

Pediatric Forensic Pathology as Forensic Science: The Role of Science and the Justice System

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INTRODUCTION

Pediatric forensic pathology is a field of forensic science. As such, it shares the frailties of many forensic sciences. Created by the justice system to serve its purpose, pediatric forensic pathology is an “uneasy partner” with that system. Although the law demands a single causal theory in order to attach responsibility for precipitating or aggravating a victim’s condition, science can never supply absolute theories; rather, it presents findings in terms of probabilities.¹ Hence, the uneasy relationship.

Probabilities can be supplied in terms that approach absolute certainty, and, on the scale of probability, forensic results in the relatively new field of DNA analysis represent the pinnacle. Nevertheless, even evidence of DNA analysis cannot be presented in terms of absolute certainty. As one moves down the scale, from approaching absolute certainty to uncertainty, it is ironic that the terms in which evidence is presented appear to become more certain. For instance, bite-mark comparison, which has been recently tested and the results presented in the scientific literature, has been shown to have a rather alarming rate of false positives (identification of the wrong biter when given more than one to compare

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¹ G.M. Chayko and E.D. Gulliver, *Forensic Evidence in Canada* (Aurora: Canada Law Book, 1999).

with a bite mark).² Bite-mark specialists regularly present their evidence in terms of “reasonable” or “high” degrees of medical certainty, even though the false positive rate would place this area of forensic science at the lower end of the probability scale.

This high level of certainty can also be discerned in certain areas of pediatric forensic pathology, such as in the theories of shaken baby syndrome and of metaphyseal fractures, as indicative of abuse. The experts opining on these areas more often than not present a degree of absolute certainty that the changes they observed could be caused by nothing else. Also of note is the increased number of experts required to further a theory at the lower end of the scale of probabilities. In a legal case engaging forensic pathology, a gunshot wound to the chest usually requires only a single forensic pathologist; in contrast, shaken baby syndrome apparently requires many more experts.

Pediatric forensic pathology has been presented as a highly specialized field that few practise, that few can do, and that requires the situating of the expert in a dedicated children’s hospital. Isolating this area of forensic pathology in a clinical setting may not be in the best interests of advancing science in this area. The closeness to teams of child abuse advocates may continue to introduce a level of error into the findings of the pediatric forensic practitioner. Clinical medicine has the treating of a patient as its core purpose, and “over-treating” is acceptable as long as the patient comes to no harm by it. Once the patient has died, this purpose is no longer of primary importance.

In Canada, wrongful convictions due to errors in forensic science have been dealt with retrospectively by public inquiries.³ Themes that have emerged from some of these

² M.C. Bowers, “Problem-Based Analysis of Bitemark Misidentifications: The Role of DNA” (2006) 159 *Forensic Science International* 104.

³ For example, the Kaufman Inquiry dealing with hair and fibre analysis at the Centre for Forensic Science, the Driskell Inquiry, dealing with hair analysis and other issues in Manitoba, and the Lamer Inquiry, which

inquiries are the lack of funding to do research, the lack of knowledge of how to deal with the areas of science in the justice system, and the lack of science in the forensic sciences. It may be time to address these core issues from a foundational point of view instead of continuing to address them only when they are found to be responsible for wrongful convictions to the point where they can no longer be ignored. The Inquiry into Pediatric Forensic Pathology in Ontario, unlike previous inquiries, is not dedicated to uncovering what occurred when a single individual was wrongly convicted. Rather, it has the potential to expose the possibility that many individuals were wrongly convicted.

This study situates the pediatric forensic expert in the broader realm of forensic science and the transformation that it is currently undergoing. An analysis of reported Canadian cases reveals some overriding themes in pediatric forensic pathology, the main ones being a need for defined expertise in the area, a need for experts to remain confined within their area of expertise when offering opinions, and the danger of utilizing an overabundance of experts in trials. The lack of scientific research in some areas of pediatric forensic pathology (and in forensic pathology in general); the issues of education and definition of the forensic expert in these cases; and, most important, the manner in which the courts utilize the evidence of these experts are all explored within the context of these themes. Also discussed is the importance of being forensic in the sense of producing evidence that is suitable for a court.

dealt in part with forensic pathology. Ontario, *The Commission on Proceedings Involving Guy Paul Morin: Report* (Toronto: Ontario Ministry of the Attorney General, 1992) (Commissioner Fred Kaufman); Manitoba, *Report of the Commission of Inquiry into Certain Aspects of the Trial and Conviction of James Driskell* (Winnipeg: The Commission, 2007) (Commissioner Patrick J. LeSage); Newfoundland and Labrador, *The Lamer Commission of Inquiry into the Proceedings Pertaining to Ronald Dalton, Gregory Parsons, Randy Druken: Report* (St. John's, 2006) (Commissioner Antonio Lamer).

THE PARADIGM SHIFT IN FORENSIC SCIENCE

In 2005, Saks and Koehler⁴ published an important review, based in part on earlier publications,⁵ on the changing nature of the forensic identification sciences. Until now, traditional forensic science has relied on the assumption of discernible uniqueness in matching such things as handwriting, fingerprints, tool marks, hair, tire marks, and bite marks. When there was no observable difference between two things, they were assumed to have been produced by the same person or object. As the authors state:

Although lacking theoretical or empirical foundations, the assumption of discernible uniqueness offers important practical benefits to the traditional forensic sciences. It enables forensic scientists to draw bold, definitive conclusions that can make or break cases. It excuses the forensic sciences from developing measures of object attributes, collecting population data on the frequencies of variations in those attributes, testing attribute independence, or calculating and explaining the probability that different objects share a common set of observable attributes. Without the discernible uniqueness assumption, far more scientific work would be needed, and criminalists would need to offer more tempered opinions in court.⁶

The onus on the other forensic sciences to move toward a new scientific paradigm has been driven by two things that have arisen directly out of the new science of DNA typing, according to Saks and Koehler: the discovery of wrongful convictions (the second-highest cause of which are forensic science errors),⁷ and the empirical nature of DNA typing itself.

⁴ M.J. Saks and J.J. Koehler, "The Coming Paradigm Shift in Forensic Identification Science" (2005) 309 *Science* 892.

⁵ See M.J. Saks, "Merlin and Solomon: Lessons from the Law's Formative Encounters with Forensic Identification Science" (1998) 49 *Hastings LJ* 1069.

⁶ Saks and Koehler, "The Coming Paradigm Shift," 892.

⁷ In their fact sheet on post-conviction DNA exonerations, the Innocence Project notes that lab error and junk science have played a role in 65 per cent of 210 of them. Information can be found at: <http://www.innocenceproject.org/Content/351.php>

An integral part of scientific testing is the estimation of error rates with the method used. Error rates allow the scientist, and the court, to objectively assess how likely an expert opinion given in a trial is to be true, or how closely it approaches the truth. Unfortunately, as Saks and Koehler point out, forensic scientists have not yet embraced this concept. Instead, when faced with a mistake, the forensic scientist attempts to distinguish between “method” error and “practitioner” error.⁸ As the authors also note, the source of error, if one occurs, is irrelevant; if an error is made, be it a false positive (where an incorrect match is made where there is not a match) or a false negative (where a correct match is determined to be a non-match), what follows from the result is the same. A mistake is a mistake, no matter the cause.

The diagnosis of the cause of death in forensic pathology is similar to the assumption of discernible uniqueness in other forensic sciences. If a decedent presents with a single stab wound to the chest that goes through the rib cage and penetrates the heart, and there are numerous litres of blood in the thorax and the person is dead, and no other disease or trauma is found, the probability that the cause of death was a stab wound is quite high. This determination is based on both the pragmatic knowledge that one cannot survive without one’s blood and the observation of the stab wound in the tissue. Usually a single cause of death will be supplied on the forensic pathologist’s report. If the same decedent presents in a decomposed or skeletonized state, where there are only two shallow nicks on two of the ribs that overlie the heart, the cause of death is no longer discernibly unique. Other soft tissue that may have shown disease or trauma is no longer present, the heart with its wound track is no longer present, and the blood is no longer identifiable as blood. Few forensic pathologists would supply a single cause of death on

⁸ Saks and Koehler, “The Coming Paradigm Shift,” 894.

their report in a case like this. The observable evidence that would allow a determination of the cause of death is not present. In order to supply a single cause of death, and thereafter be able to testify to it with something approaching absolute certainty, the assumption of discernible uniqueness must be fulfilled by utilizing the scientific method as outlined above in the quotation by Saks and Koehler. Some discussion on how this can be done will be offered below.

There are numerous areas in pediatric forensic pathology where we see the expert testifying with absolute certainty that a presumably pathological change (or collection of changes, such as “the triad,” i.e., subdural and retinal hemorrhages and brain injury caused by encephalopathy) must be due to a single cause, to the exclusion of all others. Further, this assumption of discernible uniqueness may be overapplied in cases where the evidence is telling the practitioner that there is no foundation from which to draw any conclusions; yet the practitioner “knows” (by some indefinable grounds, usually termed “experience”) that what the evidence suggests cannot be true, and therefore overinterprets this lack of a foundation. Practitioner error can include elements of observer effect and confirmation bias. Observer effect is defined as “an error of apprehension, recording, recall, computation, or interpretation that results from some trait or state of the observer.”⁹ Confirmation bias is defined as “the tendency to test a hypothesis by looking for instances that confirm it rather than by searching for potentially falsifying instances.”¹⁰ To date, when errors have been discovered in pediatric forensic pathology in

⁹ D.M. Risinger, M.J. Saks, W.C. Thompson and R. Rosenthal, “The Daubert/Kumho Implications of Observer Effects in Forensic Science: Hidden Problems of Expectation and Suggestion” (2002) 90 *California Law Review* 12.

¹⁰ *Ibid.*, 7.

Ontario, the error has been determined to be practitioner error as opposed to methodological error.

Very few published tests for practitioner error have to date been presented in the forensic scientific literature. A recent test of fingerprints identified a third source of error, which appears to be a species of confirmation bias in practitioner error. The authors define it as “in essence, epistemological problems that derive from the mechanisms of human cognition and the workings of the mind.”¹¹ This type of error occurs when practitioners are competent, well trained, and following procedures; and there is no methodological error due to equipment. In the study in which this type of error was defined, a group of experts on latent fingerprinting were presented with fingerprint pairs that they had previously either excluded or individualized. The experts did not recognize the prints. With the prints that were true exclusions, the examiners were told that the suspect had confessed. With the prints that were in fact individualizations, the examiners were told that the suspect was in police custody when the crime had been committed. The authors called this subtle, and routine, contextually biasing information. In approximately 17 per cent of the cases, the examiners changed their finding to match that of the context, thereby giving an incorrect result.

It is an accepted assumption that methodological error in forensic pathology can be minimized by utilizing a standard format or autopsy protocol. Practitioner error in the form of observer effect can be minimized by education and corrected by peer review. Practitioner error in the form of confirmation bias can be minimized by education in how

¹¹ I.T. Dror and D. Charlton, “Why Experts Make Errors” (2006) 56(4) *Journal of Forensic Identification* 600.

to apply the scientific method, and by undertaking scientific research. As for the cognitive source of practitioner error (or the third source of error):

[a]s with technological and instrumentation advances that improve their limits, accuracy, and levels of precision, so can human performance be improved with correct selection, training, and procedures. However, such endeavors need to be based on systematic and scientific research, and even then they will not totally eliminate human error of category three. Nevertheless, with such research, these errors can be drastically minimized, so minimized that although they are theoretically possible, they are in fact so very rare that de facto they do not exist.¹²

There is no reason why pediatric forensic pathology, or indeed forensic pathology in general, cannot evolve in the same way as the other forensic sciences. Indeed, it must do so, given its role in recent wrongful convictions.¹³

To date, errors in pediatric forensic pathology have largely been found to be due to practitioner error. However, the possibility that a practitioner will commit an error due to either observer effect or confirmation bias (or both) is exacerbated when there is methodological error inherent in the theory they are propounding. Therefore, it should be kept in mind that with all practitioner error comes the possibility of a measure of methodological error.

The law has responded to the need to utilize the scientific method in areas of expertise by fashioning tests for the admissibility of expert evidence. These tests will now be examined.

¹² *Ibid.*, 603.

¹³ *R. v. Mullins-Johnson* (2007) ONCA 720.

ADMISSIBILITY OF EXPERT OPINION EVIDENCE IN CANADA

In most common-law jurisdictions, the testimony of an expert witness is subjected to a test before it is allowed to be offered as evidence in a criminal trial. This test explores both the person proffering the evidence and the content of it.

