

# The Prevalence of Bruising Among Infants in Pediatric Emergency Departments

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**Study objective:** Bruising can indicate abuse for infants. Bruise prevalence among infants in the pediatric emergency department (ED) setting is unknown. Our objective is to determine prevalence of bruising, associated chief complaints, and frequency of abuse evaluations in previously healthy infants presenting to pediatric EDs.

**Methods:** We conducted a prospective, observational, multicenter study of infants aged 12 months or younger presenting to pediatric EDs. Structured sampling was used. Pediatric emergency medicine clinicians performed complete skin examinations to screen for bruising. Study investigators documented skin findings, date of visit, patient's age, chief complaint, and abuse evaluation. The primary outcome was prevalence of bruising. Secondary outcomes were prevalence of bruising based on chief complaint and frequency of abuse evaluation. Point estimates of bruise prevalence and differences in bruise prevalence between patient subgroups were calculated with 95% confidence intervals (CIs).

**Results:** Bruising was identified in 88 of 2,488 infants (3.5%; 95% CI 2.9% to 4.4%). Rates of bruising for infants 5 months and younger and older than 5 months were 1.3% and 6.4%, respectively (difference 5.1%; 95% CI 3.6% to 6.8%). For infants 5 months and younger, 83% of bruising was associated with a trauma chief complaint and only 0.2% of infants presenting with a medical chief complaint had bruising. Pediatric emergency medicine clinicians obtained abuse evaluations on 23% of infants with bruising, and that rate increased to 50% for infants 5 months and younger.

**Conclusion:** Bruising prevalence in children 12 months and younger who were evaluated in pediatric EDs was low, increased within age strata, and was most often associated with a trauma chief complaint. Most bruised infants did not undergo an abuse evaluation. [Ann Emerg Med. 2016;67:1-8.]

Please see page 2 for the Editor's Capsule Summary of this article.

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## INTRODUCTION

Bruising in infancy is a red flag for physical abuse, leading to recommendations to evaluate young infants with unexplained bruising for abuse.<sup>1-7</sup> This cautious approach is necessary because physical child abuse is a major cause of morbidity and mortality in the first year of life. Bruising is the most common initial injury from physical abuse but is often overlooked.<sup>1,8,9</sup>

### Importance

Before a finding such as infant bruising can serve as a marker for serious disease or as a trigger for further evaluation, knowledge of its prevalence in the targeted population is critical. To our knowledge, no previous study has reported the prevalence of bruising among infants in the pediatric emergency department (ED) setting or the

rate of abuse evaluations for infants with bruising. Current published prevalence data come from well-child care clinics, general ED visits that excluded trauma and suspected abuse patients, and abuse clinics.<sup>2,3,10,11</sup> These data may not apply to pediatric ED settings in which patients with a full spectrum of medical, surgical, traumatic, and social complaints are examined.

### Goals of This Investigation

Our primary objective was to determine the prevalence of bruising in the first year of life in previously healthy infants presenting to pediatric EDs. We also sought to determine the prevalence of bruising by age and chief complaint and the frequency of child abuse evaluations of infants with bruising. Our goal was to establish normative data to inform future guidelines for the evaluation of abuse in infants with bruising.

### Editor's Capsule Summary

#### *What is already known on this topic*

Although the prevalence of bruising among infants younger than 12 months has been estimated in other settings, it has not been studied in healthy infants seeking care in pediatric emergency departments (EDs).

#### *What question this study addressed*

What is the prevalence of bruising in previously healthy infants 12 months of age and younger in the pediatric ED, and how many of those with bruising are referred for child abuse evaluation?

#### *What this study adds to our knowledge*

In this prospective observational study conducted at 3 pediatric EDs, 3.5% of infants 12 months of age and younger (88/2,488) had bruising, and 23% of them were referred for child abuse evaluation.

#### *How this is relevant to clinical practice*

Although this study will not change practice directly, it provides foundational reference data on the prevalence of bruising in previously healthy infants in the pediatric ED.

and neglect concern, known coagulation abnormalities, severe neurologic and neuromuscular impairment, or severe extensive skin disorders (eg, severe eczema). These conditions can affect bruise prevalence or interfere with the interpretation of skin findings.

