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Trends in Emergency Room Visits for Child Maltreatment in Georgia, 2016-2020

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Trends in Emergency Room Visits for Child Maltreatment in Georgia, 2016-2020

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An abstract of
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Abstract

Trends in Emergency Room Visits for Child Maltreatment in Georgia, 2016-2020
By Leah Goldstein

Objective: Data from the Georgia Hospital Association (GHA) Georgia Discharge Data System from 2016-2020 were analyzed to examine trends in child-maltreatment related Emergency Department (ED) visits. In addition, we compare prevalence of ED visits in 2 COVID-pandemic time periods of 2020 to their equivalent period of 2019 (April-June and October-December) to understand the impact that the pandemic had on child maltreatment-related care seeking.
Methods: ICD-10 ED discharge codes were adapted from ICD-9 codes in existing literature to identify cases of specified (visits with an explicit ICD-to code) and suggestive (diagnoses that suggest a likelihood of maltreatment or suspected maltreatment) child maltreatment in Georgia residents under 11 years of age. The prevalence of child maltreatment visits per 100,000 children in Georgia (based on CDC WONDER estimates) overall and by demographic factors were examined. Tests for trends over time were evaluated with Cochran-Armitage tests and tests comparing 2020 to 2019 were performed with chi-square tests, with statistical significance set at $p<.01$.
Results: Prevalence of specified maltreatment dropped from 47.5 per 100,000 in 2016 to 39.2 per 100,000 in 2020. Prevalence of suggestive maltreatment dropped from 205.0 per 100,000 in 2016 to 159.7 per 100,000 in 2019. Both were statistically significant declines. Prevalence of specified maltreatment dropped from 13.2 per 100,000 in April-June 2019 to 6.7 per 100,000 in in April-June of 2020. Prevalence of suggestive maltreatment dropped from 53.4 per 100,000 in April-June of 2019 to 37.2 per 100,000 in April-June of 2020. Both were statistically significant declines. Prevalence of specified child maltreatment rose insignificantly from 10.4 per 100,000 in October-December of 2019 to 11.7 per 100,000 in October-December of 2020. Prevalence of suggestive maltreatment declined significantly from 47.1 per 100,000 in October-December 2019 to 38.6 per 100,000 in October-December of 2020.
Conclusions: The GHA dataset is a useful tool for measuring child maltreatment ED visits in Georgia. The study indicates that the pandemic resulted in decreased visits for maltreatment and represents a barrier to accurately measuring the impacts of the pandemic on maltreatment. Future studies should examine later pandemic periods when healthcare avoidance was reduced.

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I. Introduction

Child maltreatment prevalence is difficult to assess because definitions of child abuse and neglect used by child protective services and reporting requirements vary by state, and many cases go undetected and unreported (1). Victims of child maltreatment commonly present in the Emergency Department (ED) (2), and this is an important tool for understanding the burden of child maltreatment. ED records may be used to identify cases of maltreatment that are not identified through other means, such as reporting to child protective services. As teachers, law enforcement offices, and social service providers constitute three out of five reporters of child maltreatment (1), school closures and stay at home orders enacted at the start of the COVID-19 pandemic in 2020 isolated vulnerable children and inhibited the most important routes of child maltreatment reporting. Therefore, alternative sources, such as ED records, are particularly important for assessing how the negative social, economic, and health effects of the pandemic impacted child wellbeing and maltreatment.

Child abuse and neglect, also referred to as child maltreatment, is defined by the Centers for Disease Control and Prevention (CDC) as any act or series of acts by commission or omission by a parent, caregiver, or another person in custodial role that results in harm, potential for harm, or the threat of harm to a child. Four types of child maltreatment exist: physical abuse (the intentional use of physical force that can result in physical injury), sexual abuse (pressuring or forcing a child to engage in sexual acts), emotional abuse (behaviors that harm a child's self-worth or emotional well-being), and neglect (the failure to meet a child's basic physical and emotional needs. These needs include housing, food, clothing, education, and access to medical care) (3). The CDC estimates that at least 1 in 7 children have experienced child abuse and neglect in the past year, though this is likely an underestimate as this estimate was obtained through self-report (3) (4). Child maltreatment is preventable, which is why research into its prevalence, distribution, and risk factors are an important part of public health.

As it is impossible to detect all cases of child maltreatment, different approaches for measuring and estimating its prevalence exist in the literature. One approach is to measure Child Protective Services (CPS) reports, investigations, or substantiated cases. For example, The National Child Abuse and Neglect Data System (NCANDS) collects case-level data on all children who received CPS agency response in the form of an investigation or an alternative response (5). Others attempt to estimate the prevalence of maltreatment, including cases that go unreported, by surveying adults, children, or caregivers about their experiences with maltreatment. For instance, The National Survey of Children's Exposure to Violence is a telephone survey which gathers information on exposure to violence, including child abuse (4), by speaking to children aged 10-17 and caregivers of children 0-9 about their experiences. The Behavioral Risk Factor Surveillance System (BRFSS) is a nationwide telephone survey of adults which collects information about their history of physical, sexual, and emotional maltreatment as children, among other things (6). Another approach is to quantify maltreatment-related ED visits using samples such as the National Emergency Department Sample (NEDS) (7), or state Hospital Association data, as this study does.

There are many known risk factors for child abuse, often relating to the environment in which the child is reared and stressors incurred by the parents. Factors that increase a parent's likelihood of perpetrating child maltreatment include social isolation and lack of support, poverty, and unemployment (8). Mental health problems such as depression, alcohol use, and low educational achievement also increase the risk of mothers perpetrating maltreatment, and the risks are compounded when depression or life-event stress is combined with low social support (9).

