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From Suspicion of Physical Child Abuse to Reporting: Primary Care Clinician Decision-Making

Emalee G. Flaherty, MD^{a,b}, Robert D. Sege, MD, PhD^c, John Griffith, PhD^d, Lori Lyn Price, MS^d, Richard Wasserman, MD, MPH^{e,f}, Eric Slora, PhD^e, Niramol Dhepyasuwan, MD^{e,g}, Donna Harris, MA^e, David Norton, MD^h, Mary Lu Angelilli, MDⁱ, Dianna Abney, MD^j, Helen J. Binns, MD, MPH^{a,b,k}

^aDepartment of Pediatrics, Children's Memorial Hospital, Chicago, Illinois; Departments of ^bPediatrics and ^cPreventive Medicine, Feinberg School of Medicine, Northwestern University, Chicago, Illinois; ^dDepartment of Pediatrics, Boston Medical Center and Boston University School of Medicine, Boston, Massachusetts; ^eBiostatistics Research Center, Tufts-New England Medical Center, Boston, Massachusetts; ^fPediatric Research in Office Settings, Department of Research, American Academy of Pediatrics, Elk Grove Village, Illinois; ^gDepartment of Pediatrics, University of Vermont College of Medicine, Burlington, Vermont; ^hContinuity Research Network, Ambulatory Pediatric Association, McLean, Virginia; ⁱHolyoke Pediatric Associates, Holyoke, Massachusetts; ^jChildren's Hospital, Wayne State School of Medicine, Detroit, Michigan; ^kCambridge Pediatrics, Waldorf, Maryland; ^lMary Ann and J. Milburn Smith Child Health Research, Children's Memorial Research Center, Chicago, Illinois

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What's Known on This Subject

Primary care clinicians have responded in written surveys that they do not report all suspected child abuse to child protective services. Their reasons for not reporting include a lack of certainty and a belief that they can intervene more effectively.

What This Study Adds

This is the first study to examine prospectively primary care clinician decision-making regarding child abuse, including how frequently they report suspected child abuse and the level of suspicion and other factors that influence them to report.

ABSTRACT

OBJECTIVES. The goals were to determine how frequently primary care clinicians reported suspected physical child abuse, the levels of suspicion associated with reporting, and what factors influenced reporting to child protective services.

METHODS. In this prospective observational study, 434 clinicians collected data on 15 003 child injury visits, including information about the injury, child, family, likelihood that the injury was caused by child abuse (5-point scale), and whether the injury was reported to child protective services. Data on 327 clinicians indicating some suspicion of child abuse for 1683 injuries were analyzed.

RESULTS. Clinicians reported 95 (6%) of the 1683 patients to child protective services. Clinicians did not report 27% of injuries considered likely or very likely caused by child abuse and 76% of injuries considered possibly caused by child abuse. Reporting rates were increased if the clinician perceived the injury to be inconsistent with the history and if the patient was referred to the clinician for suspected child abuse. Patients who had an injury that was not a laceration, who had >1 family risk factor, who had a serious injury, who had a child risk factor other than an inconsistent injury, who were black, or who were unfamiliar to the clinician were more likely to be reported. Clinicians who had not reported all suspicious injuries during their career or who had lost families as patients because of previous reports were more likely to report suspicious injuries.

CONCLUSIONS. Clinicians had some degree of suspicion that ~10% of the injuries they evaluated were caused by child abuse. Clinicians did not report all suspicious injuries to child protective services, even if the level of suspicion was high (likely or very likely caused by child abuse). Child, family, and injury characteristics and clinician previous experiences influenced decisions to report. *Pediatrics* 2008;122:611–619

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Key Words

child abuse, decision-making, childhood injuries

Abbreviations

PROS—Pediatric Research in Office Settings
 NMAPedsNet—National Medical Association Pediatric Research Network
 CPS—child protective services
 CARES—Child Abuse Reporting Experience Study
 PCS—Practitioner Characteristic Survey
 IEC—injury encounter card
 CA—child abuse

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Address correspondence to Emalee G. Flaherty, MD, Children's Memorial Hospital, 2300 Children's Plaza, Box 16, Chicago, IL 60614. E-mail: e-flaherty@northwestern.edu