We used a structured sampling approach with research shifts as a feasible proxy to consecutive enrollment.<sup>13</sup> Cost and labor prohibited consecutive and overnight (1 AM to 7 AM) enrollment. We chose research shifts, with start and end times, to minimize potential bias in data collection and increase accuracy of the prevalence estimates. Shifts represented all days of the week between 7 AM and 1 AM in 4-, 6-, or 8-hour intervals. We investigated post hoc the lack of overnight enrollment, using 3 approaches: pediatric ED arrival times for all infants per hospital census, pediatric ED arrival times of an abuse population from our bruising clinical decision rule validation study, and surveillance of infants during 9 overnight shifts. These data, collected outside of the study enrollment timeframe, do not appear among the main study results but provide information on the overnight infant population.

The study investigator team performed data collection and included pediatric emergency medicine–based research assistants and pediatric emergency medicine attending physicians, pediatric emergency medicine fellows, and social workers who did not provide clinical care during the research shift. The principal investigator (MCP) conducted training sessions on the study protocol with all study investigators. Skin screening examiners were the treating pediatric emergency medicine clinicians who performed complete skin examinations to screen for bruising. This group included pediatric emergency medicine attending physicians, pediatric emergency medicine fellows, clinical staff physicians, nurse practitioners, and residents, all familiar with the appearance and diagnosis of a bruise. During each research shift, a study investigator identified all age-appropriate patients from the patient tracking board, confirmed with the screening examiner that the patient met inclusion criteria, and reminded the screening examiner that the patient required a complete skin examination. Skin screening examinations occurred during the course of clinical care.

### Methods of Measurement

We defined bruises as bleeding beneath intact skin and included hues of red, blue, yellow, green, and brown.<sup>14</sup> Infants were placed in gowns or undressed for examination. The study investigators verified whether the screening examiner had performed a complete skin examination and collected the following data: presence of bruising, date of visit, patient's age in months, chief complaint, and

## MATERIALS AND METHODS

### Study Design and Setting

We conducted this prospective observational study of bruise prevalence among infants aged 12 months or younger in the pediatric EDs of 3 free-standing, tertiary care children's hospitals designated as Level I trauma centers with child abuse pediatricians on staff. These 3 pediatric EDs collectively evaluate approximately 31,000 patients aged 12 months or younger each year. We gathered prevalence data as part of a larger ongoing study to validate a previously derived bruising clinical decision rule.<sup>12</sup> We obtained the prevalence data to determine expected frequency of bruising in this young age group and to identify consecutive cases of infants with bruises. Each hospital's institutional review board granted a waiver of authorization for collection of bruise prevalence information.

### Selection of Participants

Patients met inclusion criteria if they were aged 0 through 12 months, presented to the pediatric ED for care during a research shift (defined below), and had none of the following exclusion criteria: specific referral for abuse

occurrence of abuse evaluation. We defined abuse evaluation as the pediatric emergency medicine clinician's obtaining consultation from the hospital's Child Protection Team or hospital-based social worker to evaluate for possible abuse or submission of a report of suspected child abuse or neglect to a child protection agency.

Only skin findings from patients with a confirmed complete skin assessment were included in the study. Patients discharged before complete skin assessments were categorized as having incomplete skin assessments and were excluded from analysis. We conducted a sensitivity analysis of the effect of data missing because of incomplete skin assessments on estimates of prevalence.

For data analysis, patients were divided into age groups corresponding to mobility stages: 0 to 2 months (nonmobile); 3 to 5 months (able to roll and transitioning to sitting without support), 6 to 8 months (starting to crawl or pulling to stand), and 9 to 12 months (transitioning from cruising to ambulation).<sup>15</sup> We enrolled patients from all age groups until we reached a minimum of 400 patients in each age group. This sample size achieved a 95% confidence interval (CI) width of 3% (0.9% to 4.0%) around a published prevalence of 2% for infants in the well-child care setting.<sup>3</sup> We defined premobile as inability to crawl, cruise, or walk, corresponding to infants aged 0 through 5 months.

