack et al., 2011; Stith et al., 2009) to the community level. Second, they indicate mental distress and mental health professional availability should be added to the list of community risk and protective factors for child maltreatment. Our findings also have some notable implications for practice and policy, suitable to a period of growing attention to community-based strategies to protect children (Daro & Dodge, 2009; Fortson et al., 2016). They suggest that, to reduce child maltreatment reports in communities as a whole, it may be worthwhile to regard mental distress as a community problem and consider community-based approaches for this problem. Further, they suggest that supplying enough mental health professionals in communities may be helpful to reduce maltreatment report rates. Given the widespread shortages of mental health professionals in the United States, supporting more training opportunities for mental health professionals in medical, nursing, psychology, and social work schools is critical. There is also a need for policies to address the more serious shortages in rural areas by attracting more mental health professionals to rural communities. With regard to the null findings on physical distress and primary care physician rates, more research is needed for a more definite conclusion. This study may serve as groundwork for future research in this topic and as an evidence base for child maltreatment prevention efforts.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgements/Funding:

This work was funded by a grant from the Centers for Disease Control and Prevention (CDC), K01CE003229. The analyses presented in this publication were based on data from the National Child Abuse and Neglect Data System Child Files. These data were provided by the National Data Archive on Child Abuse and Neglect at Cornell University, and have been used with permission. The data were originally collected under the auspices of the Children's Bureau (CB). Funding was provided by the CB. The CDC, the collector of the original data, the funder (CB), NDACAN, Cornell University, and the agents or employees of these institutions bear no responsibility for the analyses or interpretation presented here. The information and opinions expressed reflect solely the opinions of the authors.

References

Anda RF, Felitti VJ, Bremner JD, Walker JD, Whitfield C, Perry BD, Dube SR, & Giles WH (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. European Archives of Psychiatry and Clinical Neuroscience, 256(3), 174–186. 10.1007/s00406-005-0624-4 [PubMed: 16311898]

Andrilla CHA, Patterson DG, Garberson LA, Coulthard C, & Larson EH (2018). Geographic variation in the supply of selected behavioral health providers. American Journal of Preventive Medicine, 54(6), S199–S207. 10.1016/j.amepre.2018.01.004 [PubMed: 29779543]

Aron SB, McCrowell J, Moon A, Yamano R, Roark DA, Simmons M, Tatanashvili Z, & Drake B (2010). Analyzing the relationship between poverty and child maltreatment investigating the relative performance of four levels of geographic aggregation. Social Work Research, 34(3), 169–179. 10.1093/swr/34.3.169

Austin AE, Lesak AM, & Shanahan ME (2020). Risk and protective factors for child maltreatment: A review. Current Epidemiology Reports, 7(4), 334–342. 10.1007/s40471-020-00252-3 [PubMed: 34141519]

Ayers S, Bond R, Webb R, Miller P, & Bateson K (2019). Perinatal mental health and risk of child maltreatment: A systematic review and meta-analysis. Child Abuse & Neglect, 98, 104172. 10.1016/j.chiabu.2019.104172 [PubMed: 31698284]

Beck AJ, Manderscheid RW, & Buerhaus P (2018). The future of the behavioral health workforce: Optimism and opportunity. American Journal of Preventive Medicine, 54(6), S187–S189. 10.1016/j.amepre.2018.03.004 [PubMed: 29779540]

Bell A, Fairbrother M, & Jones K (2019). Fixed and random effects models: Making an informed choice. Quality & Quantity, 53(2), 1051–1074. 10.1007/s11135-018-0802-x

Breslau J, Marshall GN, Pincus HA, & Brown RA (2014). Are mental disorders more common in urban than rural areas of the United States? Journal of Psychiatric Research, 56, 50–55. 10.1016/j.jpsychires.2014.05.004 [PubMed: 24857610]

Burgess AL, & Borowsky IW (2010). Health and home environments of caregivers of children investigated by child protective services. Pediatrics, 125(2), 273–281. 10.1542/peds.2008-3814 [PubMed: 20064867]

Cabrera C, Torres H, & Harcourt S (2020). The neurological and neuropsychological effects of child maltreatment. Aggression and Violent Behavior, 54, 101408. 10.1016/j.avb.2020.101408