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PHYSICIANS, NURSE PRACTITIONERS, and physician assistants are mandated to report suspected child maltreatment to child protective services (CPS) agencies in all 50 states. However, few of the ~500 000 reports of suspected physical child abuse (CA) to CPS agencies each year come from primary care settings.^{1–3}

National data on the frequency of presentation of children with CA injuries in primary care settings are not available. Primary care clinicians acknowledge that they do not report all cases of suspected CA to CPS.^{4–10} One of the most common reasons clinicians give for not reporting is lack of certainty that the child was abused.^{4–7} Studies also showed that some clinicians think that they can intervene more effectively than CPS.^{4–7,11} This belief suggests that clinicians have had negative experiences with CPS reporting, related to its impact on the child, the child's family, or

the clinician and practice. Prospective study of primary care clinicians' experiences with reporting of suspected physical CA can help improve our understanding of the factors that influence clinicians' decisions to report to CPS.

The nationwide Child Abuse Reporting Experience Study (CARES) prospectively examined primary care clinicians' decision-making about reporting suspected physical CA. On the basis of previous studies, we hypothesized that both clinician and patient/family factors would affect clinicians' suspicion and reporting of suspected physical CA.^{2,5-8,10,12-22} Participating clinicians provided data concerning children with injuries; therefore, CARES focused exclusively on physical CA. Neglect and sexual abuse, which often are found in the absence of an injury, were not addressed in the study. This report from the prospective CARES investigation addresses the following research questions. How frequently do clinicians report suspected CA? At what levels of suspicion do clinicians report? What factors influence reporting to CPS?

METHODS

Study Sample

Clinicians from 2 national practice-based research networks, that is, the American Academy of Pediatrics Pediatric Research in Office Settings (PROS) network and the National Medical Association Pediatric Research Network (NMAPedsNet), were recruited to participate. The PROS network includes 1941 clinicians in 712 practices, and NMAPedsNet includes 43 clinicians in 36 practices. Data were collected between October 2002 and April 2005.

Of the 1694 PROS and NMAPedsNet clinicians invited to participate, 511 (30%) agreed; of those, 434 (85%) completed the study. Data for this report were limited to the 327 clinicians (75%) who indicated that ≥ 1 child they evaluated had an injury suggesting physical CA.

Data Instruments

Data Relationships

The relationships between study measures are shown in Fig 1. All participating clinicians completed a survey describing their previous experience evaluating CA and provided data about each of up to 42 consecutive injuries.

Practitioner Characteristic Survey

The Practitioner Characteristic Survey (PCS) was based on previous surveys.^{5,7} The PCS collected information about the clinician's practice environment and CA-related experiences, attitudes, and education. Several items explored the clinician's experience with CPS, including ease of contact, professionalism, timeliness of investigator response, and CPS feedback. Practice-level factors included questions on availability of (1) professional resources (eg, an emergency department with pediatric specialists and hospital-based CA medical team/expert), (2) other pediatric clinicians (pediatricians, other physicians, or physician extenders) in the office, and (3) mental health professionals in the practice. Additional data about practice type (eg, pediatric group practice or hospital clinic) and location (suburban, rural, or urban) were obtained from the research networks.

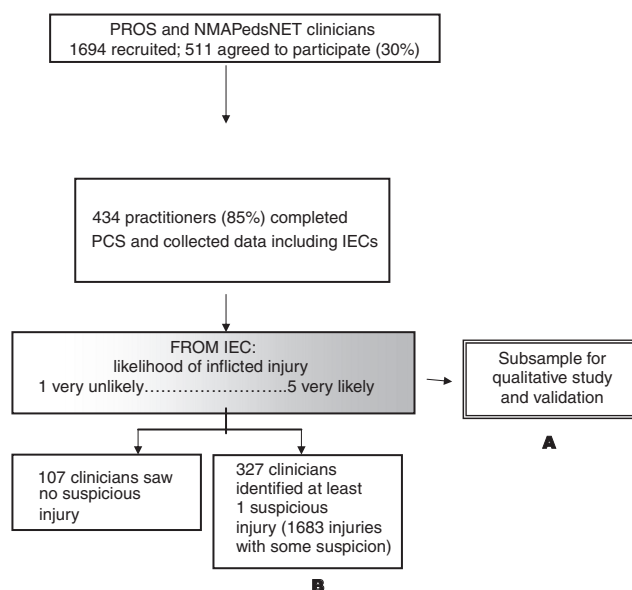


FIGURE 1

Plan for data collection and analysis. B indicates clinicians and cases analyzed in the report. The qualitative subsample A was used to identify rates of miscoding for statistical analysis.