We categorized patients by presenting chief complaint: (1) trauma, if the purpose of the pediatric ED visit was for the evaluation of an injury occurrence such as a fall from a bed or caregiver's arms; (2) medical, if the visit was related to a sign or symptom of illness such as cough, fever, or vomiting; or (3) abuse and neglect referral, if a patient presented with a specific referral or request for evaluation for possible abuse or neglect.

## Outcome Measures

Our primary outcome was the prevalence of bruising among infants presenting to the pediatric ED. Secondary outcomes included the associated chief complaint and frequency of abuse evaluations among bruised infants presenting with trauma and medical chief complaints.

## Primary Data Analysis

We calculated point estimates of bruise prevalence, with 95% CIs calculated by the Wilson score method in the entire study population, age groups, chief complaint categories, and patients evaluated for abuse.<sup>16</sup> We used the Wilson-Newcombe method to calculate 95% CI for differences in prevalence between groups.<sup>17</sup> We compared the median age of children with and without bruising with

the Wilcoxon rank sum test. We analyzed the data in the open source R software environment.<sup>18</sup>

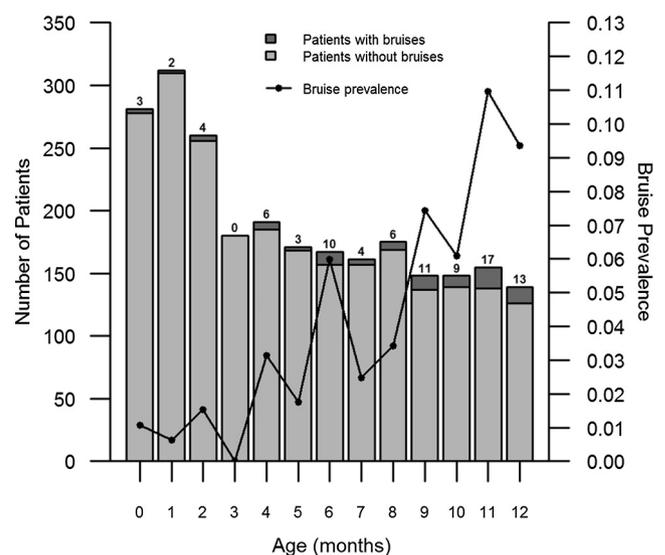
## RESULTS

### Characteristics of Study Subjects

From December 2011 to February 2013, we conducted 396 research shifts, providing approximately 2,200 enrollment hours. Fifty-eight percent of enrollment hours occurred between 7 AM and 3 PM, 42% between 3 PM and 11 PM, and less than 1% between 11 PM and 1 AM. Most shifts (85%) occurred between Monday at 7 AM and Friday at 3 PM, and 15% occurred between Friday at 3 PM and Monday at 7 AM. During research shifts, 2,773 infants aged 0 through 12 months presented to the pediatric EDs. Of these, 127 met exclusion criteria, 147 had incomplete skin assessments, and 11 presented with abuse and neglect referral chief complaints. The remaining 2,488 patients constituted the study sample.

### Main Results

Bruising was present in 88 of the 2,488 infants (3.5%; 95% CI 2.9% to 4.4%) and prevalence increased with age (Figure). The median age of the study population was 5 months (interquartile range 2 to 8 months). The median age of infants with bruising was more than double that of those without bruising (9 versus 4 months). The prevalence of bruising for infants 5 months and younger and older than 5 months was 1.3% and 6.4%, respectively (difference 5.1%; 95% CI 3.6% to 6.8%). Bruise prevalence varied by study site (6.2% at Rady Children's Hospital San Diego, 4.4% at Ann & Robert H. Lurie Children's Hospital of



