



Clinical practice

Minimising bias in the forensic evaluation of suspicious paediatric injury

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ABSTRACT

In the rules of evidence in all legal jurisdictions, medical experts are required to maintain objectivity when providing opinions. When interpreting medical evidence, doctors must recognise, acknowledge and manage uncertainties to ensure their evidence is reliable to legal decision-makers. Even in the forensic sciences such as DNA analysis, implicit bias has been shown to influence how results are interpreted from cognitive and contextual biases unconsciously operating. In cases involving allegations of child abuse there has been significant exposure in the media, popular magazines, legal journals and in the published medical literature debating the reliability of medical evidence given in these proceedings. In these cases judges have historically been critical of experts they perceived had sacrificed objectivity for advocacy by having an investment in a 'side'. This paper firstly discusses the issue of bias then describes types of cognitive biases identified from psychological research applied to forensic evidence including adversarial bias, context bias, confirmation bias and explains how terminology can influence the communication of opinion. It follows with previously published guidelines of how to reduce the risk of bias compromising objectivity in forensic practices then concludes with my own recommendations of practices that can be used by child protection paediatricians and within an organisation when conducting forensic evaluations of suspicious childhood injury to improve objectivity in formulation of opinion evidence.

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1. Introduction: the issue of bias

Within the rules of evidence in all legal jurisdictions, medical experts are required to maintain objectivity when formulating opinion.¹ In the courtroom legal advocates use cross-examination to expose bias if it is present. In contrast to **explicit bias** which is part of a person's conscious awareness such as generalised assumptions based on age, gender or race, **implicit bias** is one that an individual holds without being aware, and is therefore more difficult to acknowledge or control.

Making decisions under conditions of ambiguity and uncertainty is fundamental to being a professional. Every evidence-based decision is fundamentally a risk decision.² How doctors respond to uncertainty in medical evidence will influence reliability of opinions given in legal settings. The lay person may erroneously assume

that science always holds definitive and reliable answers. It can be argued that science is a fluid concept, with new techniques and approaches evolving over time. Evaluating science is complex, challenging to test and at times difficult to convey to a lay audience. There is an inherent risk that opinions given in evidence may sound more definitive than they actually are and hence be less reliable to the tribunal of fact.

Failure to acknowledge uncertainties are a common failing of forensic disciplines. The report "Strengthening Forensic Science in the United States" published in 2009 recognised the problems of error in forensic evidence involving the forensic sciences.³ For forensic evidence to be admissible in criminal trials and be considered as reliable, depends on the extent to which the forensic discipline is founded on a reliable scientific method giving it the capacity to accurately analyse evidence and report findings.³ This report highlighted the issue that in particular, forensic disciplines relying on human interpretation could be tainted by error and introduce bias through the absence of sound operational procedures or robust performance standards.³ Bias and other cognitive influences unconsciously affect hard-working, honest and

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dedicated forensic experts, creeping in without the expert's awareness. This is a difficult and interesting problem and applicable across all forensic domains of medico-legal practice.

Forensic medicine is an interpretative science, which is less objective than analytical sciences such as DNA analysis. It requires the forensic expert to synthesise elements of experience, descriptive studies, clinical trials, meta-analyses and apply this knowledge to one patient to determine injury plausibility. In addition to scientific knowledge, clinical experience is also valued. Experts must recognise and manage uncertainty including conceptual uncertainty of central issues of injury causation then apply what is known to a concrete scenario. The scientific knowledge basis relevant to evaluating suspicious childhood injury is broad, spanning many disciplines including pathology, biomechanics, paediatric medicine, orthopaedics and radiology. Paediatricians have expertise in understanding disease in children, normal health and development and in the diagnosis of injuries in childhood.