In addition to physical injury, those who experience child maltreatment may suffer lifelong ill effects. Experiencing abuse or neglect as a child leads to numerous mental health problems, including increased risk of developing depressive disorder, anxiety disorder, behavioral disorders, drug and alcohol misuse, and suicidal behavior (10, 11, 12). Those who have experienced maltreatment also have higher risk of

developing STIs or exhibiting risky sexual behavior (10, 12). They experience heightened risk for eating disorders and weight problems (13 ,14) and self-injury (15) later in life. Studies have shown that children who suffer abuse are more likely to exhibit violent delinquency and criminal behavior (12), as well as other negative social outcomes such as a decreased likelihood of graduating high school and an increased likelihood of becoming a teen parent (16). Child maltreatment has further been linked to a myriad of physical and chronic health conditions in adulthood, including arthritis, back problems, migraine headaches, COPD, diabetes, cancer, and stroke (18).

The stressors brought on by the COVID-19 pandemic and subsequent lockdowns and school closures in the United States in March of 2020 increased the risk of child maltreatment (18, 19). This was exacerbated for those who experienced financial strain (19). Commonly, parents had to cope with changes in children's learning and health, and parents suffered symptoms of anxiety and depression and struggled with sleep troubles (18). At the onset of the pandemic, tens of millions of Americans experienced job loss (20), which was associated with increased risk of perpetrating psychological and physical abuse (21). Job loss was concentrated among low-wage workers, while people of color were disproportionately affected by economic hardship including inability to pay rent or mortgages and difficulty covering household expenses (21). This compounded pre-existing inequalities and vulnerabilities for maltreatment, as children in families of low socioeconomic status who are often more likely to be racial/ethnic minorities are at increased risk of suffering maltreatment (2). As it has been established that social isolation increases the risk of maltreatment, particularly when combined with life event stress (9), the cooccurrence of above-mentioned stressors and isolation caused by lockdown orders created an environment where the likelihood of child maltreatment rose while the predominant pathways to detection closed. Even when formal lockdown orders were lifted in Georgia in April of 2020, economic hardship persisted, and many people remained highly isolated from support systems due to fear of contracting COVID-19 and infecting others.

It is clear that risk factors for child abuse increased as a result of the pandemic, yet measuring the impact is difficult, and few studies have measured child maltreatment outcomes during the pandemic. There is some evidence that child abuse did increase during the pandemic. For example, a study of physical child abuse injuries at a Maryland pediatric trauma center found an increase in the proportion of traumatic visits due to child abuse as compared to pre-pandemic years (22). While the circumstances surrounding the pandemic worsened risk factors for maltreatment, they also created an environment that shielded abuse from detection and weakened its reporting. In New York City, for example, there was a significant drop in child maltreatment reporting and child welfare interventions in March, April, and May of 2020 (23). A study found that in Florida, child maltreatment allegations were 27% lower than expected during March and April of 2020, the first 2 months of school closures (24). Reports to the National Child Abuse and Neglect Data System from April to June of 2020, a time where most states implemented lockdown orders, declined 22.8% compared to the same time-period the previous year (5). For this reason, reports to child protective services are an unreliable method of assessing how child maltreatment was impacted by the pandemic. Though the ED presents an opportunity to detect cases of child abuse and neglect that may go unreported through other avenues, fear of infection led to avoidance of the healthcare system, including the Emergency Department. Nationwide, ED visits declined 42% during the early months of the pandemic compared to the same period the previous year, with children under 14 and females experiencing greater declines (25). Thus, the ED may also represent a barrier to child maltreatment reporting during the pandemic.

This study aims to explore overall trends in child maltreatment-related ED visits in Georgia from 2016 to 2020 and to assess how child-maltreatment related ED visits were impacted by the economic and social upheaval triggered by the COVID-19 Pandemic by comparing prevalence from April-June of 2020 with prevalence from the same period of 2019. A later pandemic period of October-December of 2020 was also compared with prevalence from the same period of 2019 to explore the effects of the pandemic on ED visits in a later pandemic period when medical system avoidance may have declined.

II. Methods

Dataset:

This study used data from the Georgia Hospital Association (GHA) Georgia Discharge Data System, which includes emergency discharge codes reported by all Georgia acute care hospitals. The study population consiss of Georgia residents less than 11 years of age years seen in Georgia Emergency rooms from 2016 to 2020 with ICD-10 codes indicative of specified or suggestive child-maltreatment. The unit of measurement is unique visits, so individual children may appear in the dataset multiple times if they were seen in the ED on multiple occasions in the designated period. Sex, age at admission, race, and urban vs. rural status of patient residence were examined and were included in the GHA dataset. Population denominators used to calculate maltreatment prevalence were downloaded from CDC WONDER and represented the number of children less than 11 years of age residing in Georgia for each demographic group of interest. The urban vs. rural population denominator was downloaded from OASIS, the Georgia Department of Public Health's Data Warehouse, as this variable was available in the OASIS database but not the CDC Wonder database. Counties are classified as urban if their population is greater than or equal to 50,000 and rural if it is not.