**Figure.** Number of patients with and without bruises and bruise prevalence by patient's age (in months).

**Table 1.** Presence of bruising by age group and chief complaint.\*

Patient Group	Age, Months				Total
	0–2	3–5	6–8	9–12	
Total patients	1.0 [0.5–2.0] (9/853)	1.7 [0.8–3.2] 9/542	4.0 [2.5–6.1] 20/503	8.5 [6.4–11.1] 50/590	3.5 [2.9–4.4] (88/2,488)
Trauma CCs	18.2 (8/44)	23.3 (7/30)	26.0 (13/50)	44.9 (31/69)	30.6 [24.5–37.4] (59/193)
Medical CCs	0 (1/788)	0 (2/506)	1.6 (7/438)	3.7 (19/512)	1.3 [0.9–1.8] (29/2,244)
Not documented CC	0 (0/21)	0 (0/6)	0 (0/15)	0 (0/9)	0 [0–7.0] (0/51)

CC, Chief complaint.

\*Data are presented as estimated prevalence percentage [95% CI] (number bruised/number enrolled).

Chicago, and 2.6% at Cincinnati Children's Hospital Medical Center).

Most chief complaints were medical (90%), followed by trauma (8%) and not documented (2%) (Table 1). Among the 88 infants with bruising, the majority (67%) presented with a trauma chief complaint. However, 69% of infants with a trauma chief complaint lacked bruising. Premobile infants rarely had bruises (18/1,395; 1.3%), and the majority of those with bruises (15/18; 83%) had a trauma chief complaint (Table 1). Premobile infants with medical chief complaints were rarely bruised (3/1,294; 0.2%). The exclusion of the 11 patients with abuse and neglect referral chief complaints, 2 of whom had bruises, did not substantially change the bruise prevalence rate, which would have been 90 of 2,499 infants (3.6%; 95% CI 2.9% to 4.4%).

The 147 patients excluded because of incomplete skin assessments were similar in age to those with documented skin examinations (median 5 months for each group). They were less likely to have been from Rady Children's Hospital San Diego (0.7% versus 6.5%; 95% CI for difference 2.6% to 9.0%) and to have had a trauma chief complaint (2.0% versus 7.7%; 95% CI for difference 1.7% to 9.6%).

Abuse evaluations occurred for 38 infants (1.5%) and were more frequent when bruising was present: 23% (20/88) of bruised infants versus 0.8% (18/2,400) of unbruised infants (difference 22%; 95% CI 12% to 32%). The abuse evaluation rate was highest (50%; 9/18) among premobile bruised infants. Fourteen (70%) of the 20 chief complaints of bruised children evaluated for abuse were trauma and 6 (30%) were medical. These numbers exclude patients referred explicitly for abuse and neglect chief complaint concerns.

By pediatric ED census, only 11.5% (6,707/58,171; 95% CI 11.2% to 11.8%) of infant visits occurred overnight, despite that these hours occupied 29% of the 24-hour interval. The proportion of trauma chief

complaints during the overnight hours (189/6,707; 2.8%; 95% CI 2.4% to 3.2%) was slightly lower than during the day or evening hours (1,801/51,470; 3.5%; 95% CI 3.3% to 3.7%; 95% CI for the difference 0.2% to 1.1%). Per the bruising clinical decision rule validation study, the proportion of bruised infants evaluated for abuse who presented to the pediatric ED during the overnight hours was lower (14/232; 6.0%; 95% CI 3.5% to 10.0%) than the proportion who presented during day or evening enrollment hours. Per overnight surveillance, among the 45 infants aged 0 through 12 months, none had bruising. The one patient with a trauma chief complaint was the only one who underwent an evaluation for abuse. Infants in this small overnight sample were less likely to have bruising or be evaluated for abuse compared with the enrollment day or evening hours.

## LIMITATIONS

We enrolled patients in 3 tertiary center pediatric EDs, excluding patients with severe neurologic disabilities and bleeding disorders. Therefore, our results cannot be used to predict the prevalence of bruising among patients presenting to primary care clinics or inpatient services or among those with special health care needs. Data from this study are applicable in general EDs because the infant population of pediatric EDs is likely similar, with the exception of patients with highly specialized needs.