Additional data about practice type (eg, pediatric group practice or hospital clinic) and location (suburban, rural, or urban) were obtained from the research networks.

Injury Encounter Cards

Clinicians completed an injury encounter card (IEC) (Fig 2) for up to 42 consecutive visits during which an injury was noted in the clinical record, including those not related to the chief complaint. Pocket-sized IECs were designed to minimize disruption to workflow and were modeled after those used in a pilot study.⁵ The closed-ended response items included 7 patient-related factors (gender, health insurance status [a proxy for socioeconomic status], race, ethnicity, age, general injury type, and referrals) and 7 decision-making factors (injury severity [using a 5-point Likert scale with 1 = very minor and 5 = very serious], familiarity with the patient and family, adequacy of history, social support, and other risks, clinician's assessment of suspicion of physical abuse, and clinician's decision regarding CPS reporting [yes or no]). The single item assessing the clinician's suspicion of abuse asked (with responses on a 5-point Likert scale, with 1 = very unlikely, 2 = unlikely, 3 = possible, 4 = likely, and 5 = very likely), "What is your level of suspicion that this injury was caused by physical abuse?"

Audit of Eligible Visits

A random sample of 17 clinicians from 10% of the practices completed a self-audit of all medical charts of children seen on a randomly selected day during the clinician's participation in CARES (a day on which an

injury was recorded). The audits were conducted in waves throughout data collection and were used to estimate the proportions of eligible visits that were captured during data collection. Nearly all eligible visits (41 of 43 visits; 95.3%) were enrolled, and 15 sampled clinicians (88%) reported no missing cases.

Informed Consent

The CARES study was approved by the American Academy of Pediatrics institutional review board, by the institutional review board of each investigator site, and by additional institutional review boards, as necessary, that were affiliated with clinicians' practices. The participating clinicians provided informed consent. Patient consent was not required because the clinicians were the subjects of the study and all patient information was completely deidentified.

Data Analysis

Response Rates and Study Group

CARES data included responses from 434 clinicians who completed a PCS and had ≥ 1 IEC. A total of 15 375 IECs were received, and 15 003 were analyzed. Reasons for exclusion of 372 IECs were as follows: 43 did not meet eligibility requirements (eg, the clinician included a child without an injury), 9 were missing primary outcome data, 92 involved children who had already been reported to CPS, 188 were from clinicians who failed to complete a PCS, and 40 were from a single clinician who reported that 13 children had very suspicious injuries but who refused to participate in study data verification or follow-up processes.

Data for this report were limited to the 327 clinicians (75%) who indicated they saw ≥ 1 child with a suspicious injury and the 1683 injury visits they indicated had some suggestion of CA. For the purposes of this study, "suspicion" was defined as any response other than very unlikely (ie, 1 on the IEC), because we considered that response the equivalent of no probability of abuse, with all other responses indicating some probability of abuse. This interpretation of suspicion was supported by the fact that some clinicians reported injuries to CPS for which they indicated an unlikely (response of 2) level of suspicion.

Data Validation

Data analyzed included some responses that were corrected during follow-up telephone interviews. The telephone interviews were conducted during a qualitative study of a subsample of CARES clinicians that examined the process of deciding whether to report a suspected case.²³ In addition, some follow-up calls were made to verify data that were missing or contradictory. During those calls, some clinicians stated that they had inadvertently entered very likely in response to the question regarding likelihood of physical abuse but actually had intended to enter very unlikely or had indicated very likely regarding other forms of maltreatment (eg, neglect). In such cases, the study team recoded the original response to the final response for analysis.