In Canada, the admission of expert evidence in a criminal trial is derived from *R. v. Mohan*,¹⁴ and will depend on:

- 1 relevance to the case/issues at bar;
- 2 necessity in assisting the trier of fact;
- 3 a properly qualified expert; and
- 4 the absence of any exclusionary rule.¹⁵

Normally, the curriculum vitae of the expert will be canvassed and the expert will be invited to testify about a certain subject that is relevant to the case at bar, and in which he or she has particular and special knowledge and training. The subject must be one on which the trier of fact (the judge and/or jury) would require the assistance of an expert because the information is outside the knowledge of the trier of fact. Once the expert is qualified, and the testimony admitted, anything that is said by the expert is weighed, together with other evidence that has been given in the trial, when the trier of fact makes a decision in the case. A potential problem in allowing expert evidence under *Mohan* is that once the expert is qualified, even if he or she opines outside an area of expertise, the only remedy is the charge from the judge to give a questionable opinion less weight.

¹⁴ [1994] 2. SCR 9.

¹⁵ *Mohan*, *ibid.* at para. 17.

The scope allowed experts is quite broad, and it is rare that the court will find that they opined outside their area. This broad scope applies to the testimony of forensic pathologists, as well as most medical professionals and other forensic professionals, most notably psychologists. It is not uncommon for experts to opine on issues somewhat peripheral to their specific area of expertise, or indeed very much outside their area, yet the courts rarely limit this type of testimony. Given that it is often difficult to exclude an expert, particularly if he or she has authored a report that is central to the issue at bar, it may be time for the courts to re-evaluate this approach. Perhaps the subject matter on which the expert can testify could be tightly defined on voir dire; and/or the defence or Crown could rein in the testimony by objecting when it strays; and/or the issue of what weight to attach to opinion outside an area of expertise should be more carefully assessed. Of course, once a jury has heard the evidence, it may be difficult for them to discount it or give it less weight, even if instructed to do so.

Although lengthy, the following quotation from the Supreme Court of Canada's decision in *R. v. Marquard* is the authority on how to deal with opinion evidence outside the expert's area of expertise:

3 Opinion Evidence Outside the Area of the Witness's Expertise

The appellant submits that the judge erred in admitting opinion evidence given by experts outside their area of expertise and further erred by failing to instruct the jury that this evidence was to be disregarded.

Dr. Mian was qualified as an expert in child abuse and paediatrics. She was not qualified as an expert in burns. Nevertheless, she thrice voiced the opinion that the child had suffered a contact burn and not a flame burn. In cross-examination, she admitted that she was not an expert in burns or plastic surgery.

Dr. Campbell, who saw the child upon her arrival at Wellesley Hospital before referring her to the Sick Children's Hospital, was not qualified as an expert. He

acknowledged that he was not an expert on burns. He testified, however, that his experience led him to the conclusion that the child had suffered a contact burn.

Dr. Zuker was qualified to testify as to the nature or origin of burns. He went beyond this area of specialty to testify that passivity during a medical examination was characteristic of abused children.

The trial judge admitted this evidence. Although she accepted that the witnesses had gone beyond the area of expertise as qualified, she did not instruct the jury to disregard the opinions which went beyond the witnesses' areas of expertise. On the contrary, she invited the jury to place weight on these opinions, stating that opinions outside the expertise of the witnesses were "to be weighed along with all the other evidence." Defence counsel did not object to the witnesses' giving evidence in these areas. However, he strenuously objected to the judge's charging the jury that they could rely on the opinions outside the stated areas of expertise.

The problem raised in this case stems from the way the witnesses were qualified as experts. There is little doubt that they all possessed some special knowledge relating to the matters on which they testified, alleged to lie outside their expertise. While Dr. Mian and Dr. Campbell were not medical specialists in burns, there can be no doubt that as practising physicians they possessed an expertise on burns which is not possessed by the ordinary untrained person. Similarly, while Dr. Zuker was not qualified as an expert in child abuse, his long experience working with children who had been injured had no doubt given him a degree of expertise which is not possessed by the lay person. The only requirement for the admission of expert opinion is that the "expert witness possesses special knowledge and experience going beyond that of the trier of fact": *R. v. Béland*, 1987 CanLII 27 (SCC), [1987] 2 SCR 398, at p. 415. Deficiencies in the expertise go to weight, not admissibility. As stated by Sopinka, Lederman and Bryant, *The Law of Evidence in Canada* (1992), at pp. 536–37:

The admissibility of such [expert] evidence does not depend upon the means by which that skill was acquired. As long as the court is satisfied that the witness is sufficiently experienced in the subject-matter at issue, the court will not be concerned with whether his or her skill was derived from specific studies or by practical training, although that may affect the weight to be given to the evidence.

The problem in this case is that the witnesses were qualified more narrowly than their areas of expertise, or, in the case of Dr. Campbell, were not formally qualified at all. The proper practice is for counsel presenting an expert witness to qualify the expert in all the areas in which the expert is to give opinion evidence. If this is done, no question as to the admissibility of their opinions arises. But the reality is that counsel sometimes fall short of this ideal, or the questions and answers venture into territory which counsel had not at the outset foreseen. Similarly, witnesses called to testify to facts, like Dr. Campbell, may find themselves drawn into the realm of expert opinion; the line between the actions of an attending physician and the assessments underlying these actions is often less than clear.

Important as the initial qualification of an expert witness may be, it would be overly technical to reject expert evidence simply because the witness ventures an opinion beyond the area of expertise in which he or she has been qualified. As a practical matter, it is for opposing counsel to object if the witness goes beyond the proper limits of his or her expertise. The objection to the witness's expertise may be made at the stage of initial qualification, or during the witness's evidence if it becomes apparent the witness is going beyond the area in which he or she was qualified to give expert opinion. In the absence of objection, a technical failure to qualify a witness who clearly has expertise in the area will not mean that the witness's evidence should be struck. However, if the witness is not shown to have possessed expertise to testify in the area, his or her evidence must be disregarded and the jury so instructed.

This approach was adopted by the Ontario Court of Appeal in *R. v. Millar* (1989), 49 C.C.C. (3d) 193, at p. 218, where Morden J.A. (as he then was) stated for the court:

... it appears now, as it did at trial, that, assuming that medical witnesses may be competent to express an opinion with respect to the existence of child abuse, the only witness whose competency in this respect was and is challenged is Dr. MacMillan. In other words, even though some of the witnesses were not called experts in child abuse it appears to be accepted that they had sufficient expertise to express opinions on the subject. I do not question this. For example, it would appear that Dr. MacDonald, the paediatric radiologist, has had extensive experience in this field.

While I cannot approve of the procedure adopted at this trial, the fact that the witnesses all clearly possessed expertise sufficient to permit them to testify as they did leads me to conclude that allowing the jury to consider their evidence in its entirety does not constitute an error in law.¹⁶

It seems that even if an expert, particularly a medical expert, is not qualified in a specific area of medicine, if he or she has had some passing acquaintance with it, and opines upon it, the opinion will be allowed; and if any issue is raised, it will go only to weight. If the expert opines outside the area of expertise, then the court may decide that the expert was qualified too narrowly and will allow the opinion in any case. At present, there do not appear to be many remedies available to control the testimony of an expert.

¹⁶ *R. v. Marquard*, [1993] 4 SCR 223, 25 CR (4th) 1, 85 (CCC) (3d) 193. The Dr. MacMillan noted in *R. v. Millar* was a family practitioner and a coroner, whom the court found to be an expert in child abuse.

Allowing potentially problematic evidence outside the expert’s area of expertise to be made less so by cautioning the trier of fact to give it less weight may not always have the desired effect. As Binnie J. cautioned in *R. v. J.-L.J.*:

In the course of *Mohan* and other judgments, the Court has emphasized that the trial judge should take seriously the role of “gatekeeper”. The admissibility of the expert evidence should be scrutinized at the time it is proffered, and not allowed too easy an entry on the basis that all the frailties could go at the end of the day to weight rather than admissibility.¹⁷

The court in *Mohan* was dealing with a type of evidence that was described as “generally accepted,” in that it had been offered in Canadian courts in the past. Sopinka J., writing for the court in *Mohan*, did draw a distinction between this type of evidence and expert opinion evidence that advances a novel scientific theory or technique. He said (at para. 28) that, when novel scientific evidence is offered, it should be “subjected to special scrutiny to determine whether it meets a basic threshold of reliability and whether it is essential in the sense that the trier of fact will be unable to come to a satisfactory conclusion without the assistance of the expert.”

In *J.-L.J.*, Binnie J., writing for the court, outlined the following factors to be considered when novel scientific evidence is offered (derived from *Daubert v. Merrell Dow Pharmaceuticals Inc.* 509 U.S. 579 (1993) at 593–94):

- 1 Whether the theory or technique can be and has been tested;
- 2 Whether the theory or technique has been subjected to peer review and publication;
- 3 The known or potential error rate or the existence of standards; and,

¹⁷ [2000] 2 SCR 600 at para. 28.

4 Whether the theory or technique used has been generally accepted.

Binnie J., in *R. v. J.-L.J.*, reiterated the concerns from *Mohan* as a basis for having more stringent requirements in allowing novel evidence into a trial:

The law in this regard was significantly advanced by *Mohan*, supra, where Sopinka J. expressed such a concern at p. 21:

Dressed up in scientific language which the jury does not easily understand and submitted through a witness of impressive antecedents, this evidence is apt to be accepted by the jury as being virtually infallible and as having more weight than it deserves.

and at p. 24:

There is also a concern inherent in the application of this criterion that experts not be permitted to usurp the functions of the trier of fact. Too liberal an approach could result in a trial's becoming nothing more than a contest of experts with the trier of fact acting as referee in deciding which expert to accept.¹⁸

Forensic pathology and pediatric forensic pathology are not considered to be novel science, and the test in *J.-L.J.* has never been applied to them. This is in spite of the fact that novel theories within the disciplines have been proffered in recent trials (the Rule of Three, and shaken baby syndrome, for instance).

There are very few examples of voir dire concerning medical evidence that illustrate the application of *Mohan* and *J.-L.J.*

In *R. v. Palombi*,¹⁹ an expert was offered for the defence to opine on birth defects, and pediatric bone disease, and specifically a condition called temporary brittle bone disease (TBBD). Under the reliability prong of *Mohan*, the court applied the criteria laid

¹⁸ *J. (J.-L.)*, *ibid.* at 499–500.

out in *J.-L.J.* and determined that the evidence about TBBD had no scientific foundation and had not been adequately tested, therefore making it unreliable, and, as a result, not necessary. The court further found that the expert was properly qualified, and might testify on other areas of pediatric genetic defects and bone disease. This is the only example of the application of the test for novel science that could be found in the reported case law.

In *R. v. Jamieson*,²⁰ a voir dire was held to determine if the expert was properly qualified under the third criterion of *Mohan*. Dr. Warren, a pediatrician, was proffered as an expert in child abuse and child injuries to the opposition of the defence. He was to testify on three fractures seen on a living victim, their time of occurrence, their cause, and the force required. The court qualified Dr. Warren as an expert in child injuries and on how such injuries occur, despite the fact that

Child abuse, from a medical perspective, is a developing area. There is no specialty designation in the profession....

and

There has been considerable interest in the study of child abuse over the past few decades for obvious reasons. This involves many different medical specialties. *The practical difficulty in research is that certain tests, such as for the force required to fracture a child's bones, cannot be done.* Further, many victims cannot verbalize their complaint or describe the event.

Verification, quantification and identification from a scientific perspective, is limited and perhaps impossible. Opinions as to causation are similarly qualified. Whether any other medical specialist can provide more definitive expertise in this area is unknown, at least on this voir dire.

The study of child abuse may be considered as an area of novel science. Science, however, is not rigid. New principles and techniques are a regular occurrence, as can be seen in the significant advances in the past few years in the area of D.N.A. testing.

¹⁹ [2004] OJ No. 3030; 2004 ON.C. LEXIS 4044.

²⁰ 2004 CanLII 10823 (ON SC).

Mohan, supra, does not reject opinion evidence merely because it involves a novel science.

There is no single standard for admissibility, unlike the American system, as noted by the learned authors Sopinka, Lederman and Bryant in “The Law of Evidence in Canada”, 1999 2nd. Edition, Butterworths at para 12.98. Introduction of opinion evidence is, therefore, permitted where there is a minimum reliability even though there is not yet a generally accepted methodology: see *R. v. J.(J.L.)* (2000), 148 C.C.C. (3d) 487 (SCC).