The 147 patients excluded from analysis because of incomplete skin assessments may have had characteristics different from those of the study population, and their exclusion may have altered our estimate of prevalence. A sensitivity analysis revealed that bruise prevalence would have ranged from 3.4% if none of the patients with incomplete skin assessments exhibited bruising to 9.0% if all 147 patients had exhibited bruising. If the 147 patients with incomplete skin assessments had exhibited site- and chief complaint-specific bruising consistent with that of

**Table 2.** Comparison of results with those of other published studies.

Age Groups, Months	Author	Total Patients	Total Patients With Bruises	Prevalence, %
0-5	Pierce/Magana	1,395	18	1.3
	Sugar	366	2	0.6
	Harper	980	254	25.9
0-8	Pierce/Magana	1,898	38	2.0
	Sugar	473	8	1.7
	Labbe	246	3	1.2
0-11	Pierce/Magana	2,349	75	3.2
	Sugar	592	31	5.2
	Atwal	18	13	72
6-11	Pierce/Magana	954	57	6.0
	Sugar	226	29	12.8
6-12	Pierce/Magana	1,093	70	6.4
	Carpenter	177	22	12
Populations	Pierce/Magana		3 Level I trauma center pediatric EDs	
	Sugar		7 primary care pediatric offices: well-child visits	
	Harper		20 child abuse teams: physical abuse consultations	
	Labbe		Outpatient clinic and medical section of the ED	
	Atwal		Forensic pathology: fatal abusive head trauma victims	
	Carpenter		Hearing test clinics and child health surveillance clinics	

ED, Emergency department.

the 2,488 patients with complete skin examinations, our prevalence estimate would not have been appreciably different (3.5%; 95% CI 2.8% to 4.2%).

The screening examiner may have missed bruises on skin examination, or nontraumatic lesions may have been misidentified as bruises. However, all study sites were Level I pediatric trauma centers with examiners experienced in the differentiation of pediatric bruising from other lesions such as birthmarks. We neither measured agreement among screening examiners or study investigators nor provided specific training to standardize recognition of lesions. A second screening examiner did not confirm negative skin examination results because of resource and institutional review board limitations. A study investigator approached all patients identified with bruising by screening examiners for entry into the larger bruising clinical decision rule validation study. All consented patients underwent confirmatory examinations by study investigators to confirm the presence of bruising.

We did not record the sex, race, or ethnicity of all screened patients. This limited data set collected for the prevalence study did not allow us to analyze the effect of sex, race, or ethnicity on bruising prevalence. Previous studies have reported no difference in bruising by sex, whereas at least 1 study reported a difference in bruise detection by race.<sup>3,10,11</sup> Further research is required to assess the effect race, ethnicity, and skin tone likely have on bruise appearance and prevalence.

The clinical characteristics and legal outcomes of the 88 infants with bruising (with and without evaluations for physical abuse as per pediatric emergency medicine

clinician discretion) and the 2 infants with bruising referred specifically for an abuse evaluation were beyond the scope of this study. This strictly observational study reports expected rates of bruising in infants and frequency of abuse evaluations in infants with bruising and does not identify predictors of abuse status.

The structured sampling approach used to simulate consecutive enrollment can potentially introduce distortion in the population being sampled. However, inclusion of all days of the week and different intervals helped to mitigate distortions. Lack of enrollment during the overnight hours may have introduced bias into the results. We found that infant census was lower during the overnight hours, as were trauma chief complaints and abuse evaluation frequencies, compared with day or evening hours. Because bruises were almost always associated with a trauma chief complaint in this young age group and bruise prevalence is highest among abuse victims, it is possible that our day or evening prevalence slightly overestimated the true bruise prevalence. Therefore, the prevalence rate results likely represent a maximum rate.

## DISCUSSION

To our knowledge, this is the first study of bruising prevalence and abuse evaluations among infants in the pediatric ED setting, and the largest (n=2,488) to investigate bruising prevalence among infants in any clinical setting. We determined that bruising was uncommon, especially in the first 5 months of life (<2%), and, when present, was most often associated with a trauma chief complaint. Abuse evaluations occurred in less than one quarter of infants with bruising.