Analytic Methods

Statistical techniques were used to account for observed clinician coding errors and to adjust for uncertainty in the modeling process introduced because results were verified for only a subset of IECs. The confirmed data were used to develop estimates of the accuracy of suspicion and reporting. Statistical resampling methods were applied to the study data set to create 500 analytic data sets. Each data set included patients for whom outcome status was verified and some patients for whom such verification was absent, in a ratio proportional to the observed misclassification rates identified during telephone interviews. The estimates of SEs used in hypothesis testing and for confidence interval calculation reflect usual population sampling variation and variation between resampled data sets.²⁴ All analyses were repeated with each of the 500 data sets, and the results were combined. Analyses performed with the original unsampled data set validated the results for the adjusted samples, because the results were very similar. Additional information about the analysis is available upon request.

Separate models were created by using forward stepwise selection methods to determine associations with patient, clinician, and practice factors. A full hierarchical model for these data was not constructed, because the clinicians' assessments of patient risk factors (eg, domestic violence or parental drug use) reflected both patient-level characteristics and clinician training and experience. Therefore, the patient-level and clinician-level factors were unlikely to be independent. Logistic regression models were used in clinician-level analyses, with reporting of ≥ 1 case as the outcome. Generalized estimating equation models with adjustment for clinician and the clinician factors that were significant in the clinician models were used to assess practice-level factors. Generalized estimating equations with adjustment for potential clustering within clinician were used to explore patient-level associations.

To account for potential clustering of similar patients in a given practice, a case-mixture adjustment was used in both the clinician- and practice-level models. Five patient factors were chosen (race, ethnicity, insurance status, gender, and age [≤ 2 years versus older]). The proportion of each of these factors was calculated from the IECs separately for each clinician and was forced into all clinician- and practice-level models. For all models, analyses were performed to evaluate secular trends, influence of card order, and number of cards submitted.

For hypothesis testing, nominal statistical significance was set at $P \leq .05$. The univariate analysis significance criterion for entry of factors into multivariate analyses was set at .15. Analyses were performed by using SAS 9.1 (SAS Institute, Cary, NC).

RESULTS

Clinician, Practice, and Patient Characteristics

The majority of the 327 clinicians were female (56%) and white (89%). Most were physicians (88%). They practiced in 144 practices in 41 states; 59% were in

TABLE 1 Practice Characteristics for the 327 Clinicians in 144 Practices

Practice Characteristic	Proportion, %
Location	
Urban	37
Suburban	46
Rural	17
Resources available to help clinician decide whether injury was caused by CA	
Emergency department with pediatric specialists	49
Hospital-based CA team/expert	61
Other knowledgeable colleague	54
Mental health professionals, including psychiatrists, psychologists, and social workers	63
Other medical or surgical specialist	35
Observations of practice staff members	33
Providers on site and available to clinician during practice hours	
Other physician or physician extender	98
Mental health provider	26
Other practice staff member	14

pediatric group practices. Other practice characteristics are shown in Table 1. Only 15 of the 327 clinicians (4.6%) indicated that they had not reported all suspected abuse in their career.

The 1683 patients with suspicious injuries were mostly white (78%), and 58% were male. Their ages ranged from 0 through 17 years. Many patients (42%) were ≤ 2 years of age; 13% were treated for a fracture.

Clinician Reporting Patterns

Clinicians reported 95 (6%) of the 1683 suspicious injuries to CPS, with a maximum of 3 children reported by any individual clinician. Clinicians reported 73% of the children they considered likely or very likely abused and only 24% of the children they considered possibly abused (Table 2).

Factors Associated With Reporting/Not Reporting Suspected Physical Abuse

Clinician and Practice Factors

Differences between the 75 clinicians who reported ≥ 1 child with a suspicious injury and the 252 clinicians who did not are shown in Table 3. Multivariate analysis indicated that clinicians were more likely to report if they had previously lost a family as patients because the clinicians had reported to CPS and if they had not previously reported all suspected CA during their career

TABLE 2 Level of Clinician Suspicion According to Decision to Report to CPS

Management Status	Level of Suspicion, n (%)			
	Unlikely	Possible	Likely	Very Likely
Reported to CPS	7 (0.5)	34 (24.3)	25 (86.2)	29 (64.4)
Not reported to CPS	1464 (99.5)	106 (75.7)	4 (13.8)	16 (35.6)

The adjustment described in the text was used. The actual number of injury visits with some suspicion was 1683.