Casanueva C, Tueller S, Dolan M, Testa M, Smith K, & Day O (2015). Examining predictors of re-reports and recurrence of child maltreatment using two national data sources. Children and Youth Services Review, 48, 1–13. 10.1016/j.childyouth.2014.10.006

Chaffin M, & Bard D (2006). Impact of intervention surveillance bias on analyses of child welfare report outcomes. Child Maltreatment, 11(4), 301–312. 10.1177/1077559506291261 [PubMed: 17043315]

Chiang C-J, Jonson-Reid M, & Drake B (2020). Caregiver physical health and child maltreatment reports and rereports. Children and Youth Services Review, 108, 104671. 10.1016/j.childyouth.2019.104671

Conger RD, Burgess RL, & Barrett C (1979). Child abuse related to life change and perceptions of illness: Some preliminary findings. The Family Coordinator, 28(1), 73. 10.2307/583271

Continelli T, McGinnis S, & Holmes T (2010). The effect of local primary care physician supply on the utilization of preventive health services in the United States. Health & Place, 16(5), 942–951. 10.1016/j.healthplace.2010.05.010 [PubMed: 20691391]

Coulton CJ, Crampton DS, Irwin M, Spilsbury JC, & Korbin JE (2007). How neighborhoods influence child maltreatment: A review of the literature and alternative pathways. Child Abuse & Neglect, 31(11–12), 1117–1142. 10.1016/j.chiabu.2007.03.023 [PubMed: 18023868]

County Health Rankings. (n.d.-a). Frequent mental distress. https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-outcomes/quality-of-life/frequent-mental-distress

County Health Rankings. (n.d.-b). Frequent physical distress. https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-outcomes/quality-of-life/frequent-physical-distress

County Health Rankings. (n.d.-c). Mental health providers. https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/clinical-care/access-to-care/mental-health-providers

County Health Rankings. (n.d.-d). Primary care physicians. https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/clinical-care/access-to-care/primary-care-physicians

Daro D, & Dodge KA (2009). Creating community responsibility for child protection: Possibilities and challenges. Future Child, 19(2), 67–93. [PubMed: 19719023]

Drake B, Jonson-Reid M, & Kim H (2017). Surveillance bias in child maltreatment: A tempest in a teapot. International Journal of Environmental Research and Public Health, 14(12), 971. 10.3390/ijerph14090971 [PubMed: 28846657]

Felice ME (2011). Reflections on why pediatrics does not have a primary care physician shortage at present. The Journal of Pediatrics, 158(4), 523–524. 10.1016/j.jpeds.2010.12.035 [PubMed: 21402196]

Flaherty EG, & Stirling J (2010). The pediatrician's role in child maltreatment prevention. PEDIATRICS, 126(4), 833–841. 10.1542/peds.2010-2087 [PubMed: 20945525]

Fortson BL, Klevens J, Merrick MT, Gilbert LK, & Alexander SP (2016). Preventing child abuse and neglect: A technical package for policy, norm, and programmatic activities. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. 10.15620/cdc.38864

Freisthler B, Merritt DH, & LaScala EA (2006). Understanding the ecology of child maltreatment: A review of the literature and directions for future research. Child Maltreatment, 11(3), 263–280. 10.1177/1077559506289524 [PubMed: 16816324]

Hammond I, Eastman A, Leventhal J, & Putnam-Hornstein E (2017). Maternal mental health disorders and reports to child protective services: A birth cohort study. International Journal of Environmental Research and Public Health, 14(11), 1320. 10.3390/ijerph14111320 [PubMed: 29084185]

Herz DC, Dierkhising CB, Raithel J, Schretzman M, Guiltinan S, Goerge RM, Cho Y, Coulton C, & Abbott S (2019). Dual system youth and their pathways: A comparison of incidence, characteristics and system experiences using linked administrative data. Journal of Youth and Adolescence, 48(12), 2432–2450. 10.1007/s10964-019-01090-3 [PubMed: 31385232]

Kepple NJ, Wolf JP, & Freisthler B (2022). Substance use and child maltreatment: Providing a framework for understanding the relationship using current evidence. In Krugman RD & Korbin JE (Eds.), Handbook of child maltreatment (pp. 259–278). Springer Nature. 10.1007/978-3-030-82479-2_12