Published bruise prevalence rates in the first year of life vary widely, with rates of 0.6% to 72%, depending on the population studied and the inclusion and exclusion criteria applied (Table 2).<sup>2,3,9-11</sup> A clinic-based study that excluded patients with suspected abuse identified a 0.6% rate of bruising among infants aged 0 to 5 months.<sup>3</sup> A clinic and ED medical visit–based study that excluded trauma patients and those with abuse concerns reported a bruise prevalence of 1.2% among infants aged 0 to 8 months.<sup>10</sup> Our bruise prevalence rates for both these age ranges were approximately double those reported and likely reflect differences in setting and inclusion criteria.<sup>3,10</sup> Our study was conducted at pediatric EDs designated as Level I trauma centers and included trauma patients and patients evaluated for abuse at the discretion of the pediatric emergency medicine clinician.

Once infants begin to cruise, they are more likely to bruise.<sup>3</sup> Studies of clinic patients aged 6 to 12 months yielded prevalences of 12% to 13%, with increased mobility associated with increased bruising.<sup>3,11</sup> Our prevalence rate also increased within age strata but was only half that reported for the 6- to 12-month-olds. The reason for the higher rate of infant bruising in a well-child clinic population compared with that in a pediatric ED population is not clear. However, our oldest patients (aged 11 and 12 months) exhibited a more comparable prevalence rate of 10% (Figure).

Studies of high-risk or abuse populations yielded the highest bruising prevalence rates, ranging from 25.9% for children referred to child abuse teams for possible physical abuse to 72% for children who died from abusive head trauma.<sup>2,9</sup> The relatively low prevalence of bruising in healthy well-child care and ED visits in the first year of life compared with that among populations referred for or dying from abuse underscores the importance of this seemingly innocuous physical examination finding—the bruise—and indicates that such a simple finding can be ominous and requires clinical due diligence.

Bruising often precedes abuse fatalities and near-fatalities in infants and is initially missed as an abusive injury in more than one third of these cases.<sup>1,6,9,19,20</sup> Accordingly, child abuse experts and professional organizations recommend strong consideration of abuse evaluations in young premobile infants with bruising not caused by a medical condition.<sup>1-7,21-23</sup> Neither the levels of compliance with these abuse evaluation recommendations nor the rates of abuse evaluations among infants with bruising who present to the pediatric ED setting are known. Our observational study allowed us to assess but not influence clinical practice, and our results revealed that bruising was associated with an increased proportion of patients undergoing an abuse

evaluation. Although half of bruised premobile infants were evaluated for abuse, overall, three quarters of bruised infants were not evaluated. The relatively low rates of abuse evaluations among bruised infants was unexpected, given that literature reports that bruising in this young age group is a red flag for abuse that warrants further evaluation.<sup>1-5,21,22</sup> However, the factors influencing the decision to evaluate for abuse and the outcomes of those evaluations were beyond the scope of this study and will require future study to better align clinical practice with recommendations and to implement evidence-driven guidelines specific to the pediatric ED setting.

The prevalence of bruising has been reported to vary by developmental ability in healthy children. Our results were consistent with those of others who reported higher bruise prevalence in older infants starting to sit on their own or pull to stand.<sup>3,10,11</sup> Our study found a significant difference in bruise rates for infants 5 months and younger compared with older than 5 months. After aged 5 months, the proportion of patients with bruising associated with medical chief complaints increased 10-fold. These findings further suggest that normal activity should not cause incidental bruising before the infant is mobile.

To our knowledge, previous investigators have not studied the association of chief complaint with bruising. Our study found that bruising prevalence varied significantly by chief complaint category. Trauma chief complaints represented fewer than 8% of infant pediatric ED visits and only 5.3% in the first 5 months of life. However, trauma chief complaints were 8 times more common among bruised infants and 15 times more common among bruised infants 5 months and younger. The low rates of bruising associated with medical chief complaint visits (1.3% of all visits and only 0.2% of visits in the first 5 months of life) support the notion that bruising on a premobile infant should be considered an exception, especially in the absence of an adequate injury mechanism. These findings highlight the importance of a complete skin examination and context (injury findings and accompanying history) for seemingly minor injuries such as bruises on young infants.