*Child abuse is not an area of study that has reached the level of being recognized as a specialization. As yet, there are no generally accepted standards regarding causation, for example, at least with respect to the evidence on this voir dire.*²¹ [Emphasis added.]

These limitations, it is noted, are to be used to determine the weight that should be attached to the proffered evidence.²² The judge in this case recognized that child abuse is an area of novel science, but did not take the opportunity to apply the test to it, although he signalled that, at minimum, factors 1 and 3 from *J.-L.J.* could not be satisfied by this area of expert evidence. Although his statements concerning the impossibility of scientific testing in the area may not prove to be true (this is discussed in more detail below), the fact that he held that child abuse is a novel science and does not satisfy all the admissibility criteria for a novel science, and that it lacks a scientific foundation in general, suggests that perhaps he should not have allowed it as an area of expertise.

This ruling is in sharp contrast to *Truscott (Re.)* some three years later, in which the Court of Appeal stated:

Before we summarize this evidence, we must comment on the evidence of the Crown’s expert, Dr. Spitz, who has been a forensic pathologist for more than fifty years. Dr. Spitz provided the opinion that Dr. Penistan’s determination that Lynne

²¹ *Jamieson, ibid.* at paras. 10, 15, 16, 17, 19.

²² *Ibid.* at para. 21.

Harper died by 7:45 p.m. is “admirably accurate” and rests on “solid scientific foundation”. It became abundantly clear during cross-examination, however, that the only basis for Dr. Spitz’s opinion was his own experience in conducting autopsies and his belief arising from this experience that if stomach contents are readily identifiable at autopsy, then death must have occurred within two hours of the last meal.

Dr. Spitz was unable to cite any recent scientific literature that would support this view. He refused to acknowledge obvious shortcomings in his opinion when these were pointed out to him in cross-examination. He refused to concede that his opinion rested on faulty assumptions and misperceptions of the available primary evidence in this case. These shortcomings could well explain why the Crown does not ask us to rely on his evidence other than in a few very minor respects. In the result, we have not placed any reliance on his evidence and we give it no further mention.²³

Similarly, in discussing the evidence of the forensic entomologist, the court stated:

Despite what would appear to be impressive credentials, Dr. Haskell tended to overstate the effect of his opinion. He was dogmatic and reluctant to admit obvious errors. He assumed an adversarial position as revealed in correspondence with the Crown that Crown counsel disclosed to the appellant’s counsel. Several critical elements of his opinion were based on nothing more than his purported experience, which could not be verified and was not supported by any empirical work. He was unable to demonstrate that his experience had been replicated by other scientists.²⁴

The court has clearly signalled that it will not accept evidence that is based on non-scientific “personal”-type beliefs and experience. That this type of experience-based evidence is from the realm of forensic pathology makes it particularly important in the context of this study. *Truscott (Re.)* sets a precedent for the rejection of any experience-based forensic pathology that has not been scientifically tested.

Recently, the Supreme Court of Canada opened the possibility of applying the entire test for novel scientific evidence to previously accepted evidence. In *R. v.*

²³ *Truscott (Re.)*, 2007 ONCA 575 at para. 165.

²⁴ *Ibid.* at para. 313.

Trochym,²⁵ the Court applied the test for novel scientific evidence to a type of evidence that had been accepted by precedent for more than 30 years. By applying this test, it held that the science behind the technique (in this case, hypnosis) was either highly inconclusive or “highly contradictory regarding the reliability of the science in the judicial context.”²⁶ Further, Deschamps J. reiterated (at para. 37):

J.-L.J. is particularly helpful for the purpose of drawing a distinction between the efficacy of hypnosis as a therapeutic tool and its utility as a forensic tool. As Binnie J. observed, techniques that are sufficiently reliable for therapeutic purposes are not necessarily sufficiently reliable for use as evidence in a court of law where an accused’s liberty is at stake (para. 37).

This has opened the door for lower courts to apply the test of novel scientific evidence to evidence that in the past had been accepted merely by precedent.

Another very important issue is highlighted by the quote above: the distinction between forensic and therapeutic tools. A similar distinction may exist between those experts in pediatric forensic cases who are forensically trained (the forensic pathologists) and the clinicians. As will be illustrated below, in many of these cases numerous clinicians (sometimes qualified as child abuse experts) are called to testify alongside the pathologist. The use of these diverse experts allows the courts not only to apply *Trochym* to the “science,” but also to apply *Mohan* more strictly, restricting the testimony of the non-forensically trained clinicians in the scope of their evidence. As will be shown below, the clinicians regularly opine on the cause of death of a child, although this would not be part of their clinical or therapeutic role. Their role is to diagnose and treat an

²⁵ [2007] 1 SCR 239, 2007 SCC 6.

²⁶ *Trochym*, *ibid.* at 61.

individual in an attempt to cure or save the person. The current broad standards for assessing weight derived from *Marquard* allow clinicians' opinions on cause of death, because they are physicians; but perhaps the standards should be revisited. Of course, if *Trochym* is applied to some of the theories in pediatric forensic pathology, such as shaken baby syndrome or metaphyseal fractures, as indicative solely of abuse, these theories may not meet the threshold of reliability, making the need for clinical experts moot.

FORENSIC EXPERTS

The term “forensic” can be defined as something that is used in, or is suitable to, courts of law or public debate.²⁷ This definition would allow any expert who practises in an area that has been utilized in a court of law, or is deemed by that expert (or someone else) to be suitable to a court of law, to call themselves a forensic expert. This use of the term, although by definition correct, can be misleading, when normally the term is used in conjunction with a particular area of specialty to mean a specialized area of expertise in an academic or professional sense. An example of this difficulty in terminology can be seen in *William et al. v. British Columbia et al.*,²⁸ which is a ruling on the admissibility of an expert's reports. The judge describes the expert as an anthropologist and ethnohistorian. He has been qualified in the case at bar and others as an “anthropologist and ethnohistorian specializing in the use of archaeological evidence, written documentation and oral traditions to reconstruct the past cultures of Aboriginal peoples, as well as the history of contact between Aboriginal peoples and European newcomers throughout Canada and parts of the United States.”²⁹ He is an adjunct professor in

²⁷ *Black's Law Dictionary*, 7th ed.

²⁸ [2006] BCSC 1427 (CanLII).

²⁹ *William et al.*, *ibid.* at para. 1.

archaeology and sociocultural anthropology at a major Canadian university and has published and taught in this area. The expert derives most of his income by testifying in trials and calls himself a forensic anthropologist.

Although he is offering his expertise to assist the court, the use of the title “forensic anthropologist” is misleading, since there is a specific area of anthropology that is called forensic anthropology, and this is not it. Very basically, “forensic anthropology is the application of the science of physical anthropology to the legal process.”³⁰ The knowledge base, education, and experience of a sociocultural anthropologist/ethnohistorian and a physical anthropologist have few parallels. Physical anthropologists study skeletal remains and fossils or living non-human primates, while sociocultural anthropologists study the culture of groups of humans either in the past or the present. The trier of fact in this admissibility hearing declines to recognize the expert as a forensic anthropologist, perhaps recognizing that the term “forensic anthropologist” has another meaning, and perhaps relying on the more specific definition of forensic as that evidence arrived at by scientific means (see below). He remains an anthropologist and ethnohistorian, and he is qualified as an expert in these fields.

In most cases, a forensic expert will offer forensic evidence in a court. Forensic evidence is defined as evidence used in court, *especially* evidence arrived at by scientific means, such as ballistic or medical evidence.³¹ The definition for scientific evidence is testimony or opinion evidence that draws on technical or specialized knowledge and

³⁰ This definition is taken from the website of the American Board of Forensic Anthropology, which is the only professional body that offers certification in forensic anthropology in the world. Accessed at: <http://www.csuchico.edu/anth/ABFA/>

³¹ *Black's Law Dictionary*, 7th ed. (“forensic evidence”).

*relies on scientific method for its evidentiary value.*³² Definitions for forensic medicine and forensic pathology usually include the term “scientific.”

Education, Qualification, and Certification of Forensic Experts

In Ontario, forensic experts utilized in the courts are usually drawn from the government agencies for which they work. When experts are offered by the defence, they most often work in the private sector or are self-employed (more often than not after having retired from government positions); and, in many areas of expertise, the only available individuals are non-local or foreign experts. In the United States, the situation is similar for the prosecution, but many more freelance experts are available for the defence.

Other Forensic Experts: Education and Training

In criminal trials in Ontario, the most commonly called forensic experts are forensic toxicologists, forensic psychologists, forensic biologists, and police forensic identification officers. The last would normally testify about fingerprints and blood spatter in addition to other areas. Forensic pathologists, chemists, document examiners, and numerous other forensic experts may also be utilized.

Forensic scientists (for example, biologists, chemists, toxicologists) are employed by the Centre for Forensic Sciences in Ontario, the provincial laboratory in Quebec, and regional RCMP labs in the rest of the country. The education and experience requirements for these experts are similar across the country and dictated by the government laboratory that employs the scientists. Usually, a bachelor of science is required; many labs require a master’s degree (two years), and upperlevel management

³² *Black’s Law Dictionary*, 7th ed. (“scientific evidence”), (emphasis added).

and section heads require a PhD. This takes a minimum of four years (undergraduate) and extends to many more for postgraduate work (from five to ten years). Once an individual is hired, one to two years of in-house training or an apprenticeship period follow before the scientist can produce reports and testify in a court of law; this period is controlled by the employer. In accredited provincial and national forensic laboratories, the education, training, and periodic reassessment of the scientists are necessary for the laboratory to remain accredited. Therefore, accreditation of the scientist is granted by the fact that the institution for which she or he works is accredited. Accreditation ensures that national standards are met. It also ensures consistency in the product that all accredited laboratories produce and among the experts offered to the judicial system. University education will take a minimum of six years, followed by a minimum of two years of forensic training, before a forensic scientist is allowed to testify in a case.

The requirements of police forensic experts will vary according to the police service that employs them. Many of the smaller police services in Ontario and across the country rely on provincial and RCMP labs, technologists, and scientists for their forensic work. Larger services, including the RCMP, the Ontario Provincial Police, and the Metropolitan Toronto Police, have their own forensic identification services (FIS). These services are largely utilized for evidence collection and documentation at crime scenes, but they will perform their own fingerprint and blood-spatter analysis, as well as other forensic identification examinations such as footprint and tire tread-pattern analysis. Many of the major police services in Canada give priority to an applicant with an undergraduate university degree. Some police services look for it in applicants to their FIS. Before applying to be an FIS officer, the individual must first be a police officer, with all the attendant training required (minimum one year), for three years and often

longer. Upon being accepted to an FIS unit, the officer undergoes initial internal training in forensic identification techniques, followed by a period of apprenticeship. In the RCMP, this period lasts for four years and includes a proscribed training protocol and internal examinations.³³ To be an expert in fingerprint identification and/or blood-spatter analysis, officers must undertake external courses and exams. These are controlled and proctored by national and international associations such as the International Association for Identification. In addition, most police services require officers to take periodic upgrading courses at national or provincial police academies. To become a forensic identification officer who can testify in court, a minimum of eight years of experience and training are required. In reality, it often takes longer than that; but, following education and basic police work, the forensic identification expert must train for four years before he or she can testify in a trial.

Forensic psychology requires individuals to have a PhD (usually a minimum of nine to ten years of study) and then five years of training or a recognized post-doctoral position before being eligible to write the American Board of Forensic Psychology exams required for U.S. certification.

Forensic anthropology requires at least three years of practising forensics after a PhD before one is eligible to apply to write the American Board of Forensic Anthropology examinations. The realities of application dates and committee meetings usually make this a five-year process, at minimum.

To be eligible to write the American Board of Forensic Odontology exams, an applicant must have a DDS (three years of an undergraduate degree plus a four-year

³³ G.S. Anderson, "All You Ever Wanted to Know About Forensic Science in Canada but Didn't Know Who to Ask!" (2007). Available at: <http://www.csfs.ca/contentadmin/UserFiles/File/Booklet2007.pdf>

dental degree, totalling seven years); attended four annual meetings of a national forensic or forensic dental organization (minimum four years post-DDS); and fulfilled a number of other requirements, including having undertaken 25 forensic dental examinations.³⁴

For the above three areas of forensic expertise – the most common – there are no Canadian certifying bodies. More important, the actual period of forensic training is a minimum of four to five years after the terminal degree before one is allowed even to sit for a certifying examination. It should be noted that not all practitioners in these areas in Canada have been certified by the American board, nor is there a necessity to do so at present. It should also be noted that there are “experts” in all these areas practising in Canada who do not have the minimum requirements outlined above, either in the area of formal education or in post-education forensic training.