In cases involving allegations of child abuse, judges have historically been critical of experts they perceived had sacrificed objectivity for advocacy by having an investment in a 'side'.^{4,5} Police have sometimes questioned the ability of a forensic physician assessing sexual assault victims to remain objective and not to overly identify with the victim.⁶

In high profile cases involving allegations of child abuse there has been intense media exposure debating the reliability of medical evidence given in these proceedings, and in particular the diagnosis of "shaken baby syndrome". Law review journals, popular magazines and online scientific forums have been devoted to publishing papers, articles and debates on this topic and in particular focused the spotlight on the possibility that the medical evidence relied on by the courts in successful convictions may be fundamentally flawed.^{7–10} Within published peer-reviewed medical literature there has significant attention and debate about biases presented by defense experts relating to what have been referred to as 'unique theories of causation' such as the Unified Hypothesis¹¹ and Temporary Brittle Bone Disease¹² which have lacked scientific support yet been offered as explanations for findings that are generally accepted as derived from inflicted trauma mechanisms.^{13–15} The biases of these experts are thought to be in the direction of concluding a natural explanation rather than objectively considering harm and have been subject to judicial rebuke.¹⁶

Media scrutiny involving allegations of child abuse have extended to Government Inquiries and professional regulatory bodies examining perceived biases in experts involved in these legal proceedings.^{2,17,18} In Ontario, Canada during the Goudge Inquiry, the Commissioner discussed what was referred to as a "think dirty" cultural practice amongst forensic pathologists, derived from having an excessive index of suspicion of child abuse during the investigation of unexplained infant deaths.¹⁹ Goudge considered this perspective biased the pathology opinions given in court proceedings. During the Inquiry the Commissioner heard from various experts of the unstable or uncertain knowledge in many of the key forensic issues relating to infant death. In contrast to the many Inquiries that had preceded it which had demanded professionals err on the side of safety, Goudge observed that such an approach may potentially generate unacceptable risks elsewhere in the legal process, and in particular risked miscarriages of justice.²⁰

2. Causes of bias: published research

2.1. Cognitive biases

In medical diagnosis, clinicians experience a cyclical interplay between pre-existing schema, which are the mental categories

constructed from experience and belief that provide the framework for perception, reasoning and uptake of new information.²¹ Medical curricula that is schema-structured, that is, grouped by relevant clinical and patho-physiologic variables, enables knowledge to be stored in a clinically relevant way.²² This encourages 'forward reasoning' based on clinical data rather than the less efficient and more unreliable 'backward reasoning' which starts with a hypothetical diagnosis then seeks clues in the history/examination to support it.²²

Generally speaking in medicine, cognitive errors that can lead to misdiagnosis include the following types:

Premature closure/anchoring: This involves failing to appreciate there is more to know before forming a view, possibly from faulty data gathering or failing to revise diagnosis in light of new information.

'Tunnel vision': This involves seeing an incident from a personal perspective or through a narrow lens.

Faulty context generation: Referred to as context bias, this refers to the significance of findings as dependent on the context it is thought to exist in. In Carol Jenny's landmark study of missed abusive head trauma (AHT) cases, Jenny found missed abusive head trauma was more frequent in children who were white or were insured, highlighting biases related to psycho-social contextual factors.²³ Other researchers have shown socio-economic status (SES) had more effect on paediatricians conclusion of abuse than race despite identical histories.^{24,25} Radiology is a good example of how context can alter findings. A forensic approach to reporting imaging should not take the alleged history into account but instead be restricted to identifying then interpreting radiological findings to construct a differential diagnosis of cause.

Flawed heuristics. This involves the "pattern recognition" approach to diagnosis which may be erroneous, over-inclusive and have inherent "blindspots" which may lead to diagnostic error (see Box 1- The Cognitive Continuum).

Box 1

The Cognitive Continuum.

Heuristics: mental short-cuts, sometimes referred to as "rules of thumb", used to arrive at a diagnosis, based on pattern recognition and experience. It is intuitive, influenced by recency, bypasses consciousness and may be error-prone due to inherent "blindspots". Heuristics are readily available, fast and most commonly used in clinical practice.

Hypothetico-deductive reasoning: development of a broad differential diagnosis. This diagnostic method is slower, more commonly used by novices and taught in medical pedagogy.

Typically, experienced clinicians flexibly use both intuitive and hypothetico-deductive methods for clinical reasoning.

Social drivers. The term "Groupthink" has been coined to represent a strong compulsion within certain groups to reach unanimous decisions. Although reaching a unanimous decision may be seen as useful, it is problematic when the goal to reach consensus compromises objectivity. This process clearly operates in jury decisions and has been identified as the cause of erroneous convictions.²⁶ Social drivers underpin the mechanism, such as feeling intimidated or wanting to conform or giving deference to those with perceived seniority/greater expertise.

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