In our experience, both medical and legal professionals commonly believe that an impact such as from a fall off of the bed should cause bruising. In the legal system, it is often opined that if a bruise is not present, no trauma or impact occurred. The unexpectedly low frequency of bruising among infants presenting with trauma chief complaints (less than one third) in our study contradicts this commonly held belief. Our finding further highlights the importance of bruising in the first year of life and refutes the notion that infants “bruise easily.”

Prevalence of bruising varied significantly among the 3 study sites and may be attributable to the percentage of black patients presenting to each pediatric ED. One study reported that black children had a bruise prevalence rate that was nearly 3 times lower than that of white children.<sup>3</sup> Although we did not document race or ethnicity during data collection, the proportion of black patients at each institution was known from pediatric ED census data. The sites with the highest and lowest proportions of black patients had the lowest and highest prevalence rates of bruising, respectively. Further study will be required to determine the effect of skin tone on bruise recognition.

The prevalence of bruising among previously healthy infants evaluated in the pediatric ED is low and increases through the first year of life. Bruising is especially uncommon among infants with medical chief complaints and not expected as an incidental finding before infants are mobile. Therefore, clinicians should regard the bruise as a notable clinical finding worthy of clinical vigilance to elucidate its cause. Bruising is associated with an increased use of abuse evaluations. The next step in investigation is to study the specific bruise characteristics resulting from abusive and accidental injury, as well as the outcomes of the abuse evaluations in the bruised infants, to inform future guidelines and practice.

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**Author contributions:** MCP obtained funding. MCP, JNM, KK, DJL, GM, and BLB designed the study. MCP, KK, BLB, and JTK supervised the conduct of the study. JNM and GM were responsible for data collection. MCP, JNM, KK, DJL, and JTK analyzed and interpreted the data. DJL was responsible for the statistical analysis. MCP and JNM were responsible for the initial article draft, and all authors contributed to the revisions for the final version. All authors made critical intellectual contributions and approved the final article as submitted. MCP takes responsibility for the paper as a whole.

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### **Calling all EM Residents and Fellows: Submit an Abstract to *Annals of Emergency Medicine***

Now in its 18<sup>th</sup> year, the Residents' Perspective section in *Annals of Emergency Medicine* is made up entirely of articles written by emergency medicine residents and fellows. The purpose of the column is to create a forum for the discussion and analysis of topics affecting trainees in emergency medicine. They are written as informative instructional pieces, educational research, referenced position papers, or unique resident perspectives on current emergency medicine topics. To see prior articles, please go to [www.annemergemed.com](http://www.annemergemed.com). Then, under "Collections," click "Residents' Perspective."

#### *Invitation*

I would like to invite you to **submit an abstract** outlining the background and significance of the topic to emergency medicine residents. Authors of promising abstracts will be invited to submit a full manuscript for peer review. Below is a list of themes that we are particularly interested in for this year:

- Either primary research or information about research using methods other than comparative statistics as it relates to establishing evidence-based practice guidelines
- Future of the practice of emergency medicine, including but not limited to the future of the role of the emergency department
- Gaps in emergency medicine training
- Disparities in emergency medicine, academic emergency medicine, and delivery of emergency medical care

#### *Instructions*

Abstracts are limited to 300 words and should be double-spaced. Submit your abstract to [annalsfellow@acep.org](mailto:annalsfellow@acep.org). Email subject should read "Resident Perspective Submission – author's last name." Invited manuscripts will undergo the same peer review process as all other submissions to *Annals*. More information for authors can be found on the *Annals of Emergency Medicine* Web site at [www.annemergemed.com](http://www.annemergemed.com). Under "For Authors," click "What categories of articles does *Annals* publish?" Then, search for the "Residents' Perspective" under the "Other" subcategory.

Sincerely,

Nupur Garg, MD  
 Editorial Board Resident Fellow, *Annals of Emergency Medicine*  
 PGY-4, Mount Sinai Emergency Medicine Department