(Table 4). No practice-level factors were significantly associated with reporting of suspected CA, controlling for case mixture and clinician factors.

Patient Factors

Table 5 shows bivariate and multivariate analyses of patient-level factors related to reporting. The factors that seemed to influence decision-making most significantly were the injury not being consistent with the history and the patient being referred to the clinician because CA was suspected.

The multivariate model identified black race as a significant factor. Additional exploration found that the risk associated with black race was restricted to black patients with private health insurance. For this analysis, data were stratified according to health insurance; 31% of black children had private health insurance, as did 56% of children of other racial groups. Among children without private health insurance, the reporting rate for black patients (9%) did not differ significantly from the reporting rate for children of all other races (8%; relative risk: 1.14). For those with private insurance, the reporting rate for black patients was 6%, compared with 3% for all other races (relative risk: 2.11).

DISCUSSION

CA continues to cause significant morbidity and death. Clinicians who treat injured children may be in a position to identify suspicious injuries. This report describes clinical decision-making after the clinician has identified injuries that might have been caused by maltreatment and is the first to examine prospectively the factors primary care clinicians use to determine whether to report injury events to CPS.

Primary care clinicians do not report every child for whom they have any level of suspicion regarding physical CA, but they selectively report particular children. The clinician's level of suspicion for abuse was a strong indicator of whether the clinician would report a child to CPS. Injuries deemed unlikely to be caused by abuse were very rarely reported, and those with higher levels of suspicion were reported more frequently. Although clinicians have admitted in retrospective studies that they do not report all suspected abuse,^{2,4-7} the rate of nonreporting of injuries clinicians considered likely or very likely caused by abuse was much higher than that expected from PCS responses. We do not have an explanation for why a larger proportion of physicians reported injuries they indicated were likely caused by abuse, compared with injuries they indicated were very likely caused by abuse. Clearly, factors other than levels of suspicion play a role in clinicians' decision to report. Those factors are explored further in the accompanying article.²³

The data indicate that clinicians vary in how they judge the level of suspicion at which they should invoke the "reasonable suspicion" criterion that mandates a report to CPS. These prospective results confirm published results of clinician surveys. Levi and Brown²⁵ surveyed physicians about interpretation of the term "reasonable

TABLE 3 Characteristics of Clinicians Who Did Not Report a Suspicious Injury to CPS and Clinicians Who Reported a Suspicious Injury to CPS

	Clinicians Who Did Not Report Any Child (n = 252)	Clinicians Who Reported ≥1 Child (n = 75)	P
Demographic characteristics			
Male, %	47	36	.09
White, %	89	90	.70
Average age, mean ± SD, y	45 ± 9	46 ± 8	.31
Time since residency, mean ± SD, y	14 ± 9	15 ± 9	.47
Medical doctor or doctor of osteopathy, %	88	88	.97
CA experience			
Career experience, %			
Never seen abuse	7	2	
Did not report all suspected abuse	4	13	
Reported all suspected abuse	88	85	.03
Any CME in past 5 y, %	88	88	.98
Saw ≥1 child with injury suggesting CA in past 12 mo, %	49	70	.0015
Reported patient was protected from further abuse, %	62	75	.05
Family received intervention and parenting improved, %	48	58	.13
Because of report to CPS, child thrived in new environment, %	41	61	.002
Patient or family expressed appreciation that clinician had intervened, %	20	23	.51
Clinician lost reported family as patients, %	39	57	.007
Other patients heard about report and left practice, %	0	3	.99
Clinician spent many hours in court testifying, %	18	33	.008
Clinician was sued for malpractice, %	0	0	

CME indicates continuing medical education.

suspicion" in relation to reporting. Some respondents indicated that they needed to be very confident (90% likelihood of abuse) before reporting to CPS, whereas other respondents would report for low levels of suspicion (10% likelihood of abuse). Similarly, some physician respondents indicated that they would limit reporting to children for whom abuse was listed first in the differential diagnosis, whereas others would report if abuse appeared as far down as tenth on a list of possible diagnoses.

