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OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

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DOI: 10.1542/peds.2020-038489

Journal: *Pediatrics*

Article Type: Research Brief

Citation: Kaiser SV, Kornblith AE, Richardson T, et al. Emergency visits and hospitalizations for child abuse during the COVID-19 pandemic. *Pediatrics*. 2020; doi: 10.1542/peds.2020-038489

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**Emergency Visits and Hospitalizations for Child Abuse
During the COVID-19 Pandemic**

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Conflict of Interest Disclosures (includes financial disclosures): The authors have no example conflicts of interest to disclose.

Funding/Support: All phases of this study were supported by a grant from the COVID-19 Rapid Response Funding Collaborative.

Role of Funder/Sponsor (if any): The COVID-19 Rapid Response Funding Collaborative had no role in the design and conduct of the study.

Abbreviations: CPA: child physical abuse, ED: emergency department, ICU: intensive care unit, CARES: Coronavirus Aid, Relief, and Economic Security

Contributors' Statements

Drs. Kaiser, Kornblith, Puls, and Pantell conceptualized and designed the study, interpreted the data, drafted the initial manuscript, and reviewed and revised the manuscript.

Dr. Richardson conceptualized and designed the study, carried out the analyses, interpreted the data, and reviewed and revised the manuscript.

Ms. Gruhler De Souza and Drs. Fleegler, Fritz, Parikh, Zagel, Sills, Goyal, Hogan, Heller, DeLaroche, and Cooper conceptualized and designed the study, interpreted the data, and reviewed and revised the manuscript.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

Introduction

Economic recession and natural disasters have been associated with increases in child physical abuse (CPA).^{1,2} Our objectives were to compare the volume and severity of CPA encounters in children's hospitals during the COVID-19 pandemic to prior years.

Methods

We conducted a retrospective cohort study of emergency department (ED) and inpatient encounters for children ≤ 5 years old in the Pediatric Health Information System (administrative database from 52 US children's hospitals).³ This study was deemed exempt by the Institutional Review Board of the University of California, San Francisco.

We compared volume of CPA encounters from January 1-August 31, 2020 to the same timeframe in prior years (2017-2019) to understand overall trends. We compared severity of CPA encounters during the COVID-19 pandemic period (defined as March 16-August 31, 2020) to the same timeframe in prior years (2017-2019).

Outcomes

Our primary outcome was change in volume of encounters in which CPA was diagnosed, defined using International Classification of Diseases (ICD), Tenth Revision, Clinical Modification diagnosis codes.⁴ Secondary outcomes included markers of CPA severity: intensive care unit (ICU) utilization (yes = more severe), number of injuries (higher total = more severe),

injury type (abusive head trauma = more severe), Hospitalization Resource Intensity Scores for Kids (H-RISK, higher score = more severe), and in-hospital mortality (yes = more severe). H-RISK is a measure of severity based on resource utilization.⁵

Analysis

We described total volume of children's hospital ED and inpatient encounters in 2020 and prior years using frequencies. To compare volume of CPA encounters in 2020 to prior years, we conducted a difference-in-differences analysis using linear regression models with an interrupted time-series approach. Models evaluated: 1) differences in volume of CPA encounters at the onset of the pandemic, comparing March 2020 to prior years; and 2) differences in the rate of change in CPA encounters, comparing 2020 to prior years.

To compare severity of CPA encounters during the COVID-19 pandemic to prior years, we analyzed categorical severity variables (e.g., ICU utilization) using Chi-square tests and H-RISK score using Student's t-tests. Analyses were performed using SAS 9.4 (Cary, NC) and significance was set at $\alpha=0.05$.

Results

There was a sharp decline in the all-cause/overall volume of ED and inpatient encounters in children's hospitals in Week 10 of 2020, corresponding to March 16th (Figure 1a).

When comparing trends in volume of CPA encounters in 2020 to prior years, we also found a significant decline at Week 10 of 2020 (-63.4 cases [95% Confidence Interval: -91.8, -35.9]). We found no significant differences in intercepts or slopes of CPA encounter trends comparing 2020 to prior years (Figure 1b).

Severity of CPA encounters during the COVID-19 pandemic was similar to prior years, with no significant differences in the proportion of infants with abusive head trauma, the proportion of children ages 1-5 years with ICU utilization, or the proportion of children with in-hospital mortality (Table 1). ICU utilization in infants decreased during the COVID-19 pandemic; and injury patterns in children ages 1-5 changed (greater proportion with fracture).