Experts in Pediatric Forensic Pathology

By virtue of the title of “expert,” one would expect a pediatric forensic pathologist to have training and experience in both forensic pathology and pediatric pathology. Canada does not currently have a certifying body that offers training and exams for either pediatric pathology or forensic pathology, each of which is a subspecialty of anatomic pathology.³⁵

Prior to certification by a recognized examining body in any subspecialty in medicine, a number of steps must be followed. A minimum of an undergraduate university degree (four years) is required for entrance into medical school (four years), and then an area of specialty in medicine is undertaken. In Canada, the residency in

³⁴ Accessed at: <http://www.abfo.org/qualific.htm>

³⁵ For forensic pathology, see the notation at: <http://rcpsc.medical.org/information/index.php?specialty=417&submit=Select>

pathology (anatomic or general) demands an additional five years of post-graduate training, after which individuals write specialty examinations. The residency training programs and certification examinations are the responsibility of the Royal College of Physicians and Surgeons of Canada, and the American Board of Pathology in the United States. Once candidates are certified in a specialty, they must maintain their certification with ongoing education, training, and testing.³⁶ During the pathology residency in Canada, a minimum of two months' training in forensic pathology is required and a period of training in pediatric pathology is also necessary. However, this short exposure during the residency period is not considered subspecialty training.³⁷ Following the residency period, the specialist may opt to undertake training in a subspecialty. Forensic pathology and pediatric pathology are subspecialties. They require one year of training each at an approved facility that offers the fellowship training, at the end of which a subspecialty exam is written. Examinations following a year of training in forensic pathology or pediatric pathology are offered by the American Board of Pathology in the United States. For a number of years, it was possible to write the exam in forensic pathology without having done the year of training, but that is no longer possible. Another available subspecialty examination in forensic pathology is offered by the Worshipful Society of Apothecaries of London in the United Kingdom. Although there is no training component, the exam includes a written and oral/practical part, as well as a dissertation that consists of actual reports on post-mortems performed by the candidate

³⁶ A summary of the pathology residency and the responsibilities of the Royal College of Physicians and Surgeons of Canada in it may be found at:

<http://www.pathologytraining.org/frontMatterPDF/CertCanFM.pdf>

A similar document for the American Board of Pathology may be found at:

<http://www.pathologytraining.org/frontMatterPDF/CertUSFM.pdf>

³⁷ Specifics of training and accreditation in pathology in Canada may be found at:

<http://rcpsc.medical.org/information/index.php?specialty=202&submit=Select>

and a discussion of the findings. The certification awarded is Doctor of Medical Jurisprudence (DMJ (path)). This title can be added to the qualifications following a physician's name. The U.S. subspecialty certifications offer no title.

To hold the title of pediatric forensic pathologist by virtue of having written and passed examinations, an individual's education and training would require 15 years (four years of undergraduate study, four years of medical school, five years of residency, and one year each of forensic and pediatric pathology subspecialty training), with only one of those years consisting of forensic training and one of pediatric training.

In Ontario, certification is not currently required in order to practise forensic pathology.³⁸ There are no pediatric forensic pathologists in Canada who hold certifications in both pediatric pathology and forensic pathology. In the United States, in 2002, four individuals were certified in both these subspecialties.³⁹ Currently, seven individuals are certified in both subspecialties.⁴⁰

³⁸ The definition of who may perform forensic autopsies in Ontario is derived from *Guidelines on Autopsy Practice for Forensic Pathologists: Criminally Suspicious Cases and Homicides*, 2nd ed. (Ontario: Office of the Chief Coroner, October 2007), p. 5, as follows:

2.3. For the purposes of this document, a forensic pathologist will be defined as a legally qualified medical practitioner with: (i) postgraduate training and specialty certification (Royal College of Physicians and Surgeons of Canada, American Board of Pathology, or Royal College of Pathologists) in anatomical or general pathology, and (ii) a combination of training, experience, or certification in forensic pathology such as:

2.3.1. Postgraduate training or in-house/institutional mentorship in forensic pathology, or

2.3.2. Full-time employment or recognized experience as a forensic pathologist, or

2.3.3. Certification in forensic pathology by the American Board of Pathology, Royal College of Pathologists, Society of Apothecaries of London, or the Royal College of Physicians and Surgeons of Canada (pending at this time).

³⁹ H. Krous, President's Message, Society for Pediatric Pathology, *Newsletter*, Summer 2002. Available at: <http://www.sponline.org/nwsltr/02su.htm>

⁴⁰ Randy Hanzlick, "Options for Modernizing the Ontario Coroner System," in *Controversies in Pediatric Forensic Pathology and Models of Forensic Pathology and Death Investigation*, vol. 1 of Inquiry into Pediatric Forensic Pathology in Ontario, *Research Studies* (Toronto: Ministry of the Attorney General, 2008). Also available at: http://www.goudgeinquiry.ca/policy_research/pdf/Hanzlick_Options-for-Modernizing.pdf

Comparative Requirements Among Forensic Experts

Areas of forensic expertise are generally divided into two categories, very broadly defined as forensic science and forensic medicine. Forensic identification sciences would include the areas usually practised by the police in Canada (for example, scene collection of evidence, impression evidence, blood-pattern analysis) and those areas of investigation undertaken by the forensic laboratories (for example, DNA analysis, toxicology, questioned documents, firearms and ballistics, electronics). Leaving aside the years of formal education required – a necessity if one decides to pursue a career in the field in forensics – police forensic identification officers must have a minimum of four years’ forensic training before being considered an expert. Forensic laboratory scientists must have a minimum of two years’ forensic training before being considered an expert.

In the areas of forensic medicine, forensic odontologists must have at least four years of forensic training before they are allowed to write certifying exams. Forensic anthropologists require at least three years of forensic training to be eligible, and forensic psychologists require five years of forensic training.

These training periods are in sharp contrast to the training period for forensic pathology, which is one year. (The only other forensic specialty that would follow a medical degree is forensic psychiatry, which also requires a subspecialty training period of one year post-residency.⁴¹) However, the contrast in years spent training in forensics between forensic pathology and the other forensic sciences is not so apparent when other factors are taken into account, specifically the quality of the training.

⁴¹ Information on the requirements for sitting the board examination in forensic psychiatry offered by the American Board of Psychiatry and Neurology Inc. may be found at: <http://www.abpn.com/fp.htm> The Royal College of Physicians and Surgeons of Canada does not offer a subspecialty in forensic psychiatry.

The fellowship training year in forensic pathology (or pediatric pathology) is administered by a long-standing oversight and educational body that is responsible for all aspects of medical training. The curriculum is set, the institutions that offer the fellowships are known and supported, and the mentors are qualified to oversee the curriculum. The requirements for the program are clear, and the examination content is available before the individual sits for the exam. In other words, there is transparency in the requirements and the expectations. A board-certified fellow can be expected to have a minimum of training and knowledge no matter where he or she chooses to practise. In contrast (I will use forensic anthropology, since it is my area of specialty), the American Board of Forensic Anthropology⁴² was recently created for the sole purpose of certifying forensic anthropologists by a group of individuals who grandfathered themselves onto the board. There are no institutions that offer fellowship training, and no mentors available or suggested. There is no transparency with regard to the requirements for application (for instance, the expected content and format of forensic reports are not available on the website, nor are examples provided by the board members) or the content of the examination (no old exams are posted anywhere). Effectively, anthropologists must self-train and hope that they are doing so adequately in order to pass the exam. This is in contrast to a qualification offered by the Worshipful Society of Apothecaries in Forensic Human Identification;⁴³ the curriculum is outlined and indeed offered as a course by a participating university, and the thesis and exam requirements are posted on the website with copies of previous exams and theses. Arguably, the quality of a single year in a defined and mentored training program (such as a medical subspecialty) may outweigh

⁴² See <http://www.csuchico.edu/anth/ABFA/>

the quantity of a number of years of self-training. More important, a certifying body or specialty training program that publicizes its requirements allows the courts to more easily explore the qualifications of a proffered expert who holds them. In Ontario, however, some forensic scientists are now qualified (and have been in the recent past) to provide forensic pathology evidence without being certified or trained (as in a set program) in forensic pathology.

Experts Testifying in Pediatric Forensic Pathology Cases

Pediatric forensic pathology cases are defined here as those criminal cases in which the accused is being tried for the death of a child or infant, and in which an autopsy has been done because the death occurred under criminally suspicious circumstances.

In Ontario, when an adult dies in criminally suspicious circumstances, a forensic pathologist performs the post-mortem.⁴⁴ The forensic pathologist determines the cause of death, and the coroner determines the manner of death. Although mandated by legislation in Ontario, this distinction may not always make sense in criminally suspicious cases. A forensic pathologist is qualified to determine the cause and manner of death, but the coroner is not qualified to determine the cause of death. Forensic pathologists can be given coroner status.⁴⁵ The forensic pathologist seeks the assistance of other experts as he or she deems necessary. The most commonly utilized experts are the toxicologist,

⁴³ See

<http://www.apothecaries.org/index.php?page=27&PHPSESSID=377d986dfd0ba992c37d33ea0488a670>

⁴⁴ That a forensic pathologist, as defined at page 5 by the terms in the October 2007 *Guidelines on Autopsy Practice*, undertakes the post-mortem in these types of cases, is a relatively new standard. Not all jurisdictions will require that a forensic pathologist undertake the post-mortem.

⁴⁵ Other studies being presented to the Inquiry deal in more depth with this issue, which addresses the nuances of cause and manner of death statements and particularly how they can overlap when observations at a crime scene are incorporated into the statements. Further, a discussion of the medical examiner's system as compared to a medical coroner's system will engage this issue. There are at least two forensic pathologists in Toronto, of whom I am aware, who have been given coroner status, but these individuals do not practise as coroners.

forensic biologist, neuropathologist, cardiac pathologist, and, less often, the forensic dentist and forensic anthropologist. In addition, if the death occurred after a stay in hospital, the forensic pathologist may ask the coroner to obtain medical records from that stay to assist in determining the cause of death. These records may include reports from other specialists, most commonly a radiologist. It is usually exclusively the forensic pathologist who testifies in any resulting criminal trial – although other experts, who have some findings surrounding the cause of death derived from specialized testing of the victim’s remains, may occasionally testify as well. The defence seldom calls forensic experts in these cases.

In cases where a child has died, it is rare that the forensic pathologist is the only medical expert called to testify. Commonly, numerous medical witnesses are called. Often, these witnesses include all or many of the physicians who had any contact with the child prior to the child’s death. With adult deaths, by contrast, the forensic pathologist normally considers the reports of these other physicians in his or her autopsy report and, if found necessary, utilizes them in making conclusions. Most of the cases that engage numerous other experts are ones in which a novel or contentious cause of death is being considered. This is most often shaken baby syndrome. Given that the area being examined (shaken baby syndrome) is contentious, a number of dangers are associated with allowing numerous non-forensic medical experts to testify. Because these medical experts bring to the case a ready-made diagnosis that speaks to the ultimate issue, they are effectively qualifying a novel science without the science having to go through the legal test for qualification. In addition, this ready-made diagnosis is presented in absolute terms, with the highest degree of probability. Rarely is any other explanation entertained

for the observed pathological changes. Shaken baby syndrome signifies that someone shook the baby and that the cause of death is therefore a culpable act. Culpability or blameworthiness is usually reserved as an issue for the trier of fact to find. Utilizing other terms for this cause of death, for example, “non-accidental head trauma,” “abusive head injury,” or “inflicted head trauma,” does not remove the element of culpability.

Essentially, when a clinician who is an expert in one area – for instance, ophthalmology – testifies that the child exhibited shaken baby syndrome, he or she is testifying outside his or her area of expertise. When many of these clinicians testify in a case, which is the norm, the sheer number of opinions brings with it a danger of conviction by overwhelming saturation.

THE CASE LAW

Numerous reported pediatric forensic pathology cases in Canada and a selection of cases from the United States were considered for this research study. In general, the outcome of the case (whether the accused was found guilty or not guilty) was not usually decided on the basis of the medical evidence alone (as in keeping with the task of the trier of fact to weight *all* evidence accepted and presented). Nevertheless, the medical evidence generally forms a substantial part of the case involving a pediatric death.

These cases usually engage four general issues:

- 1 The cause of death is almost always attributed to shaken baby syndrome, or some type of non-accidental traumatic injury, or there is a negative autopsy (cause of death undetermined or unascertained). The negative autopsy may be said to be consistent with asphyxiation or consistent with homicide.