The clinician's decision to report suspected CA to CPS was primarily influenced by the patient's medical and social history and physical examination findings. The most important consideration for the clinician was the case history; if the injury was judged to be not consistent with the history or the child's development level, then the odds of reporting increased dramatically. This suggests that physician education has been somewhat successful; however, receipt of recent continuing medical

education on CA was not associated with reporting to CPS.

Severe injuries were more likely to be reported than minor ones, as reported previously.^{14,26} Previous studies noted that CPS was less likely to substantiate reports of less-serious injuries. We speculate that previous experience with this type of CPS response strengthens clinicians' decisions to filter their reports to cases for which they think CPS will take action. This approach may impede access to CPS services for chronically abused children with repeated minor injuries, which are often accompanied by emotional abuse and consequent long-lasting psychological and developmental harm.²⁷⁻³¹ Lack of referral for such services may result in missed opportunities to prevent escalation of the severity of the abuse, which may result in serious or fatal harm.^{32,33}

Among privately insured patients, black children were more likely to be reported. Other studies demonstrated varying results for child maltreatment reporting

TABLE 4 Univariate and Multivariate Analyses of Clinician Factors Influencing Reporting

Characteristic	n (%)	Proportion Reported, %	Univariate Analysis ^a		Multivariate Analysis ^b	
			OR (95% CI)	P	OR (95% CI)	P
Lost family reported to CPS as patients	140 (43)	57	2.0 (1.1-3.9)	.03	2.1 (1.1-4.1)	.03
Did not report all suspected CA in whole career	15 (5)	13	3.4 (1.0-11.6)	.05	3.6 (1.1-11.8)	.03
Saw ≥1 case of suspected CA in past year	174 (54)	70	2.0 (1.1-3.5)	.02		

Analyses were adjusted for case mixture. OR indicates odds ratio; CI, confidence interval.

^a Reporting model was adjusted for clustering within a practice.

^b Analysis was adjusted for the number of clinician injury visits and for clustering within a practice.

TABLE 5 Evaluation of Characteristics Associated With Reporting of Suspicious Injuries

Characteristic	n (%)	Proportion Reported, %	Univariate Analysis		Multivariate Analysis	
			OR (95% CI)	P	OR (95% CI)	P
Black race	310 (19)	8	1.6 (0.9–2.9)	.1	2.5 (1.2–5.0)	.012
No private health insurance	816 (49)	8	2.5 (1.5–4.2)	<.001		
Patient referred because CA suspected	45 (3)	48	19.4 (9.8–38.4)	<.001	10.2 (4.1–25.3)	<.001
Unfamiliarity with patient	478 (28)	7	1.5 (0.9–2.5)	.11	2.0 (1.1–3.5)	.021
High injury severity (4 or 5)	171 (10)	13	3.2 (1.9–5.4)	<.001	2.9 (1.5–5.5)	.001
Not laceration	371 (22)	2	3.2 (1.5–6.7)	.002	5.3 (1.8–16.0)	.003
Tissue trauma	854 (51)	7	1.7 (1.1–2.6)	.013		
Injury not consistent with history	81 (5)	50	28.8 (16.2–51.0)	<.001	25.9 (12.0–55.7)	<.001
Several injuries	53 (3)	28	7.4 (3.6–15.4)	<.001		
No. of past injuries	68 (4)	17	3.8 (1.9–7.7)	<.001		
Parental delay in seeking care	130 (8)	13	2.8 (1.5–5.1)	<.001		
At least one factor besides injury not consistent	236 (14)	16	4.5 (2.8–7.2)	<.001	2.7 (1.4–5.1)	.003
Parents have little social support	102 (6)	18	4.4 (2.3–8.3)	<.001		
Parental history of drug or alcohol abuse	49 (3)	30	8.2 (4.0–16.6)	<.001		
Parent victim of abuse	37 (2.1)	43	15.0 (6.4–34.8)	<.001		
Concerns about parent/child interaction	87 (5.2)	28	8.4 (4.7–14.8)	<.001		
Previous CPS involvement	121 (7)	27	8.9 (5.4–14.5)	<.001		
No. of family factors						
0	1450 (95)	2.5	5.2 (3.9–6.9)	<.001	4.4 (2.9–6.7)	<.001
1	17 (1.1)	20.0				
≥2	67 (4.4)	36.7				