Discussion

In this multicenter study of US children's hospitals, we found declines in child physical abuse encounters during the COVID-19 pandemic. These declines were during a time when total volumes of encounters were also lower. We found severity of CPA encounters during the pandemic was similar to prior years. Our findings may reflect true decreases in CPA; or, our findings may instead reflect compromised infrastructure for detecting CPA or delayed effects of the pandemic on CPA.

Our study cannot explain the mechanisms driving these findings. Protective factors contributing to decreases in CPA may have included financial stipends from the Coronavirus Aid, Relief, and

Economic Security (CARES) Act and/or eviction protections. Policies supporting such protections should continue to be prioritized, and the mechanisms by which such policies and/or other protective factors may have decreased CPA should be investigated.

If the proportion of children diagnosed with more severe abusive injuries (e.g., abusive head trauma, ICU admission) had increased during the COVID-19 pandemic, this could indicate that declines in the number of CPA encounters were driven by children with less severe abusive injuries not presenting for medical care or being missed by clinicians. However, we found the severity of CPA encounters was stable in pandemic versus pre-pandemic years. We interpret this to suggest that either a) the true occurrence of CPA decreased similarly across the whole spectrum of severity, or b) the presentation of CPA to medical care and/or missed cases of CPA by clinicians decreased similarly across the whole spectrum of severity. The latter case is less likely because more severe injuries are associated with significant clinical signs/symptoms, and because clinicians more often miss CPA with less severe injuries. Nonetheless, to better ensure detection of CPA and promote overall child health, it will be important to ensure access to primary care and prevention services (e.g., home visiting), promote continued awareness of CPA among clinicians,⁶ and safely reopen schools and daycares.

Our study was limited to the first 6 months of the pandemic; analyzing longer-term effects may reveal different patterns, and we intend to examine this in the future. The goal of this analysis was to provide timely, actionable guidance for clinicians and policymakers. Thus, the PHIS database was chosen because it is updated quarterly, whereas other national, all-payer databases

are updated every 1-3 years (e.g., Healthcare Cost and Utilization Project databases).

Additionally, encounters in PHIS children's hospitals represent a small portion of CPA. Thus, our results do not represent the overall epidemiology of CPA during the COVID-19 pandemic, and larger national samples should be studied.

References

1. Wood JN, French B, Fromkin J, Fakeye O, Scribano PV, Letson MM, Makoroff KL, Feldman KW, Fabio A, Berger R. Association of Pediatric Abusive Head Trauma Rates With Macroeconomic Indicators. *Acad Pediatr*. 2016 Apr;16(3):224-32.
2. Seddighi H, Salmani I, Javadi MH, Seddighi S. Child Abuse in Natural Disasters and Conflicts: A Systematic Review. *Trauma Violence Abuse*. 2019 Mar 13: [Epub ahead of print]
3. Children's Hospital Association. Pediatric Health Information System. <https://www.childrenshospitals.org/phis>. Accessed on September 20, 2020.
4. Puls HT, Anderst JD, Davidson A, Hall M. Trends in the Use of Administrative Codes for Physical Abuse Hospitalizations. *JAMA Pediatr*. 2019 Nov 4;174(1):91-3.
5. Richardson T, Rodean J, Harris M, Berry J, Gay JC, Hall M. Development of Hospitalization Resource Intensity Scores for Kids (H-RISK) and Comparison across Pediatric Populations. *J Hosp Med*. 2018 Sep 1;13(9):602-608.
6. Rosenthal CM, Thompson LA. Child Abuse Awareness Month During the Coronavirus Disease 2019 Pandemic. *JAMA Pediatr*. 2020;174(8):812.

Table 1. Child Physical Abuse Severity during the COVID-19 Pandemic versus Prior Years

	Children Age < 1 Year			Children Ages 1-5 Years		
	COVID-19 Pandemic (n=616)	Prior Years (n=2101)	p-value*	COVID-19 Pandemic (n=621)	Prior Years (n=2,477)	p-value*
ICU Utilization (n,%)	95 (15.4)	448 (21.3)	<0.01	46 (7.4)	196 (7.9)	0.68
HRISK Score (mean, SE)	1.267 (0.082)	1.368 (0.049)	0.31	0.941 (0.076)	0.863 (0.035)	0.33
Type of Injury (n,%)						
Fracture	361 (58.6)	1,183 (56.3)	0.31	134 (21.6)	428 (17.3)	0.01
Abusive Head Trauma	198 (32.1)	713 (33.9)	0.41	67 (10.8)	219 (8.8)	0.13
Abdominal	13 (2.1)	59 (2.8)	0.34	39 (6.3)	124 (5.0)	0.20
Burn	17 (2.8)	52 (2.5)	0.69	48 (7.7)	172 (6.9)	0.50
Skin	237 (38.5)	834 (39.7)	0.59	460 (74.1)	1,893 (76.4)	0.22
Other	66 (10.7)	212 (10.1)	0.65	86 (13.8)	324 (13.1)	0.61
Number of Injuries (n,%)						
1	0.74			0.08		
2	394 (64.0)	1,348 (64.2)		465 (74.9)	1,955 (78.9)	
3+	173 (28.1)	568 (27.0)		111 (17.9)	382 (15.4)	
In-Hospital Mortality (n,%)	49 (8.0)	185 (8.8)		45 (7.2)	140 (5.7)	
In-Hospital Mortality (n,%)	12 (1.9)	71 (3.4)	0.07	15 (2.4)	55 (2.2)	0.77

