

# Improving Clinical Judgment in Abuse Case Finding

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Although child maltreatment has existed through human history, widespread, sustained attention to the problem of child physical abuse has only a 54-year history, after the 1962 publication of *The Battered Child Syndrome* by Kempe and colleagues.<sup>1</sup> Since then, all US states and many foreign countries have passed laws and developed systems to respond to reports of child abuse. Medical recognition of this phenomenon is reflected in an expanding medical literature; child abuse pediatrics has become a certified pediatric subspecialty (2005) with accredited fellowships (2007) and a board certification exam (2009). The field has evolved from a field of a few professionals identifying a few disturbing cases to one that has grown to be more systematic and driven by careful epidemiology and scientific study of both diagnosis and outcome. Berger et al's<sup>2</sup> "Validation of the Pittsburgh Infant Brain Injury Score for abusive head trauma" in this issue of *Pediatrics* adds an important step in this evolution of science by validating the importance of sentinel findings or "red flags" for abusive head trauma and a clinical prediction rule (CPR) that can guide clinicians in decisions about looking for occult intracranial hemorrhage when the history is not accurately presented and the risks are high.

That child maltreatment was only widely recognized as a problem in the 1960s is proof of the potential for maltreatment to go clinically unrecognized. Although intracranial injury might seem, on the face of it, to lead to obvious and immediate

impairment of function, ~30% of abusive head trauma is initially missed.<sup>3,4</sup> Even when abuse has been suspected, the clinical signs of intracranial hemorrhage may not be present in young children.<sup>5</sup> To decrease missed abuse, clinicians have been warned to be alert to socioeconomic risk factors, poor eye contact or abnormal affect by a child's caregiver, unreasonable delay in seeking care, or a history that does not match the injuries identified or the child's developmental stage. Although these factors have value, there are at least 3 problems with this more casual approach.

First, this approach misses abuse. Despite decades of awareness-building, injured children are commonly treated and discharged without recognition that their injuries are the result of abuse: often with serious or fatal outcomes.<sup>3,6,7</sup> Second, this approach results in widespread variability and racial and socioeconomic bias. Children in poor or African-American families disproportionately undergo testing for abusive injuries and are more likely to be reported to child protective services; white, affluent children are more likely to be victims of missed abuse.<sup>3,8</sup> Finally, a gestalt-based approach places an emotional burden both on the provider, who must wrestle with the decision of whether the person sitting across from them might have abused a child, and the caregiver, for whom the decision to pursue testing can rightly be perceived as a judgment.

CPRs are intended to aid in either the diagnosis or prognosis of clinical



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conditions.<sup>8</sup> CPRs specifically quantify elements of the encounter and use elements of the patient history, physical examination, and laboratory findings to estimate disease likelihood or guide intervention. CPR development requires 3 separate tasks.<sup>9</sup> First, one needs to identify meaningful clinical features as prospective variables to be included in a CPR. This process melds literature reviews, clinical experience, and expert consultation. Candidate variables are entered into a draft CPR, and statistical analysis (typically multivariate regression modeling) reveals which parameters should be included in the final CPR. Then, the proposed CPR is validated with an unrelated population of participants to ensure that the associations identified in the derivation step of the CPR are not because of a particular characteristic of the initial population or reflect chance. The third or next step is to assess the impact of a CPR on the clinical care and behavior of health care providers. This step may include quality improvement, practitioner or patient satisfaction, and even economic evaluations.

The study by Berger et al<sup>2</sup> had a goal identifying well-appearing infants, with no history of trauma, in the first year of life who could have an intracranial hemorrhage. Histories in children with acute head trauma are often absent; a feeding and smiling infant in the first year of life, with no neurologic abnormalities on exam, may still have a thin layer subdural hematoma and radiologic evidence of abuse.<sup>9</sup> In the Berger et al study,<sup>2</sup> cases and controls were classified by intracranial findings and selected from 3 different clinical centers. The gold standard for determining trauma was clear-cut and unequivocal. The scored factors

for the CPR included abnormality on dermatological exam, age >3 months, a head circumference above the 85th percentile, and a low hemoglobin. The new CPR was remarkable for its sensitivity in action (93%). Specificity was less exciting at 53%, meaning that a number of other children would still be imaged. Although there is widespread concern about the radiation exposure of children by pediatric head computed tomography, this study was not designed to address this issue. It was designed to identify children who would be missed in diagnosing an intracranial hemorrhage. Other work on the modality of computed tomography and imaging are needed to reduce the radiation burden involved in protecting children who have been or are suspected of being victims of abusive head trauma.<sup>10,11</sup>

This rule was designed for, and studied in, a population of well-appearing children with nonspecific presentations. Providers who appropriately choose to pursue testing for abusive injuries in children presenting with other concerning findings should not be deterred on the basis of a normal head size, young age, or a normal set of laboratories.

This CPR is an important reminder that young children can be victims of life-threatening abuse in situations with few clinical findings and that vigilance is still required to ensure that this form of abuse doesn't add to the burden of young child deaths.

#### ABBREVIATION

CPR: clinical prediction rule

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