OR indicates odds ratio; CI, confidence interval.

rates for black children. According to data collected by the National Child Abuse and Neglect Data System, the rate for black children is almost twice those for white and Hispanic children (20.2 cases per 1000 children, compared with 10.7 and 9.5 cases per 1000 children, respectively).¹ A study showing that minority children had higher rates of abusive fractures also found that they were more likely to be evaluated and reported for suspected abuse than were white children with similar fractures.³⁴ Several other studies showed no overrepresentation of black children in substantiated and reported abuse.^{13,35–37} Our findings that there were no racial differences in reporting when families did not have private insurance suggest that, among clinicians treating patients of lower socioeconomic status, race does not influence clinician decision-making about reporting suspected CA. However, having private insurance seems to protect white children from being reported.

These data do not support previous findings that clinicians with previous negative experience with reporting perceive themselves as less likely to report suspected abuse.^{5,7} Instead, analyses suggested that clinicians were more likely to report suspected abuse if they had lost a family as patients as a result of reporting or if they had not reported all suspected abuse in the past. Gunn et al⁶ also found that clinicians who had reported more cases of CA or who had more experience testifying in child maltreatment cases indicated that they had not reported all cases of suspected CA in the past. Perhaps clinicians with more experience evaluating CA feel more confident both to report and to not report and may manage some suspected abuse by using alternative means.

Only 30% of the PROS and NMAPedsNet clinicians who were recruited agreed to participate, which is sim-

ilar to previous PROS studies.^{38,39} The completion rate was considered very good for a prospective study requiring busy clinicians to complete several forms and to collect prospective data. If clinicians who were more interested in the issues of CA participated and biased the study results, then our finding that many suspicious injuries were not reported is even more concerning.

Clinician coding errors regarding the level of suspicion were a potential limitation. If a small proportion of the ~13 000 visits coded as very unlikely to have been abuse related were in fact miscoded as having a high likelihood of abuse, then those few reports could potentially have important effects on analyses. When additional information was available, the study team recoded some cases and a statistical plan was developed and applied to account for the uncertainty introduced by potential participant error. Therefore, the data presented provide a conservative estimate of injuries not reported. It is possible that the original responses were correct and data corrections reflect a change in the opinion of the clinician after the patient visit or an effort on the part of the clinician to avoid discussing the decision not to report a suspicious injury.

CONCLUSIONS

Even when they suspected that an injury was likely or very likely caused by CA, clinicians did not report all suspicious injuries to CPS. This prospective observational study demonstrates that clinicians apparently apply various interpretations to the legal mandate to report when there is reasonable suspicion of CA. Reporting occurred more often as the level of suspicion increased. Why clinicians choose not to report is explored further in the accompanying article.²³ CARES results should facilitate

design of an intervention to assist primary care clinicians in identifying and optimally managing suspected physical CA.