The COVID-19 Pandemic period was defined as March 16-May 31, 2020. CPA encounters during this timeframe were compared to the same timeframe in prior years (2017-2019). *Calculated using Chi-squared tests for categorical variables and Student's t-test for H-RISK score

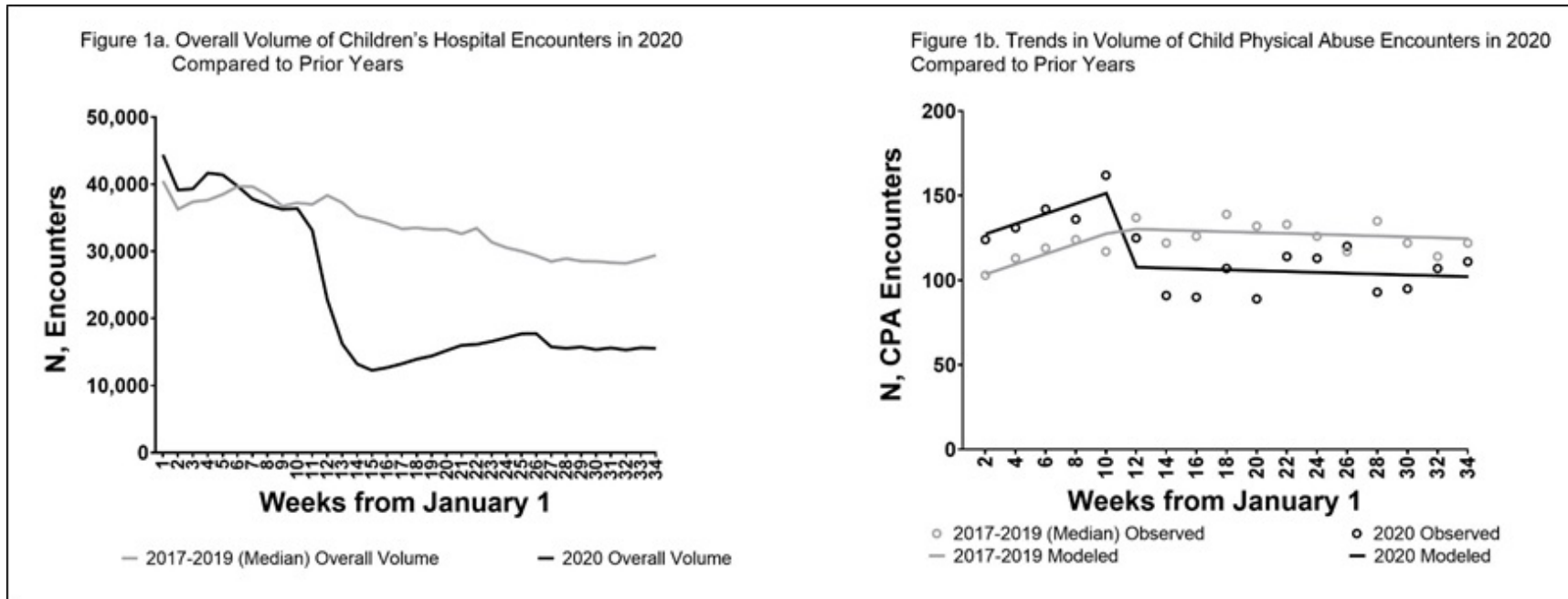


Figure 1. All-Cause/Overall Children's Hospital Encounters and Child Physical Abuse Encounters in 2020 Compared to Prior Years (2017-2019)

Panel "a" illustrates changes in the all-cause/overall volume of children's hospital encounters in 2020 compared to prior years (black versus grey lines, respectively). Panel "b" illustrates changes in trends in volume of CPA encounters in 2020 compared to prior years (black versus grey lines, respectively). *March 16th

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Pediatrics originally published online December 30, 2020;

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Pediatrics originally published online December 30, 2020;

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<http://pediatrics.aappublications.org/content/early/2020/12/28/peds.2020-038489.citation>

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