Kim H, & Drake B (2018). Child maltreatment risk as a function of poverty and race/ethnicity in the USA. International Journal of Epidemiology, 47(3), 780–787. 10.1093/ije/dyx280 [PubMed: 29390062]

Kim H, Gundersen C, & Windsor L (2022). Community food insecurity and child maltreatment reports: County-level analysis of U.S. national data from 2009 to 2018. Journal of Interpersonal Violence, 088626052210801. 10.1177/08862605221080148

Kim H, Wildeman C, Jonson-Reid M, & Drake B (2017). Lifetime prevalence of investigating child maltreatment among US children. American Journal of Public Health, 107(2), 274–280. 10.2105/AJPH.2016.303545 [PubMed: 27997240]

Kohl PL, Jonson-Reid M, & Drake B (2011). Maternal mental illness and the safety and stability of maltreated children. Child Abuse & Neglect, 35(5), 309–318. 10.1016/j.chiabu.2011.01.006 [PubMed: 21620157]

Lansford JE, Dodge KA, Pettit GS, Bates JE, Crozier J, & Kaplow J (2002). A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. Archives of Pediatrics & Adolescent Medicine, 156(8), 824–830. 10.1001/archpedi.156.8.824 [PubMed: 12144375]

Maguire-Jack K (2014a). Multilevel investigation into the community context of child maltreatment. Journal of Aggression, Maltreatment & Trauma, 23(3), 229–248. 10.1080/10926771.2014.881950

Maguire-Jack K (2014b). The role of prevention services in the county context of child maltreatment. Children and Youth Services Review, 43, 85–95. 10.1016/j.childyouth.2014.05.004

Maguire-Jack K, & Kim H (2021). Rural differences in child maltreatment reports, reporters, and service responses. Children and Youth Services Review, 120, 105792. 10.1016/j.childyouth.2020.105792

Maguire-Jack K, & Klein S (2015). Parenting and proximity to social services: Lessons from Los Angeles County in the community context of child neglect. Child Abuse & Neglect, 45, 35–45. 10.1016/j.chiabu.2015.04.020 [PubMed: 26026359]

Maguire-Jack K, & Negash T (2016). Parenting stress and child maltreatment: The buffering effect of neighborhood social service availability and accessibility. Children and Youth Services Review, 60, 27–33. 10.1016/j.childyouth.2015.11.016

Mulder TM, Kuiper KC, van der Put CE, Stams G-JJM, & Assink M (2018). Risk factors for child neglect: A meta-analytic review. Child Abuse & Neglect, 77, 198–210. 10.1016/j.chiabu.2018.01.006 [PubMed: 29358122]

O'Brien M (1996). Child-rearing difficulties reported by parents of infants and toddlers. Journal of Pediatric Psychology, 21(3), 433–446. 10.1093/jpepsy/21.3.433 [PubMed: 8935243]

Peterson C, Florence C, & Klevens J (2018). The economic burden of child maltreatment in the United States, 2015. Child Abuse and Neglect, 86. 10.1016/j.chiabu.2018.09.018

Pignone MP, Gaynes BN, Rushton JL, Burchell CM, Orleans CT, Mulrow CD, & Lohr KN (2002). Screening for Depression in Adults: A Summary of the Evidence for the U.S. Preventive Services Task Force. Annals of Internal Medicine, 136(10), 765. 10.7326/0003-4819-136-10-200205210-00013 [PubMed: 12020146]

Porter N, & Ispa JM (2013). Mothers' online message board questions about parenting infants and toddlers. Journal of Advanced Nursing, 69(3), 559–568. 10.1111/j.1365-2648.2012.06030.x [PubMed: 22568390]

Schunck R (2013). Within and between estimates in random-effects models: Advantages and drawbacks of correlated random effects and hybrid models. The Stata Journal: Promoting Communications on Statistics and Stata, 13(1), 65–76. 10.1177/1536867X1301300105

Sedlak AJ, Mettenburg J, Basena M, Petta I, McPherson K, Green A, & Li S (2010). Fourth national incidence study of child abuse and neglect (NIS-4): Report to congress. US Department of Health and Human Services.