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This is a report from the PROS network and the NMAPedsNet. The participating pediatric practices that agreed to be listed (45% of the participating practices either did not respond to a query about listing or asked not to be listed) are shown according to American Academy of Pediatrics chapter, as follows: Alabama: Physicians to Children (Montgomery); Alaska: Anchorage Pediatric Group (Anchorage); Arizona: Mesa Pediatrics Professional Associates (Tempe), Orange Grove Pediatrics (Tucson); California-1: Rowe, Maisel, Heath and Harvey (Greenbrae), Shasta Community Health Center (Redding), Pediatric & Adolescent Medical Associates of the Pacific Coast (Salinas); California-2: practice of Bharati Ghosh, MD, FAAP (Montclair), University of California, Los Angeles, West Los Angeles Office (Los Angeles), Inland Empire (Riverside); California-4: Southern Orange County Pediatric Associates (Rancho Santa Margarita), Edinger Medical Group (Fountain Valley); Colorado: Cherry Creek Pediatrics (Denver), Rocky Mountain Youth Clinics (Thornton); Florida: Giangreco, Scarano & Taylor Pediatrics (Bradenton), Atlantic Coast Pediatrics (Merritt Island); Georgia: The Pediatric Center (Stone Mountain); Hawaii: Children's Medical Association (Aiea), practice of Christine S. Hara, MD (Honolulu), Island Pediatrics (Hilo); Illinois: Fairview Pediatrics (Grayslake), Kidz Health (Chicago); Indiana: Jeffersonville Pediatrics (Jeffersonville); Kansas: Ashley Clinic (Chanute); Kentucky: Pediatric & Adolescent Medicine (Lexington), practice of Carl E. Smith, MD, FAAP (Harlan); Massachusetts: Baystate Pediatric Group (Springfield), Jonathan A. Benjamin, MD, and Roger W. Spingarn, MD, LLC (Newton Center), Northampton Area Pediatrics (Northampton), Pediatric Associates of Norwood & Franklin (Franklin), Holyoke Pediatric Associates (Holyoke), Tri-River Family Health Center (Uxbridge); Maryland: Shady Side Medical Associates (Shady Side), Children's Medical Group (Cumberland), Potomac Pediatrics (Rockville), practice of Steven E. Caplan, MD (Baltimore); Maine: Maine Coast Pediatrics (Ellsworth), Kennebec Pediatrics (Augusta), InterMed Pediatrics (Portland); Michigan: Kidz 1st Pediatrics (Rochester Hills), Orchard Pediatrics (West Bloomfield), Children's Health Care of Port Huron, PC (East China), Children's Hospital of Michigan (Detroit); Minnesota: Brainerd Medical Center (Brainerd); Missouri: Priority Care Pediatrics (Kansas City); North Carolina: Elizabeth Pediatrics (Charlotte), Eastover Pediatrics (Charlotte); North Dakota: Medical Arts Clinic-TMC (Minot), Merit-Care Medical Group-Pediatrics (Fargo); New Hampshire: Dartmouth-Hitchcock Clinic (Keene); New Jersey: Chestnut Ridge Pediatric Associates (Woodcliff Lake),

Delaware Valley Pediatric Associates (Lawrenceville); New Mexico: Albuquerque Pediatric Associates (Albuquerque), University of New Mexico Hospital (Albuquerque); New York-1: Lewis Pediatrics (Rochester), Elmwood Pediatric Group (Rochester), Outer East Side Health Clinic (Buffalo), State University of New York Upstate Medical University (Syracuse); New York-3: St Barnabas Hospital (Bronx); Ohio: Oxford Pediatrics & Adolescents (Oxford), Children's Choice Pediatrics (Stow), Pediatric Associates of Lancaster (Lancaster), practice of John DiTraglia, MD (Portsmouth), South Dayton Pediatrics (Dayton); Oklahoma: Norman Pediatric Associates (Norman), practice of Patrice A. Aston, DO (Oklahoma City), Shawnee Medical Center Clinic (Shawnee); Pennsylvania: Reading Pediatrics (Wyomissing); Rhode Island: Rainbow Pediatrics (Providence), practice of Marvin Wasser, MD (Cranston); South Carolina: Barnwell Pediatrics (Barnwell), Palmetto Pediatrics & Adolescent Clinic (Columbia); Tennessee: Plateau Pediatrics (Crossville); Texas: practice of Sarah L. Helfand, MD (Dallas), Winnsboro Pediatrics (Winnsboro), Building Block Pediatrics (Pleasanton); Utah: University Health Care (Salt Lake City), Mountain View Pediatrics (Sandy), Utah Valley Pediatrics (American Fork); Virginia: Pediatrics of Arlington (Arlington), Alexandria Lake Ridge Pediatrics (Alexandria); Vermont: St Johnsbury Pediatrics (St Johnsbury), Hagan & Rinehart Pediatricians (South Burlington), Pediatric Medicine (South Burlington); Washington: Harbor Pediatrics (Gig Harbor); Wisconsin: Gundersen Lutheran Pediatrics (La Crosse), Beloit Clinic (Beloit); Wyoming: Jackson Pediatrics (Jackson). NMAPedsNet practices (listed here by state) are as follows: Florida: Arlene E. Haywood, MD (Plantation); Maryland: Cambridge Pediatrics (Waldorf). The listing of participants' names does not imply their endorsement of the data and conclusions.

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