Maltreatment Codes:

Child maltreatment codes were identified using ICD-10 codes adapted from King et al. (7), converted from ICD-9 codes using ICD10Data.com. ICD-10 codes for specified and suggestive maltreatment cases were included in order to detect cases of maltreatment that may be overlooked by other sources of child maltreatment data, such as child abuse reports and investigations. Specified maltreatment visits contain explicit maltreatment diagnoses, while suggestive codes lack an explicit maltreatment diagnosis but contain diagnoses that suggest a likelihood of maltreatment or suspected maltreatment. Maltreatment cases were identified as patients who had any of the selected maltreatment ICD-10 codes listed in their

principal ICD-10 diagnosis or any of their first 10 ICD-10 diagnoses fields. Cases were also classified as victims of physical, sexual, or neglect if any of the codes identified for that abuse type appeared in any of the diagnosis fields. Given that some children had more than one type of abuse reported, the categories of maltreatment were not mutually exclusive. These children were additionally identified as poly-maltreatment victims, indicating they had codes relating to more than one type of abuse. Some codes indicated unspecified maltreatment, in which case visits were given no maltreatment category. A list of ICD-10 codes appears in Table 1.

Statistical Analysis:

All statistical analysis were performed using SAS version 9.4. Specified and suggestive codes were evaluated independently and prevalence for each group was calculated as well as for each demographic subgroup. Three tests were performed within each group. The first was an overall test for trend among the specified and suggestive populations and subgroups from 2016-2020, which was performed using Cochran-Armitage tests with a statistical significance level of $P< 0.01$ to account for multiple significance testing. To assess the impact of the COVID-19 pandemic on maltreatment ER visits, particularly lockdown orders and school closures, visits from April-June of 2020 were compared with visits from the same period in 2019 using chi-square tests with a statistical significance level of $P< 0.01$. This test was performed again for October-December of 2019 and 2020 to assess how ED visits for maltreatment may have been different in the post-lockdown pandemic period compared to pre-pandemic.

All tests were performed among the specified and suggestive populations, as well as subgroups stratified by sex, race, urban/rural, age groups (<1, 1-4, 5-7, 8-10), and type of maltreatment. Ethnicity was not addressed in the analysis because ethnicity was not consistently captured in the dataset. Analysis was not performed for counts less than 10 due to unstable rate estimates derived from small sample size. Because of small numbers leading to unstable estimates, only Black and White race was included for race

analyses, with the exception of suggestive 5-year trends, in which the counts for Asian race were sufficient for stable estimates.

Table 1. Specified and Suggestive ICD-10 Codes

Category of maltreatment- title of diagnosis	ICD-10 Code
Physical Abuse	
Child physical abuse, confirmed	T74.1
Child physical abuse, suspected	T76.1
Shaken infant syndrome	T74.4
Injury by assault	X92-Y09
Retinal hemorrhage, unspecified eye	H35.6
Fracture of vault of skull	S02.0
Fracture of cervical vertebra and other parts of neck	S12, S32.0
Fracture of rib(s), sternum and thoracic spine	S22.3 S22.4
Fracture of scapula	S42.1
Subarachnoid hemorrhage	S06.6
Subdural hemorrhage	S06.5
Intracranial hemorrhage, unspecified	I62
Injury to unspecified intrathoracic organs	S27
Injury to stomach and small intestine	S36.3 S36.4
Injury to spleen	S36.0
Injury to spinal cord	S34
Injury by undetermined intent	Y21-Y33
Sexual Abuse	
Child sexual abuse, confirmed	T74.2
Child sexual abuse, suspected	T76.2
Genital Herpes	A60.0
Gonococcal infection	A54
Pelvic inflammatory disease, unspecified	N73.9
Contusion of genital organs	S30.2
Observation after alleged rape	Z04.4
Observation for abuse/neglect	Z04.7

Neglect	
Deprivation of food	T73.0
Deprivation of water	T73.1
Child psychological abuse, confirmed	T74.3
Child psychological abuse, suspected	T76.3
Child neglect or abandonment, confirmed	T74.0
Child neglect or abandonment, suspected	T76.0
Other severe malnutrition	E43
Dental carries	K02
Fracture of lumbar spine and pelvis	S32
Traumatic pneumothorax	S27.0
Injury to heart or lung	S26, s27.3
Injury to GI tract, unspecified	
Injury to liver	S36.11
Injury to kidney	S37.0
Burn of head and trunk	T20, T21
Burn of leg	T25
Injury by firearm, undetermined intent	Y22-Y24
General maltreatment	
Unspecified child maltreatment, confirmed	T74.9
Unspecified child maltreatment, suspected	T76.9
Adult and child abuse, neglect and other maltreatment, confirmed	T74
Adult and child abuse, neglect and other maltreatment, suspected	T76

Diagnoses in boldface indicate specified maltreatment and diagnoses not in boldface indicate suggestive maltreatment.

III. Results

Trend Analyses:

Specified Maltreatment

In the period from 2016 to 2020, specified maltreatment rates peaked in 2017 (63.6 ED visits per 100,000 population) and declined thereafter, reaching its lowest rate in 2020 (39.8 visits per 100,000), representing a significant overall downward trend (P<.0001). This trend was mirrored in most of the stratified analyses. Rates of maltreatment in males remained higher than females throughout the period and both displayed significant decreases overall. Black children experienced maltreatment at a much higher rate than White children and experienced a particularly sharp increase in 2017 (106.3 per 100,000) which was 2.7 times higher than the rate for White children in that year (39.4 per 100,000). In 2020, both Black and White children reached their lowest 5-year rates (67.6 per 100,00 and 22.0 per 100,000, respectively). Rates in urban counties were consistently higher than in rural counties, though rural counties displayed an increase in 2019 that nearly matched the rate for urban counties (47.0 per 100,000 vs. 49.5 per 100,000). Both reflect the overall trends seen in this period, peaking in 2017 and declining in 2020, though rural counties experienced a sharper decline in 2020 than urban (28.9 per 100,000 vs. 41.3 per 100,000). Children in the 8-10 age group had the highest rates of maltreatment throughout the period, followed by 5-7, 1-4 and <1. The rates significantly declined in the oldest 2 age categories (P<.001 for 8-10 and 5-7) but did not change significantly in the youngest 2 age groups (P=0.40 for 1-4 and P=0.45 for <1).