- 2 When the cause of death is given as shaken baby syndrome, the inquiry usually involves issues of timing of injuries (based on the presence of healing or non-healing of injuries) so that exclusive opportunity can be canvassed, and/or the story of the accused as to the demeanour of the child prior to death can be compared with the expected physiological response (usually alert and responsive vs in a coma).
- 3 When the cause of death is given as shaken baby syndrome, the issue of force necessary to induce the injury as being greater than that which could have occurred from a short fall is often included in the testimony. The force is often characterized as extreme or excessive, which allows for a theory of subjective intent to be placed before the trier of fact. If the subjective intent can be proven, the person can be found guilty of murder instead of manslaughter.
- 4 Often, numerous medical experts testify on behalf of the Crown, one of whom is not unusually an expert in child abuse.

In cases where a single pathologist, usually the forensic pathologist or pathologist who performed the post-mortem, testifies, the fact that the child died by unlawful means would be abundantly clear to a reasonable person by simply looking at the autopsy photographs. An example of this would be *R. v. E.B.*,⁴⁶ in which a five-year-old child died exhibiting physical signs of extreme starvation as well as numerous bruises, rashes, ulcers, and lice. In this case, both the pathologist who performed the post-mortem and a

medical expert in child nutrition testified. It is in the more complex and contentious cases where numerous experts testify.

As well as the four general issues noted above, practitioner error and advocacy on the part of both the forensic pathologists and the non-forensic experts can be seen in the cases.

Potential Sources of Error in Forensic Pathology

The Degree of Force Required

The issue of the force required to produce an observed injury is commonly canvassed in cases where there has been an assault or a death. The amount of force applied, or lack thereof, can be used to argue intent (*mens rea*) to inflict an injury or death, or illustrate that the accused would have known that the amount of force used could have inflicted an injury or death. In my opinion, there may be some cases in which some forensic experts may be able to opine on force, but these are far fewer than the reported cases would lead one to believe.

There are some examples of cases where the courts have attempted to limit opinion evidence on the degree of force required. In *R. v. Pengelly*,⁴⁷ the Court of Appeal dismissed the appeal on the conviction of murder. We hear of only one expert in the appeal: the forensic pathologist who performed the autopsy. The cause of death was “subdural and subarachnoid hemorrhaging caused by blunt force trauma to the head, consistent with open hand slaps. This resulted in swelling to the brain affecting the area of the brain that controls cardiac and breathing functions.”⁴⁸

⁴⁶ [2006] OJ No. 1864.

⁴⁷ [2000] OJ 3415.

⁴⁸ *Pengelly*, *ibid.* at para. 3.

One of the issues on appeal was:

- 10 The appellant also submitted that the trial judge failed to instruct the jury to disregard the portion of Dr. Rao's testimony that analogized the degree of force used by the appellant to that of a twelve story fall or a major motor vehicle accident. It was submitted that the expert had strayed beyond her field of expertise with the analogies and that the testimony should be inadmissible. They are not inadmissible. Any objection to these analogues goes only to weight and it was up to defence counsel to deal with the analogies either in cross-examination or in closing submissions or both.⁴⁹

Following *Marquard*, the court found that even if this type of evidence were outside the area of expertise of the forensic pathologist, it was still admissible. Defence counsel should have objected, and that objection, perhaps, would have caused the trial judge to instruct the jury to give the evidence less weight. The analogy to a 12-storey fall is extreme. Judicial instructions to the jury to give the analogy less weight may not have had the desired effect, since the analogy would have already been heard. The onus was placed on the defence to bring this issue to the judge's attention as well.

There is a scale of knowledge of force required to produce injury. Nearly irrefutable cases will be those that are, for instance, recorded in some way. Deaths that occur by GO or VIA Rail trains are now recorded by a camera on the front of the train. The speed at which the train was travelling when it hit the person is usually known, as is the weight of the train; therefore, the actual amount of force can be calculated.

Down the scale somewhat would be deaths that are witnessed by many people who recount the same sequence of events (such as seeing a person commit suicide

⁴⁹ *Ibid.* at para. 10.

from a busy city highway overpass, or witnessing a motor vehicle accident, or indeed being the emergency personnel who extricated the individual from the motor vehicle), which can be nearly irrefutable. If a number of similar incidents verified in this way are collected and published as a series in the literature, in order to illustrate some feature of them (perhaps the type of injuries normally sustained), then the publications can be relied on to a reasonable degree when opining on the amount of force required to produce injuries that are similar to those seen in the published examples. Some studies have used artificial or animal models to explain trauma experienced by humans; these would be similarly further down the scale. Sometimes the instrument that caused the life-ending injury will remain in the decedent (for example, a bullet or a knife). The amount of force necessary to cause the injury can sometimes be generally calculated through a knowledge of firearms and specifically the calibre of bullet (there will, of course, be some individual variation with firearms). What cannot be known are the variables; for example, intervening object, related angles of the weapon and the decedent, and the distance of the firearm from the decedent. (We can, however, make some assumptions about distance based on the presence or absence of gunshot residue in the wound, since the residue travels only so far before it disperses and can no longer impregnate the area of the wound.)

The scientific evidence of the force necessary to induce various traumatic changes in infants and children is minimal and confined to a few studies on primate models, infant cadavers, and some dummy and computer models,⁵⁰ or it is anecdotal information that is

⁵⁰ For more information on these studies see Stephen Cordner, et al., "Pediatric Forensic Pathology: Limits and Controversies," in *Controversies in Pediatric Forensic Pathology and Models of Forensic Pathology and Death Investigations*, vol. 1 of *Inquiry into Pediatric Forensic Pathology in Ontario, Research Studies*

not truly evidence-based. There are data available on the mechanism of injury in children that could possibly be used to test some of the proffered evidence on force required, but they should be carefully scrutinized as to origins prior to any data manipulation or interpretations.⁵¹ There is a need for more studies – both retrospective and experimental – on the force necessary, since the limitations on the methodology of the published studies suggest there is not enough reliable scientific data to form the basis for an evidence-based approach to the question of the degree of force and the effect of short falls on infants.

Dating or Aging of an Injury

The timing of injuries is often canvassed because it can provide the court with evidence of exclusive opportunity.

The court in *R. v. Clarke*⁵² summarizes some typical testimony when both fresh and older injuries are found:

The evidence of Dr. Chitra Rao provides a time frame in which the fatal injuries were inflicted. The skull fractures which collectively caused the death occurred at periods of time which encompass two possible time frames: zero to six hours, and three to 10 days before death. (Death was pronounced at 6:51 p.m. September 29, 1997 at the Hamilton General Hospital.) The diffuse axonal injury to the brain occurred 18 to 20 hours before death. Maliek would have been immediately comatose. He would not be capable of any activity. The pneumonia that Maliek suffered from had probably existed two to three days before death....⁵³

This type of information is often found in these cases, even when there is no older injury.

The timing of when the trauma occurred can be used to place the accused with the

(Toronto: Ministry of the Attorney General, 2008), ch. 2. Available at: http://www.goudgeinquiry.ca-policy_research-pdf-limits_and_controversies-cordner.pdf/

⁵¹ See <http://www.phac-aspc.gc.ca/injury-bles/chirpp/index-eng.php>

⁵² [2001] OJ No. 4629.

⁵³ *Clarke, ibid.* at para. 73.

decedent. The problem with this type of evidence is that dating the age of an injury is not at all precise.⁵⁴ Histologically (under the microscope), some degree of precision (hours to days) may be possible, depending on the type of tissue being assessed. This range of age of injury broadens when the material is being assessed grossly at post-mortem or during surgery and widens even more when only an X-ray or CT scan is being assessed. Aside from there being few recent studies on rates of healing, the variables that affect each individual's rate of healing may not be known in a specific case. More research needs to be done on general rates of healing and the factors that can affect them.

Practitioner Error Deriving from the Directive to “Think Dirty”

In *R. v. Seth*,⁵⁵ the forensic pathologist testified about the directive to “think dirty” as part of the *Protocol for the Investigation of Sudden and Unexpected Deaths in Children Under 2 years of Age*, issued by the deputy chief coroner for the province. The Pediatric Death Review Committee has existed since 1989, and recently a separate committee that investigates deaths under the age of two has been expanded to include deaths under the age of five years. These committees include coroners; pathologists practising in children's hospitals; forensic pathologists; pediatricians from various areas in the province; other doctors in children's hospitals; police officers; coroners' counsel; and some members of other child welfare organizations, including the Children's Aid Society.⁵⁶

⁵⁴ Cordner et al., “Pediatric Forensic Limits,” Appendix 5.

⁵⁵ [2001] OJ No. 2322.

⁵⁶ Information from *Report of the Pediatric Death Review Committee and Deaths Under Five Committee*, Office of the Chief Coroner, Province of Ontario, June 2007. Additional information about the history and membership of these committees was provided by Ms. Dorothy Zwolakowski, executive officer, Investigations, Pediatric Death Review Coordinator – Medical.

The child in *Seth* died in 1996. It is worthy of note that the trial judge carefully cautioned the jury about the pathologist's testimony, giving this directive:

He referred to Dr. Rao's evidence of the directive to "think dirty", and instructed the jury that it was their duty to consider the evidence objectively and to be impartial. He instructed the jury to question whether a scientist could maintain impartiality and objectivity if instructed by a superior to "think dirty". Given that there was evidence that death was caused by regurgitation leading to airway obstruction and asphyxia, he raised the issue of whether Dr. Rao's opinion that that was unlikely was tainted by the "think dirty" admonition. Finally he stated that it was his view that on the evidence there was a reasonable doubt as to whether the death was a homicide.⁵⁷

Another example of this directive to "think dirty" can be seen in the testimony of one of the pathologists in *R. v. M.T.*:⁵⁸

In his report, Dr. Smith described the cause of death as "undetermined". In cross-examination, he testified that he could not identify the specific cause of death with any certainty. In re-examination, he was asked whether he could exclude possible causes of death. Dr. Smith replied:

I don't have any evidence of natural disease to explain P.T.'s death. If I accept the history that you gave me, that is that he was seemingly well at even 7 in the morning and dead at 7:30 or in extremis such that he ultimately died a little while afterwards, if that's true - and here once again you understand how frustrating this is because I don't know. There's a whole series of things I don't know whether they're true or not true. *If that's true, then I have to regard P.T.'s death as being non accidental in nature unless an alternate credible explanation is given.* [Emphasis added.]

It is only by "thinking dirty," or presuming that the death is homicidal unless proven otherwise, that an undetermined cause of death can become a non-accidental cause of death, for if the expert was letting the evidence speak for itself, no "feeling" or

presumption would cloud or change the interpretation. This is an example of the type of practitioner error that results from the interpretation error of observer effect, combined with confirmation bias. A forensically trained expert should assume that an undetermined cause of death is not suspicious unless there is definite evidence that it is. A trained and experienced forensic expert should similarly not opine in court to this extent, where they are actually testifying to a different cause/manner of death than has been provided in their autopsy report.

It appears from the case that Dr. Smith may have decided that the cause of death was non-accidental because of the presence of three skull fractures on an X-ray. However, he did a second post-mortem on the child, and there is no indication that the presence of these skull fractures was confirmed by actually looking at the skull. The Supreme Court of Canada recently set aside the convictions in this case based on fresh evidence from two forensic pathologists, said to discredit the evidence of Dr. Smith.⁵⁹

In the recent case of *R. v. Mullins-Johnson*,⁶⁰ it was agreed by the two Crown pathologists and one of the defence pathologists that the victim had been sexually abused and suffocated. A reanalysis of the case demonstrated the following:

The fresh evidence shows that the appellant's conviction was the result of a rush to judgment based on flawed scientific opinion. With the entering of an acquittal, the appellant's legal innocence has been re-established. The fresh evidence is compelling in demonstrating that no crime was committed against Valin XXXX and that the appellant did not commit any crime. For that reason an acquittal is the proper result.⁶¹

⁵⁷ *Seth*, [2001] OJ No. 2322 at para. 71.

⁵⁸ [2004] OJ No. 4366 at para. 11.

⁵⁹ *R. v. Trotta* [2007] SCC 49.

⁶⁰ *R. v. Mullins-Johnson* (2007) ONCA 720.

⁶¹ *Ibid.* at para. 22.

No crime was committed. The cause of death is undetermined (not homicidal asphyxia), and there was no sexual assault or ongoing sexual abuse (the misinterpreted changes were artifactual in nature). This case appears to be another example of practitioner error due to a preconceived idea that the death was non-accidental when it was not.