Shaw M, & De Jong M (2012). Child abuse and neglect: a major public health issue and the role of child and adolescent mental health services. The Psychiatrist, 36(9), 321–325. 10.1192/pb.bp.111.037135

Slack KS, Berger LM, DuMont K, Yang M-Y, Kim B, Ehrhard-Dietzel S, & Holl JL (2011). Risk and protective factors for child neglect during early childhood: A cross-study comparison. Children and Youth Services Review, 33(8), 1354–1363. 10.1016/j.childyouth.2011.04.024

Stith SM, Liu T, Davies LC, Boykin EL, Alder MC, Harris JM, Som A, McPherson M, & Dees JEMEG (2009). Risk factors in child maltreatment: A meta-analytic review of the literature. Aggression and Violent Behavior, 14(1), 13–29. 10.1016/j.avb.2006.03.006

Thomas KC, Ellis AR, Konrad TR, Holzer CE, & Morrissey JP (2009). County-level estimates of mental health professional shortage in the United States. Psychiatric Services, 60(10), 1323–1328. 10.1176/ps.2009.60.10.1323 [PubMed: 19797371]

U.S. Department of Health and Human Services. (2021). Child maltreatment 2019. https://www.acf.hhs.gov/cb/data-research/child-maltreatment

Vaithianathan R, Rouland B, & Putnam-hornstein E (2018). Injury and Mortality Among Children Identified as at High Risk of Maltreatment. Pediatrics, 141(2).

White OG, Hindley N, & Jones DP (2015). Risk factors for child maltreatment recurrence: An updated systematic review. Medicine, Science and the Law, 55(4), 259–277. 10.1177/0025802414543855 [PubMed: 25107943]

Table 1.

Descriptive Statistics, U.S. Counties, 2014–2017 (N_1=2,540; N_2=638; N_3=51).

Variable	Mean (SD) or %
Dependent Variables – Child Maltreatment Report Rate	
Total	
Total: # children with a maltreatment report per 1k children	58.4 (28.0)
By Child Age	
Age 0–5: # children with a maltreatment report per 1k children aged 0–5 years	71.9 (36.2)
Age 6–11: # children with a maltreatment report per 1k children aged 6–11 years	60.8 (29.5)
Age 12–17: # children with a maltreatment report per 1k children aged 12–17 years	44.3 (21.3)
Independent Variables	
Mental distress rate: % adults reporting ≥ 14 days of poor mental health per month	11.8 (1.60)
Mental health professional rate: # mental health professionals per 10k population	18.3 (12.0)
Physical distress rate: % adults reporting ≥ 14 days of poor physical health per month	11.5 (1.8)
Primary care physician rate: # primary care physicians per 10k population	7.1 (2.8)
Control Variables	
Median household income per 10k (in 2018 U.S. dollar)	56.7 (13.7)
% single-parent households among resident households with related children	35.6 (7.2)
% Black children among resident children	13.0 (14.2)
% Latino children among resident children	17.7 (16.9)
% foreign-born among residents	8.6 (7.5)
% children among residents	23.1 (3.0)
% children with disabilities among resident children	13.5 (3.1)
% moved in one year among residents	15.4 (3.9)
Urbanicity	
Large urban: county in metro area with ≥ 1 million population	32.7%
Small urban: county in metro area with < 1 million population	49.2%
Rural: nonmetro county	18.1%
Year	
2014	24.6%
2015	25.1%
2016	25.1%
2017	25.1%

Note. N_1 = number of county-year observations. N_2 = number of counties. N_3 = number of states (and the District of Columbia).

Table 2.

Random Effects Within-Between Models of Child Maltreatment Report Rates, U.S. Counties, 2014–2017.