Rates of specified physical abuse far exceed the rates for other specified abuse types, with neglect displaying the lowest rates. All abuse categories (physical, sexual, neglect, and polyvictim) displayed significant (P<.0001) tests for trend, though the overall trends varied by type of abuse. Physical abuse trends mimic the overall trends observed, peaking in 2017 (58.4 per 100,000) and declining until 2020 (33.2 per 100,000). Sexual abuse had a nearly 2-fold increase from 2016 to 2017 (6.2 per 100,000 vs. 11.7 per 100,000). Sexual abuse then dropped steadily until 2019 (6.0 per 100,000) and then increased again in 2020 (7.7 per 100,000). Rates of specified neglect cases were low overall, but generally declined from 2016 (1.9 per 100,000) to 2018 (1.4 per 100,000) and then increased until reaching a 5-year high in 2020 (2.1 per 100,000). Though the test for trend for neglect was significant, counts of specified neglect remained low so trends should be interpreted with caution. Polyvicimtization had a nearly 2-fold increase

from 2016 to 2017 (4.6 per 100,000 vs 8.5 per 100,000), but rates thereafter were comparable to that seen in 2016.

Figure 1. Prevalence of Specified Child-Maltreatment-Related ED Visits per 100,000 Children (0-10 years). Georgia, 2016-2020

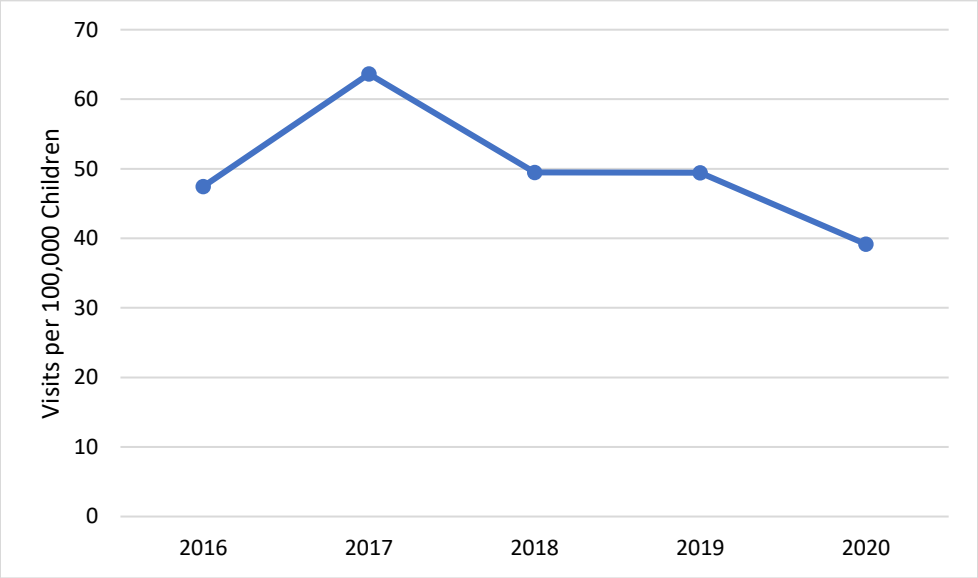
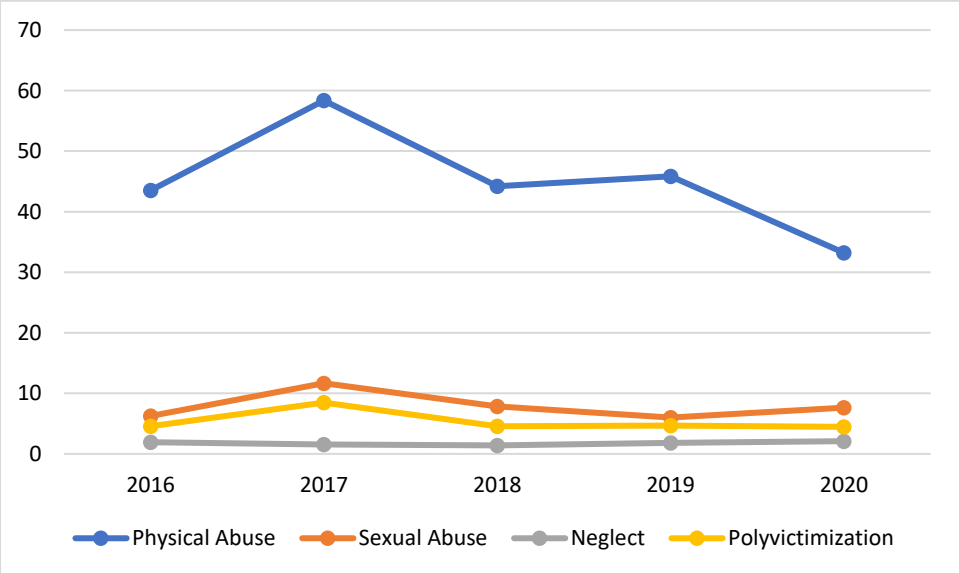


Figure 2. Prevalence of Specified Child-Maltreatment-Related ED Visits by Abuse Category per 100,000 Children (0-10 years). Georgia, 2016-2020



Abuse categories are not mutually exclusive

Table 2. Prevalence of Specified Maltreatment-Related ER Visits by Demographic Characteristics and Abuse Category, per 100,000 Children (0-10 years). Georgia, 2016-2020.