Examples of this type of testimony specifically by a pediatric forensic pathologist are not limited to homicide cases, but can also be seen in some child custody cases. In *Children's Aid Society of the Region of Peel v. L.J.P.*,⁶² Dr. Smith testified on the cause of death of two of the respondent's children. With the first child, he reviewed the pathology report and some tissue from the autopsy where the cause of death had been determined as sudden infant death syndrome (SIDS). His opinion was that the cause of death was unknown. Since child abuse could not be ruled out (nor could it be proven), the death was reclassified as a sudden unexplained death (SUD).⁶³ With the next child, Dr. Smith did a second post-mortem, with the first post-mortem having established the cause of death as being undetermined. Although Dr. Smith concurred that there was no anatomic cause of death, he opined that the autopsy findings were consistent with an asphyxial cause of death. There is no apparent anatomical reason to present the cause of death in these cases as one of a potentially suspicious nature. This suggests practitioner error in the form of confirmation bias. The type of proceedings in which the evidence is presented should make no difference in the level of suspicion. Just because this is a child welfare case does not mean that the level of certainty that is required to make a diagnosis

⁶² 2003 CanLII 52513 (ON CJ)

⁶³ A SIDS cause of death carries with it a "natural" manner of death. Reclassification into a SUD changes the manner of death to undetermined, which leaves the door open for a criminal prosecution. The classification system used by the Office of the Chief Coroner is that of the National Association of Medical

should be lowered. The courts may utilize a different scale, but the forensic pathologist can only make a diagnosis based on scientific evidence, and the nature of that evidence does not change regardless of its purpose.

Introduction of Error Through the Use of Non-forensic Experts

Non-forensically trained medical experts often give evidence in child death cases.

Usually, there are many who are called in any one case.

In *R. v. Smith*,⁶⁴ the crown called ten medical witnesses, six of whom were doctors from the Hospital for Sick Children: a pathologist, a pediatric neuropathologist, a pediatric neuroradiologist, a pediatrician, a pediatric neurosurgeon, and a pediatric ophthalmic surgeon. The Court of Appeal stated: “*Six doctors from the Hospital for Sick Children were qualified to give opinion evidence relating to the cause of death. All six opined that severe shaking caused Katie’s death*”⁶⁵ [emphasis added]. With the exception of the pathologist, none of these doctors would normally give an opinion on cause of death in their daily practice. The defence called a pediatric pathologist who also had at his disposal a report prepared by a forensic neuropathologist who had made an independent examination of some of the tissues retained at autopsy. The defence testimony was that the child had died of natural causes arising from her significant medical problems due to prematurity.

The decedent in this case was born three months prematurely and suffered from numerous ailments that had kept her in the hospital for over two-and-a-half months after her birth. When released, she continued to suffer from sleep apnea (which also occurred

Examiners (Office of the Chief Coroner, *Report of the Pediatric Death Review Committee and the Deaths Under Five Committee*, 2007, p. 10).

⁶⁴ [2001] OJ 4981.

on her readmission to hospital with a pulmonary virus). One of the issues on appeal was that

the trial judge erred in allowing Dr. Mian, a Crown expert, to testify in a way that amounted to saying Mr. Smith is the type of person who would commit the alleged offence and as to the statistical frequency of non-accidental versus accidental head injury in children ...⁶⁶

The court held that the statistical evidence really should not have been given, but that it took up only half a page of transcript and was therefore not likely to have been used by the jury in assessing guilt. Dr. Mian suggested in her evidence that there was an 80 per cent chance that the child had been shaken. Similarly, the court allowed her evidence on the social risk factors that pointed to the accused as being at risk of shaking his child. The transcript does not reference which study the expert referred to in acquiring her data, but information such as this should be closely scrutinized as to methodology of data collection, source of data collection, and purpose of data collection. In addition, Dr. Mian is a pediatrician and, at one time, was director of the Hospital for Sick Children Suspected Child Abuse and Neglect (HSC SCAN) team. It is unknown if she is a psychologist, a social scientist, or a statistician. Although the court found that the prejudicial effect of the evidence was likely minimized by the brevity of it, the evidence was allowed, nonetheless. It does not necessarily follow that the brevity of the evidence would mean that the jury would not be influenced by it.

This case also illustrates the conclusiveness in presentation of opinion that has been seen in other cases where non-forensic medical experts testify:

⁶⁵ *Smith, ibid.* at para. 3.

⁶⁶ *Ibid.* at para. 6.

Dr. Alex Levin, a staff paediatric ophthalmic surgeon at the Hospital for Sick Children had examined Katie with an indirect ophthalmoscope at approximately 5:00 p.m. on March 22, 1994. He reported finding dot haemorrhages, swelling of the macula and possibly some bruising of the retina in the right eye, and severe, multiple dot and blot haemorrhages in the retina and some swelling in the macula of the left eye. He said the haemorrhages were not only in the posterior pole, but also throughout the retina. Although there are hundreds of causes of retinal hemorrhaging, he opined that, in light of their severity and nature, *only shaking* could account for the haemorrhages he saw.⁶⁷ [Emphasis added.]

This absolute statement of causation illustrates the assumption of discernible uniqueness that has been a feature in forensic science until recently, particularly those forensic sciences without an empirical foundation.

Another example of an absolute statement of causation by a non-forensic expert is seen in *R. v. Olsen*,⁶⁸ an appeal against conviction and sentencing by the parents of a six-month-old child who died as a result of acute pneumonia in the presence of rib and other unspecified fractures. The father had been previously convicted of aggravated assault on an older sibling. The appeal was advanced on issues of law, and there is little detail about the medical evidence. One issue is canvassed in the discussion on similar fact evidence that deals with shaken baby syndrome:

The trial judge's discretion to admit similar act evidence is entitled to deference on appeal, and I am not persuaded that the trial judge committed a reviewable error in the exercise of his discretion. The appellants' argument depends on drawing a distinction between two different kinds of shaking, but that distinction – and it is a hair splitting distinction at best – is not supported by the medical evidence. Dr. Mian, a paediatrician and head of the SCAN (Suspected Child Abuse and Neglect) team at the Hospital for Sick Children since 1984, gave extensive evidence about the cause of the injuries to Mikey Jr. and to Sara. In her opinion, both Sara's rib and bone injuries and Mikey Jr.'s neurological injuries were caused by violent or severe shaking. She refused to draw the distinction relied on by the appellants. *Her opinion that violent*

⁶⁷ *Ibid.* at para. 25.

⁶⁸ 1999 CanLII 1541 (ON CA).

*shaking was the mechanism in both cases was unaffected by the absence of brain injuries to Sara. She commented that Sara may have avoided brain injuries because she was older, may have had better neck control or stronger blood vessels, or may have been shaken in a way that resulted in less movement of her head.*⁶⁹ [Emphasis added.]

The conclusion that there was violent shaking in the absence of brain injuries is somewhat startling in view of the fact that at least two of the diagnostic criteria for shaken baby syndrome occur in the brain.

In *R. v. Katwaru*,⁷⁰ the Court of Appeal overturned a conviction of manslaughter on mistakes in law made by the lower court judge, none of which were specifically related to the expert evidence. The decedent in the case was a premature infant who remained in the hospital for two months after birth, and died approximately two months later. We are told of two medical experts in this case, in which there had initially been the possibility of either of the parents having exclusively caused the injuries to the infant. The cause of death was given as “massive brain damage from being shaken back and forth in an extremely violent fashion.”⁷¹ The testimony of the medical experts is summarized:

According to the pathologist, Dr. Taylor, the injuries to the brain likely occurred two days before the child’s death, three at the outside. He was unable to estimate with any degree of certainty the length of time between the infliction of the fatal injuries and the appearance of related symptoms in the child. Dr. Mian, on the other hand, an expert in child abuse from the Hospital for Sick Children, testified that the ill-effects from the severe shaking would have been apparent immediately and the child would not have functioned normally thereafter.⁷²

⁶⁹ *Olsen, ibid.* at para. 12.

⁷⁰ [2001] OJ No. 209.

⁷¹ *Katwaru, ibid.* at para. 12.

⁷² *Ibid.* at para. 13.

Although neither of the experts in this case is forensically trained, the pediatric pathologist declined to comment on the onset of symptoms from the observed changes in the brain. The pediatrician, however, definitively stated that the onset of symptoms would have been immediate, effectively giving absolute evidence to allow for a determination of exclusive opportunity. The clinical presentation of symptoms in a child purportedly shaken is contentious, and the literature does not appear to provide any scientific basis for its determination.

There appears to be a trend for non-forensic experts, those specifically qualified as experts in child abuse, to make absolute statements, particularly in regard to shaken baby syndrome.

The opinions of non-forensic medical experts have also been used to forward the theory of the force necessary. This information can be utilized to provide the subjective element that would make a charge of murder possible.

In *R. v. Shepherd*,⁷³ the Court of Appeal overturned the appellant's conviction for first-degree murder because, in his direction to the jury, the lower court judge had failed to relate the evidence of one of the medical experts to the issue of intent. The decedent in the case was a five-and-a-half-month-old infant who had been born 10 weeks prematurely and had remained in hospital for some time after birth. The pathologist's evidence concerning manner of death was:

Dr. Rao, the pathologist who conducted the autopsy of Mariah, concluded that she died from an episode of Shaken Baby Syndrome. The infant had bleeding on the surface of the brain, surrounding the optic nerve, and along the spinal canal all of

⁷³ [2001] OJ No. 1490.

which was consistent with Shaken Baby Syndrome. Dr. Rao was of the view that the incident that caused the injuries occurred from zero to four hours before the child became comatose. On the basis of the autopsy findings alone, Dr. Rao could not rule out drowning as a possible cause of death. In her opinion, however, the injuries were not consistent with the possibility that Mariah became unconscious because of near drowning and then was shaken in an attempt to resuscitate. The child's lungs were heavy and congested and contained fluid. It was Dr. Rao's opinion that the fluid was produced as a result of the injury to the child's brain.⁷⁴

In addition to the pathologist, the Crown also called an expert in shaken baby syndrome.⁷⁵ The following excerpts from the case report display some of the issues that are normally canvassed in these cases:

The Crown also called Dr. Huyer as an expert in Shaken Baby Syndrome. He agreed with Dr. Rao that the child died from Shaken Baby Syndrome. In Court, he demonstrated the force necessary to cause the injuries observed in the child. He held his hands extended fully in front of him and moved them back and forth rapidly more than four times. Dr. Huyer testified that a layman would recognize problems with a small child during a shaking incident....

Dr. Huyer testified that the child's injuries were not typical of those found in attempts to resuscitate following a near drowning....

As indicated, none of the treating medical staff had noticed anything unusual about the area around the anus. At the autopsy, however, Dr. Rao found a one centimeter area of bruising around the anus. In her opinion, the bruising was caused by rubbing action from a blunt object such as a finger or penis. While she could not say if there had been penetration by the object, there were no tears or fissures on the lining of the inner anal canal, indicating an absence of penetration. She estimated that the trauma that led to the bruising could have occurred up to six hours prior to Mariah becoming comatose. However, since the comatose state would retard the healing process, Dr. Rao thought it likely that the trauma occurred closer to the six-hour mark. Neither the rectal probe used at the hospital nor the plug in the kitchen sink could have caused the bruising observed at the autopsy. Dr. Huyer believed that the infliction of the injury that led to this bruise would have caused pain to Mariah and that she likely would have reacted by crying out and trying to pull away....

The similar-fact evidence:

⁷⁴ *Shepherd, ibid.* at para. 12.

⁷⁵ Dr. Huyer is a family practitioner and a coroner. At the time of the case he was a member of the HSC SCAN team.

Dr. Rao testified that she found evidence of a previous injury to the brain that may have been caused by shaking the infant. This injury occurred three to ten days prior to the death. She testified that the injury from the prior shaking was “not that great”. Dr. Huyer was of the view that the injury was at least seven days old and more likely fourteen days prior to the death. He testified that the old injury resulted from “extreme force” that would be recognized as potentially injurious to the child. There was also an area of old bruising on Mariah’s face behind her left ear.⁷⁶

Prior to a new trial being held, the accused pled guilty to manslaughter.⁷⁷ The accused had admitted to leaving the baby in the bath and finding her under the water and shaking her in an attempt to revive her. The anal bruise was explained by wiping the baby at a diaper change. The accused was released on time served.