	Coefficient (95% confidence interval)					
	Mental health models (N_1 = 2,540; N_2 = 638; N_3 = 51)			Physical health models (N_1 = 2,540; N_2 = 638; N_3 = 51)		
Fixed effects	**Unadjusted random intercept model**	**Adjusted random intercept model**	**Adjusted random slope model**	**Unadjusted random intercept model**	**Adjusted random intercept model**	**Adjusted random slope model**
Mental distress rate						
Within-effect	1.30[a] (0.68, 1.98)	0.97[a] (0.41, 1.58)	0.50[b] (−0.13, 1.11)	-	-	-
Between-effect	10.40[a] (9.11, 11.69)	2.05[a] (0.06, 3.94)	1.43 (−1.08, 4.23)	-	-	-
Mental health professional rate						
Within-effect	−0.36[a] (−0.52, −0.21)	−0.31[a] (−0.48, −0.16)	−0.38[a] (−0.63, −0.14)	-	-	-
Between-effect	0.01 (−0.14, 0.15)	0.14[a] (0.02, 0.26)	0.11[b] (−0.02, 0.22)	-	-	-
Physical distress rate						
Within-effect	-	-	-	0.24 (−0.24, 0.69)	−0.06 (−0.51, 0.38)	−0.06 (−0.54, 0.44)
Between-effect	-	-	-	6.56[a] (5.47, 7.73)	1.47[b] (−0.21, 3.16)	0.71 (−1.55, 2.62)
Primary care physician rate						
Within-effect	-	-	-	0.07 (−0.95, 1.07)	0.42 (−0.54, 1.41)	0.42 (−0.54, 1.44)
Between-effect	-	-	-	−0.39 (−0.89, 0.08)	0.23 (−0.18, 0.67)	0.33 (−0.08, 0.74)
Model fit						
Bayesian information criterion	18231.3	17996.2	17476.7	18335.9	18025.0	17991.4

Note. N_1 = the number of county-year observations. N_2 = the number of counties. N_3 = the number of states (and the District of Columbia). A lower value of Bayesian information criterion indicates a better model fit. An unadjusted random intercept model included the given independent variables (i.e., mental health or physical health variables), year-fixed effects, and county-level and state-level random intercepts. An adjusted random intercept model additionally included all control variables (i.e., median household income, % single-parent households, % Black children, % Latino children, % foreign-born, % children among residents, % children with disabilities, and % moved in one year). An adjusted random slope model further included county-level and state-level random slopes.

[a] $p < .05$

[b] $p < .10$

Table 3.

Random Effects Within-Between Models of Child Maltreatment Report Rates by Child Age Group, U.S. Counties, 2014–2017

	Coefficient (95% confidence interval)					
	Mental health models (N_1 = 2,540; N_2 = 638; N_3 = 51)			Physical health models (N_1 = 2,540; N_2 = 638; N_3 = 51)		
Fixed effects	**Age 0–5 child maltreatment report rate**	**Age 6–11 child maltreatment report rate**	**Age 12–17 child maltreatment report rate**	**Age 0–5 child maltreatment report rate**	**Age 6–11 child maltreatment report rate**	**Age 12–17 child maltreatment report rate**
Mental distress rate						
Within-effect	0.84[a] (0.01, 1.66)	0.20 (−0.50, 0.97)	0.50 (−0.14, 1.14)	-	-	-
Between-effect	1.91 (−1.26, 5.17)	0.69 (−2.22, 3.64)	1.30 (−0.84, 3.52)	-	-	-
Mental health professional rate						
Within-effect	−0.59[a] (−0.95, −0.27)	−0.31[a] (−0.48, −0.11)	−0.13[b] (−0.30, 0.03)	-	-	-
Between-effect	0.08 (−0.08, 0.23)	0.11 (−0.01, 0.24)	0.13[a] (0.04, 0.23)	-	-	-
Physical distress rate						
Within-effect	-	-	-	0.23 (−0.39, 0.81)	−0.24 (−0.82, 0.26)	−0.16 (−0.61, 0.24)
Between-effect	-	-	-	1.05 (−1.65, 3.46)	0.50 (−1.92, 2.65)	0.53 (−1.13, 2.20)
Primary care physician rate						
Within-effect	-	-	-	0.60 (−0.65, 1.96)	0.15 (−0.99, 1.29)	0.61 (−0.38, 1.46)
Between-effect	-	-	-	0.42 (−0.07, 0.91)	0.21 (−0.27, 0.68)	0.23 (−0.14, 0.55)

Note. N_1 = the number of county-year observations. N_2 = the number of counties. N_3 = the number of states (and the District of Columbia). All models were estimated separately for each subgroup-specific outcome variable (e.g., age 0–5 child maltreatment report rate). All models are adjusted random slope models, including county-level and state-level random intercepts and random slopes, year fixed effects, all control variables (i.e., median household income, % single-parent households, % Black children, % Latino children, % foreign-born, % children among residents, % children with disabilities, and % moved in one year), and the given independent variables.

[a] $p < .05$

[b] $p < .10$