Year	2016	2017	2018	2019	2020	P-Value
Total	47.5	63.6	49.5	49.4	39.2	**<.0001**
Sex						
Male	51.4	70.4	53.5	53.9	42.0	**0.0005**
Female	43.4	56.7	45.4	44.8	36.3	**<.0001**
Race						
Black	78.4	106.3	86.0	89.3	67.6	**0.001**
White	28.1	39.4	25.8	23.7	22.0	**<.0001**
Urban/Rural						
Urban	48.8	65.3	51.3	49.5	41.3	**0.003**
Rural	41.0	55.5	41.2	47.0	28.9	**<.0001**
Age Group						
<1	26.8	29.6	26.7	35.1	24.8	0.45
1-4	31.9	44.9	35.6	36.8	34.8	0.40
5-7	51.9	67.4	54.1	48.1	39.6	**<.0001**
8-10	68.6	93.3	69.2	71.0	48.4	**<.0001**
Abuse category						
Physical Abuse	43.5	58.4	44.2	45.9	33.2	**<.0001**
Sexual Abuse	6.2	11.7	7.8	6.0	7.7	**<.0001**
Neglect	1.9	1.5	1.4	1.8	2.1	**0.0001**
Polyvictim	4.6	8.5	4.6	4.7	4.5	**<.0001**

P-Values in boldface indicate statistical significance at the .01 significance level

Suggestive Maltreatment

While suggestive maltreatment showed a significant change from 2016 to 2020 (P<.0001), the rates remained relatively constant from 2016 to 2019 and then declined substantially in 2020 (204.6 per 100,000 in 2019 vs. 159.7 per 100,000 in 2020). In contrast to specified maltreatment, females had slightly higher rates of suggestive maltreatments in all years, with the exception of 2016 (206.0 per 100,000 for males and 204.0 per 100,000 for females). Both males and females showed similar trends, with fairly steady rates followed by considerable declines in 2020 (154.2 per 100,000 for males and 165.3 per 100,000 for females). Like for specified maltreatment, Black children had much higher rates of suggestive maltreatment compared to White children. Suggestive rates for Asian children were included

in the analysis due to sufficient sample size, and Asian children had the lowest rates of maltreatment among the 3 racial categories. While Black and White children had significant trends (P<.0001), the trend for Asian children was non-significant (P=.23), although it appears to show a decline, albeit more gradual than other racial groups. For Black children, rates of abuse increased slightly from 2016 to 2017 (261.4 per 100,000 vs. 272.5 per 100,000), remained constant until 2019 (274.3 per 100,000), and declined substantially in 2020 (209.4 per 100,000). For White children, there was a generalized slow decline and then sharper decline in 2020. Unlike for specified maltreatment, rates of suggestive maltreatment were higher among children in rural counties compared to urban counties. Both showed significant trends (P<.001), but urban counties remained approximately constant from 2016 (184.1 per 100,000) to 2019 (192.8 per 100,000) and then declined in 2020 (150.8 per 100,000), while rural counties experienced a general decline from 2016 (284.6 per 100,000) to 2020 (189.1 per 100,000). By age group, the pattern was also inverted from that seen for specified maltreatment. Children <1 generally had the highest rates of suggestive maltreatment, followed by 1-4, 5-7. And 8-10. The older 3 age categories all had significant declines in the period (P<.0001), while children <1 year had no significant change (P=.19).

In contrast to specified abuse, the rates of suggestive neglect were the highest of the abuse categories. All abuse categories showed significant declines from 2016 to 2020 (P<.0001). Rates of physical abuse declined by nearly 50% from 2016 (67.5 per 100,000) to 2020 (34.6 per 100,000), while rates of sexual abuse declined by nearly 70% (33.2 per 100,000 in 2016 vs. 10.2 per 100,000 in 2020). Neglect was steadier, with a drop in 2020. Polyvictimzation fluctuated, with an overall decline in the period.

Figure 3. Prevalence of Suggestive Child-Maltreatment-Related ED Visits per 100,000 Children (0-10 years). Georgia, 2016-2020