This case is illustrative of a number of trends seen in these cases: a child abuse expert is called, the evidence given by said expert is potentially highly prejudicial (demonstration of shaking), exclusive opportunity is canvassed in the timing of injuries, and relatively innocent injuries are interpreted as being more sinister. This evidence is made all the more powerful when the forensic pathologist determines the cause of death to be shaken baby syndrome and provides a window of opportunity by dating the observed pathological changes. It is significant to note that the forensic pathologist could not rule out drowning because of the congested and fluid-filled lungs. This may have raised a reasonable doubt as to the cause of death had the child abuse expert not testified.

In cases where the pathologist calls the cause of death undetermined, the other medical experts may be equally unable to determine the cause of the observed pathological change. However, the sheer number of proffered inferences based on “suspicions” may tip the cause of death toward homicide.

⁷⁶ *Shepherd* at paras. 13–16.

⁷⁷ *R. v. T.R.S.* [2004] OJ No. 2639.

This phenomenon is seen in *R. v. Shields*,⁷⁸ a preliminary inquiry in which the accused was discharged from standing trial for second-degree murder. The pathologist who performed the post-mortem on the 11-month-old child determined that the cause of death was unexplained, based on his autopsy and a review of the medical history and medical records of the child. The neuropathologist agreed that the cause of death was unexplained, but opined that the cause of death was likely acute craniocerebral trauma. The ophthalmic pathologist, while leaving the door open to other interpretations of the observed retinal hemorrhages, stated that the most likely cause was “some rotational injury, the force of which would have to be considerable,”⁷⁹ and that he “‘didn’t think’ the findings in the eyes could help determine if the injuries were accidental or non-accidental but that they were certainly consistent with injuries from shaking.”⁸⁰ The attending pediatric emergency physician observed retinal hemorrhages but no other external injuries, and because he had suspicions about shaken baby syndrome (he testified that he “believes retinal hemorrhages are almost exclusively the result of ‘shaken baby syndrome’”⁸¹), he had an expert in child abuse examine the deceased infant:

Dr. Warren was asked for his opinion on the cause of death. He testified that in addition to examining the child at Emergency on February 18, 2003, he has reviewed the autopsy reports and has discussed the medical records for the child with Dr. Daisy Pavri, the child’s paediatrician. Dr. Warren’s opinion is that a rotational force was applied to the child both acutely, shortly before her death, and in the past, from within days to a couple of weeks before February 18, 2003. He testified that the pathologists’ findings are consistent with a shaken baby injury being the cause of death.

⁷⁸ [2004] OJ No. 3979.

⁷⁹ *Shields*, *ibid.* at para. 36.

⁸⁰ *Ibid.* at para. 37.

⁸¹ *Ibid.* at para. 15.

His opinion is, further, that the type of force required to cause what the pathologists found would be beyond what a normal reasonable individual would apply; not the type of force an infant would receive in normal activity or normal play.⁸²

The Crown based their theory that the accused had exclusive opportunity to injure the child on the testimony of Dr. Ramsay, but the court found that his evidence did not definitively explain the mechanism of death. In the result, even if it could be proven that significant non-accidental force caused the injuries, which in turn caused the baby's death, there was insufficient evidence that the accused applied the force. By the piling of expert opinion upon expert opinion, the case against the accused evolved from an undetermined cause of death to two episodes of shaking prior to death. The most certain opinion was proffered by Dr. Warren, a pediatrician who heads the child abuse team in London, Ontario. In the result, exclusive opportunity could not be demonstrated, so the accused was not bound over for trial.

A similar scenario is seen in a Saskatchewan case, where the accused was not only tried but also found guilty, and was only recently acquitted by the Court of Appeal. In *R. v. Schoenthal*,⁸³ six experts gave medical testimony for the Crown. The pathologist who performed the post-mortem was not called to testify. The Crown presented the attending general practitioner in the emergency room, a pediatrician, an ophthalmologist, a neurologist/neurosurgeon, a neuropathologist, and a family practitioner. The family practitioner was qualified as an expert in the assessment and treatment of injuries to children, including their causes, effects, and observable symptoms. The defence did not consent to the qualification of this witness. The court accepted her based on the fact that

⁸² *Ibid.* at paras. 19–20.

she was a member of a child abuse medical team; that she had reviewed in excess of 100 cases; and that she had interviewed the accused. The defence in the case called a forensic pathologist.

Based on the testimony of the medical experts, the court drew a number of conclusions, among which was:

iv) That the mechanism of injury leading to the brain injury described as the subdural hemorrhage and the massive retinal hemorrhages was consistent with and most likely resultant from shaking and not from any fall (as variously described by Dawn Schoenthal in providing Samuel's recent history of occurrences to various parties).⁸⁴

The Saskatchewan Court of Appeal has recently allowed the accused's appeal and acquitted the accused based largely on its review of the medical evidence.⁸⁵ The court found the following:

To restate the problem, in order for the trial judge to have entered the conviction as he did which he based upon the shaking, it must be shown that either the shaking itself or a subdural haematoma occasioned by the shaking was a substantive cause of Samuel's death. Dr. Courtney's evidence, since he was an ophthalmologist, did not speak to causation and did not purport to say that the retinal haemorrhages were caused by the March 17th shaking. Dr. Ruthnum said that the subdural haematoma contributed to Samuel's death, but he also was of the opinion that the subdural haematoma caused Samuel's seizure which led to his death. This again is not evidence which is consistent with the findings of fact of the trial judge. Dr. Buwembo and Dr. Robinson both indicated a potential for the type of shaking to cause injuries that Samuel displayed, but gave insufficient evidence to establish that the March 17th incident caused a subdural haematoma and whether that haematoma was one of the causes of death. There was confusion between the two haematomata, their ages and their causality sufficient that an analysis of all of the evidence fails to show a clear opinion by any expert that the shaking on March the 17th during the course of the seizure, was an effective cause. In some instances this is inconsistent with the theory

⁸³ [2006] SKQB 66 (CanLII).

⁸⁴ *Schoenthal*, *ibid.* at para. 81.

⁸⁵ *R. v. Schoenthal* [2007] SKCA 80 (CanLII).

about shaking causing a seizure. Further, all of the speculation on shaking, given the indeterminacy of the age of the injury Samuel suffered, could well have had reference to other incidents in Samuel's life. Those, however, were not the subject of this trial.⁸⁶

And:

In summary, it is my conclusion that the learned trial judge erred in concluding, as he clearly did, that there had been a "final diagnosis" as to the cause of Samuel's death, and that this diagnosis included the recent subdural hemorrhage as a cause. Neither report relied upon expresses that conclusion or any other conclusion as to cause of death. Nor does the *viva voce* evidence of Dr. Robinson support the view that his report should be interpreted as expressly identifying any cause of death. His oral testimony was that it was hard to say.⁸⁷

Perhaps the lower court judge was confused by the sheer number of experts. The case does not even say what the cause of death, as determined by the autopsy pathologist, was, and the autopsy pathologist was not called to testify.

In *Shields* the accused was discharged, and in *Schoenthal* the accused was acquitted on appeal. There are, however, cases similar to these, where numerous non-forensic medical experts testify, and the accused is found guilty in spite of the fact that the cause of death is undetermined at autopsy and the other experts base their opinions on untested "suspicions," while admitting they have a low degree of certainty as to the cause of the observed pathological change.

In *R. v. Pimmental*,⁸⁸ seven experts testified for the Crown: the autopsy pathologist, the neuropathologist, a radiologist, a pediatric neurologist, a specialist in pediatric medicine and infectious diseases, and two pediatric intensivists. The cause of

⁸⁶ *Ibid.* at para. 22.

⁸⁷ *Ibid.* at para. 186.

death was unascertained with a finding of cerebral edema. As to the cause of the cerebral edema:

The doctors could not offer an opinion on the cause of the cerebral edema with absolute certainty, but could offer an opinion on the probable or likely cause based on the history of the case.

In the case at bar, the Crown asked most of the medical experts to opine on the cause of the baby's death, setting out a hypothetical scenario based upon the appellant's statements to the police.⁸⁹

The appellant stated that he had placed his hand over the baby's mouth and held it there for some time, and all the Crown's medical experts agreed that this was the likely, or most likely, explanation for the child's death. The Court of Appeal upheld his conviction for manslaughter.

LATITUDE AND SCOPE OF EXPERTS IN PEDIATRIC FORENSIC CASES

In comparison with cases surrounding the admissibility of expert opinions in the broader forensic sciences in Canada, it would appear that medical witnesses are given a lot of latitude. As demonstrated in the cases above, medical doctors, although they may be highly specialized in their clinical fields, are allowed to testify on issues that one would assume are solely the responsibility of the forensic pathologist, such as cause of death and, in some provinces, manner of death. These experts also provide conclusive opinions, with a high degree of certainty, that are not supported by the current level of research in pathology or child abuse. In pediatric forensic pathology cases, these experts often opine

⁸⁸ (2000) MBCA 35 (CanLII).

⁸⁹ *Pimmental, ibid.* at paras. 59 and 60.

far beyond any areas on which the forensic pathologist who performed the autopsy would opine. In particular, they give evidence in those areas that are not yet supported by research, such as the degree of force required to inflict a certain type of trauma; or the period between the onset of a certain pathological change, or the receipt of actual trauma, and the exhibition of symptoms from it. In addition, they also give evidence that is outside their area of expertise by giving opinions that are not evidence-based.

In clinical medicine, an ophthalmologist would not be asked to set a complex fracture of a bone, since this is what an orthopedic surgeon is trained for. A neurosurgeon would not be called on to diagnose a mass on the large intestine, and a family practitioner would not be given a brain to dissect and assess. The skill-sets, the education, and the training are in specialized areas of medicine, which in most cases take five years post-medical school to acquire. (Family medicine takes less than five years.)

Shaken Baby Syndrome: An Evidence-Based Diagnosis?

In the bulk of the cases considered here, and indeed reported on, the medical issue is shaken baby syndrome (SBS). This cause of death or injury is clearly problematic or it would not appear so often in the case law, nor would it require so many experts to prove its existence. Current empirical research actually nullifies the claim that the diagnostic criteria for shaken baby syndrome (that is, the triad) are unique to shaken baby syndrome.⁹⁰ In most anecdotal publications, shaken baby syndrome is “proven” in one of two ways: either the accused confesses to shaking the baby, or the accused is convicted of shaking the baby. In neither scenario is there an independent, objective way in which to

⁹⁰ C.B. Looney, J.K. Smith, L.H. Merck, H.M. Wolfe, N.C. Chescheir, R.M. Hamer, and J.H. Gilmore, “Intracranial Hemorrhage in Asymptomatic Neonates: Prevalence on MR Images and Relationship to Obstetric and Neonatal Risk Factors” (2007) 242 *Radiology* 535

prove that the baby was indeed shaken. The current triad of diagnostic criteria for SBS are believed to have been “discovered” through this type of anecdotal fact-finding. As one admitted “anti–shaken baby” advocate puts it: “[T]he plural of anecdote is not data; the sum of ‘vast clinical experience’ may be knowledge but it is not science.”⁹¹ Hence, the preponderance of “scientific” publications proving the existence of shaken baby syndrome tends to be made up of case reports or case series. An example of a case series is a recent article whose authors studied a series of 12 infants who had been diagnosed as shaken babies with the purpose of proving that retinal hemorrhages can exist bilaterally. The summary of results is as follows:

Of the 12 patients evaluated at Penn State University, the age at presentation ranged from 6 weeks to 15 months, with an average age of 4.3 months. Six (50%) had bilateral intracranial hemorrhage, while 6 (50%) had unilateral intracranial hemorrhage. The six patients with unilateral intracranial hemorrhage all had ipsilateral retinal hemorrhages. The perpetrators were male (100%) and 11 (92%) were the babies’ fathers. For the five patients evaluated at Children’s Hospital of Philadelphia, the age at presentation ranged from 4 weeks to 1 year, with an average of 4.35 months. Three (60%) had bilateral intracranial hemorrhage and two (40%) had unilateral intracranial hemorrhage. The perpetrators were male in four (80%) cases and three (60%) were the babies’ fathers.⁹²

It is interesting to note that the clinical ophthalmologists who published the report found it important to include the sex of the perpetrators, and their relationship to the patient.

⁹¹ J. Plunket, “Shaken Baby Syndrome and Other Mysteries” (Spring 1998). Letter submitted to the *American Journal of Forensic Medicine and Pathology*. Available at: <http://www.portia.org/chapter08/mystery.html>

⁹² J.S.A. Arlotti, B.J. Forbes, M.S. Dias, and D.J. Bonsall, “Unilateral Retinal Hemorrhages in Shaken Baby Syndrome” (2007) 11 *Journal of the American Association of Pediatric Ophthalmology and Strabismus* 2, 175.