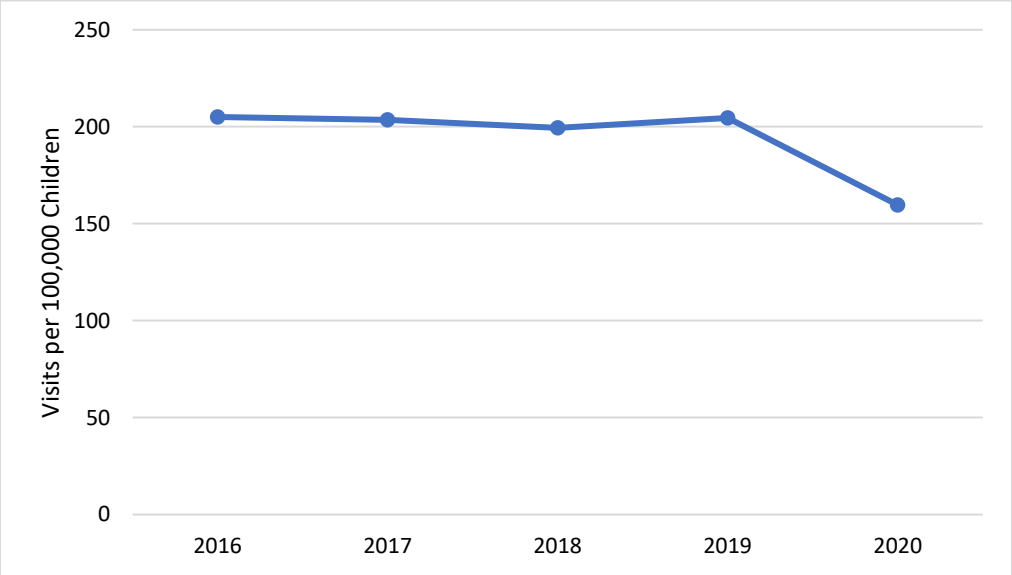
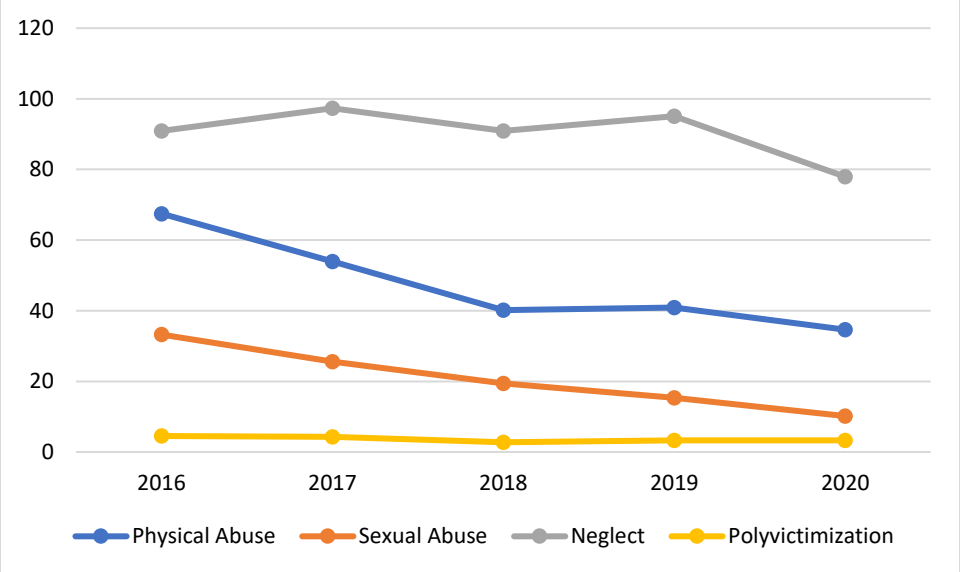


Figure 4. Prevalence of Suggestive Child-Maltreatment-Related ED Visits by Abuse Category per 100,000 Children (0-10 years). Georgia, 2016-2020



Abuse categories are not mutually exclusive

Table 3. Prevalence of Suggestive Maltreatment-Related ER Visits by Demographic Characteristics and Abuse Category, per 100,000 Children (0-10 years). Georgia, 2016-2020

Year	2016	2017	2018	2019	2020	P-Value
Total	205.0	203.6	199.5	204.6	159.7	**<.0001**
Sex						
Male	206.0	199.2	187.1	191.2	154.2	**<.0001**
Female	204.0	208.1	212.3	218.5	165.3	**<.0001**
Race						
Black	261.4	272.5	274.4	274.3	209.4	**<.0001**
White	165.1	159.4	147.3	153.9	120.4	**<.0001**
Asian	50.7	53.8	44.9	48.5	44.9	0.27
Urban/Rural						
Urban	184.1	185.5	188.6	192.8	150.8	**<.0001**
Rural	284.6	272.9	240.3	243.8	189.1	**<.0001**
Age Group						
<1	256.1	241.5	273.1	306.7	243.2	0.19
1-4	248.4	247.9	251.4	242.3	206.1	**<.0001**
5-7	198.9	191.8	177.3	195.4	150.0	**<.0001**
8-10	142.3	148.7	133.8	135.5	86.4	**<.0001**
Abuse Category						
Physical Abuse	67.5	53.9	40.2	40.9	34.6	**<.0001**
Sexual Abuse	33.2	25.5	19.4	15.4	10.2	**<.0001**
Neglect	90.9	97.3	90.9	95.0	77.9	**<.0001**
Polyvictim	4.5	4.3	2.7	3.3	3.3	**<.0001**

P-Values in boldface indicate statistical significance at the .01 significance level.

Impact of COVID-19 Pandemic: 2019 and 2020 Comparisons:

Specified Maltreatment

The COVID-19 lockdown period (April-June 2020) resulted in a decline in specified maltreatment overall and in nearly all demographic categories compared with the same period of 2019. The overall rate of ED visits for specified abuse declined by nearly 50% in this period of 2020 compared 2019 (6.7 per 100,000 vs. 13.2 per 100,000, P<.0001). While rates of ED visits declined significantly for both males (P<.0001) and females (P=.005), the decline was more substantial for males. Whereas in 2019 males had higher

rates of abuse than females (14.6 per 100,000 vs. 11.7 per 100,000), in 2020 the rates were very similar, with males exhibiting slightly lower rates than females (6.3 per 100,000 vs. 7.2 per 100,000). White children showed no significant change in rates of specified maltreatment (P=0.11), while the rates among Black children declined 50% from 2019 to 2020 (23.9 per 100,000 vs. 11.9 per 100,000, P<.0001). Similarly, rates of ED visits for abuse in rural counties did not significantly change (P=.23) whereas in urban counties, visits declined 51.8% from 2019 to 2020 (14.1 per 100,000 vs. 6.8 per 100,000, P<.0001). In 2019 ED visit rates in urban countries were 1.6 times higher than in rural counties, but rates in 2020 were nearly identical. Specified rates among children <1 were not analyzed due to insufficient sample size. Rates in children 1-4 declined significantly from 2019 to 2020, with a nearly 50% decline (11.1 per 100,000 vs. 5.7 per 100,000, P=.003). Rates among children 5-7 did not change significantly (P=0.2). Children aged 8-10 experienced the most substantial decline, with a 59.7% decline from 2019 to 2020 (18.3 per 100,000 vs. 7.4 per 100,000, P<.0001). ED visits for physical abuse decreased significantly, with a 51.7% decrease from 2019 to 2020 (179 per 100,000 vs. 5.83 per 100,000, P<.0001),). Visits for sexual abuse did not change significantly (P=0.19), and visits for neglect were too few to analyze. Polyvictimization did not change significantly (P=0.18).

When comparing the post-lockdown period of 2020 (October- December) to the equivalent period of 2019, however, there was a small increase that was not statistically significant. This trend was observed for several subgroups as well, nearly all of which had insignificant changes. The exception is for rural counties, which exhibited a significant increase from 2019 to 2020 (8.5 per 100,00 vs. 18.3 per 100,000, P<.0001).

Table 4. Prevalence of Specified Maltreatment-Related ER Visits by Demographic Characteristics and Abuse Category, per 100,000 Children (0-10 years), Georgia, April-June 2019 and 2020.

	April-June 2019	April-June 2020	P-Value
Total	13.2	6.7	**<.0001**
Sex			
Male	14.6	6.3	**<.0001**
Female	11.7	7.2	**0.005**
Race			
Black	23.9	11.8	0.11
White	5.5	3.8	**<.0001**
Urban/Rural			
Urban	14.1	6.8	**<.0001**
Rural	8.8	6.1	0.23
Age Group			
1-4	11.1	5.7	**0.003**
5-7	12.5	7.3	0.02
8-10	18.3	7.4	**<.0001**
Abuse Category			
Physical Abuse	12.1	5.8	**<.0001**
Sexual Abuse	1.9	1.3	0.19
Polyvictim	1.4	0.9	0.17

P-Values in boldface indicate significance at the .01 significance level

Table 5. Prevalence of Specified Maltreatment-Related ER Visits by Demographic Characteristics and Abuse Category, per 100,000 Children (0-10 years), Georgia, October-November 2019 and 2020

	April-June 2019	April-June 2020	P-Value
Total	10.4	11.7	0.30
Sex			
Male	11.7	11.2	0.79
Female	9.1	12.1	0.07
Race			
Black	19.3	18.5	0.77
White	5.4	7.7	0.07
Urban/Rural			
Urban	10.8	12.4	0.24
Rural	8.5	18.3	**0.001**
Age Group			
1-4	7.6	11.9	0.02
5-7	8.3	11.5	0.15

8-10	16.2	13.4	0.29
Abuse Category			
Physical Abuse	10.4	11.7	0.87
Sexual Abuse	1.3	2.3	0.05
Polyvictim	1.0	1.5	0.24

P-Values in boldface indicate significance at the .01 significance level

Suggestive Maltreatment

Like specified maltreatment, suggestive maltreatment showed significant declines in the lockdown period of 2020 (April-June) compared to the equivalent period of 2019 (37.2 per 100,000 vs. 3.4 per 100,000, P<.0001). Nearly all demographic subgroups had significant declines in ED visit rate, with the exception of children <1, for whom significance was borderline (P=.013). Unlike for specified maltreatment, visits for suggestive physical abuse did not change significantly in this period (P=.09). Suggestive sexual abuse, on the other hand, declined by 60.4% (P<.001). Neglect also declined significantly during this period (24.0 per 100,000 in 2019 vs. 18.6 per 100,000 in 2019, P=.002), while instances of polyvictimization were too few for analysis.

During the post-lockdown period of 2020 (October-November), there was a significant decrease in suggestive maltreatment-related ED visits overall, compared with the equivalent period in 2019 (38.6 per 100,000 vs. 47.1 per 100,000, P=.0005), with some variability by subgroup. Significant declines occurred among females (51.5 per 100,000 vs. 37.3 per 100,000, P<.001), Black children (66.7 per 100,000 vs. 49.7 per 100,000, P=.0003), children in urban counties (44.9 per 100,000 vs. 36.8 per 100,000, P=.002), and children aged 5-7 (45.4 per 100,000 vs. 31.3 per 100,000, P=.001). Prevalence of visits for physical abuse, sexual abuse, and neglect did not change significantly in this period and instances of polyvictimization were too few for analysis.

Table 6. Prevalence of Suggestive Maltreatment-Related ER Visits by Demographic Characteristics and Abuse Category, per 100,000 Children (0-10 years), Georgia, April-June 2019 and 2020.

Year	2019	2020	P-Value
Total	53.4	37.2	**<.0001**
Sex			
Male	47.0	35.0	**<.0001**
Female	59.9	39.5	**<.0001**
Race			
Black	68.4	46.4	**<.0001**
White	41.7	29.8	**<.0001**
Urban/Rural			
Urban	48.0	33.6	**<.0001**
Rural	72.7	50.2	**0.0005**
Age Group			
<1	78.3	52.8	0.013
1-4	65.2	47.7	**0.0002**
5-7	48.5	34.0	**0.001**
8-10	35.7	22.7	**0.0005**
Abuse Category			
Physical Abuse	10.9	8.9	0.09
Sexual Abuse	5.1	2.0	**<.0001**
Neglect	24.0	18.6	0.002

P-Values in boldface indicate statistical significance at the .01 significance level

Table 7. Prevalence of Suggestive Maltreatment-Related ER Visits by Demographic Characteristics and Abuse Category, per 100,000 Children (0-10 years), Georgia, October-November 2019 and 2020

Year	2019	2020	P-Value
Total	47.1	38.6	**0.001**
Sex			
Male	42.8	40.0	0.39
Female	51.5	37.3	**<.0001**
Race			
Black	66.7	49.7	**0.0003**
White	34.5	28.6	0.04
Urban/Rural			
Urban	44.9	36.8	**0.002**
Rural	54.1	44.5	0.10
Age Group			
<1	66.3	60.8	0.59
1-4	57.8	52.2	0.23

5-7	45.4	31.3	**0.001**
8-10	29.5	22.2	0.04
Abuse Category			
Physical Abuse	9.1	9.2	0.92
Sexual Abuse	2.8	2.1	0.25
Neglect	22.3	18.5	0.02

P-Values in boldface indicate statistical significance at the .01 significance level

IV. Discussion

During the period from 2016-2020, there were 3,717 ED visits for specified child maltreatment and 14,500 ED visits for suggestive child maltreatment. Specified physical abuse was detected in 3,359 visits and suggestive maltreatment was indicated in 3,539 visits. Specified sexual abuse was detected in 588 visits and suggestive sexual abuse was indicated in 1,550 visits. Specified neglect was rarely detected (131 visits) but was the most common type of abuse indicated by suggestive codes (6,741 visits). This indicates that in the ED setting neglect is rarely captured explicitly. These findings underscore that identifying abuse—particularly sexual abuse and neglect—in the ED setting is difficult. Suggestive maltreatment codes can be a valuable tool for identifying and measuring possible instances of abuse which are not detected explicitly and are of particular importance for neglect.

Results indicate that ED visits for child maltreatment generally declined from 2016 to 2020, with 2020 representing the fewest number of visits of the years analyzed. This was true generally for specified abuse and suggestive abuse and across most demographic groups. Suggestive maltreatment had a particularly noticeable drop off in 2020, perhaps indicating that less severe instances of abuse were not appearing the in ED because of pandemic measures and fear of contagion. The early COVID-19 period (April-June 2020) resulted in significant declines in ED visits for maltreatment across the board in Georgia compared to the same period in 2019. Overall, specified abuse rates declined by nearly 50% and suggestive abuse rates declined by about 30% when compared to the same period of 2019. These declines are roughly

consistent with the overall decline in ED visits observed nationally compared to 2019 (25) and exceed the decline in reporting to CPS seen in NCANDS and other studies (5,23, 24). As little change was seen in visits for abuse in the later part of 2020 compared with the previous year, this suggests that school closures, stay at home orders, and avoidance of the medical system for fear of infection had an important impact in preventing child maltreatment victims from accessing medical care in the early pandemic. This study suggests that ED visits suffer the same, if not more, barriers to accurately measuring maltreatment that other avenues for reporting did. Of particular note is rural populations who experienced a nonsignificant change in specified visits from April-June 2019 to 2020 and a 116.9% increase from October-December 2019 to 2020, suggesting that abuse was in fact rising due to consequences of COVID-19, but children were not visiting the ED in the early part of the pandemic. Since ED visits help to capture the most severe instances of abuse-- those that require medical treatment-- it is worrying that many children went without needed care during that time.

There are several limitations to the methods used in the study. Determination of child maltreatment is based on ICD-10 codes, which depend on ED staff to cite maltreatment in the medical chart and on hospital coders to accurately utilize the codes. Thus, there may be inter-hospital inconsistency in use of the codes. Further, the codes used to identify visits for maltreatment were adapted from a study describing maltreatment in children 0-3 years of age. Older children were included in the current study because we aimed to identify how consequence of the COVID-19 pandemic, including school closures, impacted maltreatment care-seeking. Since the codes were not tailored to this study's age group, identification of maltreatment, particularly suggestive maltreatment, may be imprecise. However, other studies have used these same codes in older age groups (26). Physical abuse was also likely overcounted by this study, as some of the injuries included may have been result of peer-on-peer violence or other external factors, such as transportation injuries, rather than child maltreatment. In addition, the ICD-10 codes were adapted from a study which utilized ICD-9 codes, and conversion was not straightforward in all instances. A final limitation of the dataset is that total ED visits for children under 10 was not available, so we were not able

to assess child maltreatment visits as a proportion of total ED visits, which would have been an alternate way to analyze the data which would have accounted for the general decrease in healthcare utilization during the pandemic, and particularly the lockdown period. Nevertheless, the study is useful for describing the trends of maltreatment in Georgia and illuminates the barriers to care seeking that occurred as a result of the COVID-19 pandemic. It also illustrates the feasibility of utilizing the Georgia Hospital Association ED discharge dataset to investigate maltreatment in Georgia. This is noteworthy because the GHA dataset is a complete sample of Georgia hospitals, so the findings represent the true ED utilization in Georgia rather than an estimate. Lastly, this study emphasizes the importance of utilizing suggestive ICD-10 codes in addition to specified codes to obtain a more comprehensive picture of all forms of abuse.

V. Conclusion

This study suggests that ED visits declined during the first year of the pandemic, possibly due to aversion of medical care. However, measuring ED visit rates in this time does not shed light onto how severity and frequency of child maltreatment were truly impacted by stressors of COVID-19. To gain a better understanding of the impacts of the pandemic on child maltreatment outcomes, future studies should look at later pandemic periods, where the economic stressors brought on by the pandemic persisted, but fewer restrictions and attitude changes may have led to less avoidance of the medical system. Preexisting knowledge of risk factors for child abuse suggests that maltreatment likely increased during the pandemic, but this study and others show that maltreatment often went undetected. The extent of the abuse remains to be seen, as does the long-term effects on the victims of abuse. Regardless of the challenges, we must continue to find ways to identify and help victims of maltreatment, particularly in times of crisis and isolation.

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