The results of this “study” are flawed from the very start because they are based on a foundation of confirmation bias. The authors believe and accept that the babies were shaken. The cause of the observed phenomena should be demonstrated empirically, utilizing scientific diagnostic criteria such as genetic tests, sensitive diagnostic imaging, and chemical tests. The question should be, under what circumstances are retinal hemorrhages observed? We may then get closer to the answer of what causes them. To do that, a random sample of children’s eyes must be observed after death, or a random sample of children presenting in the emergency room for any complaint should be assessed. In order to make it truly scientific, a child whose history cannot be objectively confirmed by other scientific diagnostic criteria should not be included in the study.

In some instances, an attempt is made to undertake a case control study, but doing so would presume a correct diagnosis of shaken baby syndrome. These studies typically have small numbers of cases. For example, a recent publication outlines a study that looked at “Mechanisms, Clinical Presentations, Injuries, and Outcomes from Inflicted Versus Noninflicted Head Trauma During Infancy.” The number of patients assessed was 54, with 11 of them determined to have inflicted head injuries. Numerous summary statements were made about the differences in the two groups.⁹³ Eleven is a very small subset of data from which to draw comparisons.

Retrospective studies are often used to provide information on incidence and risk factors for a particular disease. In turn, they allow epidemiologists and other researchers to develop strategies to deal with the disease in order to lessen future occurrences of it. Retrospective studies also provide numerous statistics derived from the calculation of

incidence and risk factors that do find their way into court in shaken baby cases.⁹⁴

Although retrospective studies and their statistics may be useful for a host of reasons, the data on which the statistics are calculated should be carefully assessed. In a large Canadian study on shaken baby syndrome, the inclusion criteria were outlined:

In this study, SBS was defined as any form of intracranial, intraocular or cervical spine injury as a result of substantiated or *suspected* shaking.⁹⁵ [Emphasis added.]

The inclusion of suspected shaking cases inflates the number of subjects in the study, which then affects all statistics derived from the study. There are already problems with substantiated cases, because they include those in which people confessed, or those in which the diagnosis of shaken baby syndrome was made by hospital personnel. The problems with confessions are well known.

All these types of studies are inherently flawed because they accept that the only reason for the observed change, or the phenomenon being studied, is shaken baby syndrome.

What would a more scientific study of the subject look like? In a recent study, a group of radiologists undertook a prospective study in which they performed MRIs on a group of neonates in order to study brain development. What they discovered was that 26

⁹³ K.P. Hymel, K.L. Makoroff, A.L. Laskey, M.R. Conaway and J.A. Blackman, "Mechanisms, Clinical Presentations, Injuries, and Outcomes From Inflicted Versus Noninflicted Head Trauma During Infancy: Results of a Prospective, Multicentered, Comparative Study" (2007) 119 *Pediatrics* 5, 922.

⁹⁴ For example, see M. Mian's testimony in *R. v. Smith* [2001] OJ No. 4981 at para. 6.

⁹⁵ W.J. King, M. MacKay, and A. Sirnick, "Shaken Baby Syndrome in Canada: Clinical Characteristics and Outcome of Hospital Cases" (2003) 168 *Canadian Medical Association Journal* 2, 155.

per cent of the newborns exhibited intracranial hemorrhages, which were asymptomatic.⁹⁶ Intracranial hemorrhaging, both old and fresh, is one of the diagnostic criteria of shaken baby syndrome, and many experts will testify that an infant becomes immediately unresponsive after an intracranial hemorrhage. This one study, which did not go looking for brain bleeds, but found them in otherwise healthy infants, falsifies that theory. This type of broader-based scientific research, where the basic data collection is not skewed by any preconceived subjective expectations of the researchers and provides evidence that goes toward falsifying a theory rather than confirming it, is an example of true scientific research. It is very unlike the type of self-validating research that considers only known or suspected cases of shaking, noted above. This research also demonstrates the necessity of combining clinical research with post-mortem studies in areas of contention, or indeed any areas in pediatric forensic pathology and forensic pathology in general.

Many areas of forensic science have been reluctant to “scientificize,”⁹⁷ but the paradigm shift evoked by DNA testing now demands that all areas do so. It is not the focus of this research study to delve any further into the medical issues surrounding shaken baby syndrome. It is, however, worth noting that research is being carried out that can properly address the cause and meaning of the “triad” used for diagnosing exclusively that a baby has been shaken. Good research in this area will begin with the premise that the “triad” is *not* exclusively caused by shaking the baby (a null hypothesis).

⁹⁶ C.B. Looney, J.K. Smith, L.H. Merck, H.M. Wolfe, N.C. Chescheir, R.M. Hamer, and J.H. Gilmore, “Intracranial Hemorrhage in Asymptomatic Neonates: Prevalence on MR Images and Relationship to Obstetric and Neonatal Risk Factors” (2007) 242 *Radiology* 535.

⁹⁷ In 2000, the U.S. National Institute of Justice solicited research on fingerprints, which never got off the ground. It wasn’t until 2005, following a number of high-profile errors in fingerprint identification, that the institute solicited research again. In 2007, a grant was awarded to actually undertake quantitative research on one aspect of fingerprint identification, which will include testing millions of matches and false matches (see <http://www.findbiometrics.com/press-release/4704>). However, this is a test of automated systems only.

If SBS truly exists as a medical condition, then the diagnosis of it should be possible through objective scientific criteria. In these cases, and the recent cases involving homicide diagnosed on the “rule of the 3” or “Meadow’s Law,” a phenomenon occurs that we see nowhere else in forensic pathology. Although it is true that forensic pathologists will take into account the medical history and the scene observations in other types of suspicious deaths, they will never take into account the confession of the accused, or the story of the accused. Who, apparently, did what to the victim, or the theory of the police as to who did what and how the death occurred, is anecdotal. It does not stand alone as objective scientific information that can be independently proven, unless of course it can be. If it is true, then it should be able to be independently confirmed or proven. This is scientific testing.

The Rise of Forensic Pediatricians and Child Abuse Prevention Teams

In 1990, the Public Health Agency of Canada began data collection in its Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP), run by the Injury and Child Maltreatment Section of the Health Surveillance and Epidemiology Division, Centre for Health Promotion.⁹⁸ All the ten pediatric hospitals and four general hospitals in Canada participate in the program. Data collection entails the filling out of forms that address the circumstances in which an injury occurred for which a patient is presenting. The collected information is quite comprehensive and includes such things as what caused the injury, when and where it occurred, factors contributing to it, and personal biological information. This information is reported by the patient or guardian. Additional

⁹⁸ Accessed at: <http://www.phac-aspc.gc.ca/injury-bles/chirpp/index-eng.php>

information on the injury and treatment received is provided by the emergency room staff. CHIRPP staff use the International Classification of Disease (ICD-9) E (external cause of injury) codes to upload this information into databases. The codes are defined by mechanism or cause of injury, and by intent. The choices for intent are: unintentional, self-inflicted, assault, other violence, or undetermined. Child maltreatment is one of the coded causes, and the only code for intent is in the assault column. Numerous other mechanisms or causes also have the option of an assault code, such as fall, suffocation, medication, drowning, fire, and struck by or against.

The existence of this system for reporting trauma in the interests of public health and injury prevention provides some explanation for why medical experts other than forensic pathologists – whose responsibility it normally is to make determinations about cause and intent (or manner) when there has been a death involving trauma – are called on to offer opinions on the cause and manner of an injury in a child in their care who later dies. It is because they have had to do so since at least 1990. However, the rise in child abuse and neglect, or child protection programs in hospitals and other social agencies, began prior to that time. Discovering just when these programs were initiated in Ontario hospitals is not a straightforward task, nor is determining who makes up their expert staff and the extent of their training.⁹⁹

As for available training, 25 pediatric forensic fellowships are currently available in the United States while none could be found in Canada.¹⁰⁰ Normally these fellowships take from two to three years and can be undertaken by individuals with MD degrees who

⁹⁹ The Children's Hospital of Western Ontario does list the staff at: <http://www.chwo.org/programs/chilabus.htm>

¹⁰⁰ Information on the hospitals in the United States that offer fellowships in pediatric forensics or child abuse and neglect may be found at: <http://www.helfersociety.org/Fellowships.htm>

have completed their residency in pediatrics. There is currently no board subspecialty certification in this area.

As demonstrated in the above cases, it is not uncommon for the courts to qualify persons associated with clinical child abuse teams as child abuse experts, although the field does not exist by way of examination and certification. These experts are often called in cases where a child did not survive, but they are as commonly utilized in child custody cases and cases where the child survived. In these cases, there may be no forensic pathologist or forensically trained individual involved at all.

For example, in *R. v. Donnelly*¹⁰¹ the accused was found guilty of aggravated assault endangering life in a case of shaken baby syndrome. A single expert testified:

Dr. Wolski was the sole medical expert who testified. He is a recognized expert in child abuse and shaken baby syndrome. The defence did not challenge his impressive credentials.

Dr. Wolski confirmed the diagnosis of shaken baby syndrome, and gave evidence with respect to the timing of the constellation of injuries sustained by Adriana. There was evidence of an earlier subdural haematoma, suggesting a potential incident of earlier shaking, or a prior unrelated injury. The defence did not challenge Dr. Wolski's diagnosis, although various suggestions were put to Dr. Wolski about potential alternate causes of the injuries that he did not accept.¹⁰²

Typically, the expert is unwavering in his or her opinion, and this is a predictable result:

I am mindful of the principle noted in the *R. v. Harris & Ors*, [2005] E.W.C.A. Crim. 1980, at para. 136 that the accused in a shaken baby case does not have to provide evidence or prove an alternative cause for the injury. However, if the medical evidence as to the cause and timing of injury is irrefutable and there is no other plausible explanation given on behalf of the accused then as Reilly J. points out, I

¹⁰¹ 2007 CanLII 24078 (ON SC).

¹⁰² *Donnelly*, *ibid.* at paras. 25 and 26.

must consider the credibility of Mr. Donnelly's evidence in the context of the uncontested medical evidence, as well as the uncontested evidence of Adriana's presentation on March 3, 2005.¹⁰³

Other medical experts may also be called to testify in child custody cases. In

Children's Aid Society of the Region of Peel v. L.J.P., another medical expert testified:

There were X-rays taken this time that were suspicious of fractures to two bones, but no findings of child abuse could be made. Dr. Cairns' unofficial opinion was that the death of A.P. was more likely non-accidental than from a natural cause. There was, however, no medical history available for A.P. to be able to conclude there were natural causes of death.¹⁰⁴

Dr. Cairns was the deputy chief coroner and was likely qualified through his role as head of the Pediatric Death Review Committee, but a coroner is not a forensic expert in the same manner as a forensic pathologist. Here we see the same error as that committed by Dr. Smith in *R. v. M.T.* Because a natural cause of death could not be ruled in, the "suspicion" of two fractures allowed him to interpret the death as non-accidental. This flaw in reasoning is again due to practitioner error, here, most likely to observer effect.

In numerous cases where a child has survived an apparent injury, or where a family court hearing is held when a sibling has died or has been apparently injured, one or more medical experts give opinion evidence. To discuss these in greater detail would, however, go beyond the scope of this contribution. Many of these cases involve members of the HSC SCAN team testifying as experts.¹⁰⁵

¹⁰³ *Ibid.* at para. 194.

¹⁰⁴ *Children's Aid Society of the Region of Peel v. L.J.P.*, 2003 CanLII 52513 (ON CJ) at para. 59.

¹⁰⁵ Some examples are *R. v. A.E.*, 2000 CanLII 16823 (ON CA); *R. v. K.M.*, 2007 CanLII 13937 (ON SC); *Children's Aid Society of Haldimand-Norfolk v. C.(D.)*, 1995 CanLII 5603 (ON CJ); *Catholic Children's Aid Society of Toronto v. De.S. (M.)*, 2005 CanLII 336 (ON CJ); *Children's Aid Society of the region of*

In cases both where the child has survived and where he or she has not, we see this unique contribution of other “experts” to a conviction. In no other type of forensic pathology cases do we see a troop of experts produced for the trial who have made a determination of the cause and manner of death based in part on an interview of the suspect, usually prior to the death of the individual. This is what happens when a team like the HSC SCAN team is activated.

When the interview of a person who may become the accused in a case is used as part of the formation of an opinion about whether a child was abused, the entire opinion may be deemed inadmissible. In *R. v. Laidley*,¹⁰⁶ Justice Campbell found that members of the SCAN team were persons in a position of authority under the meaning of the common-law confessions rule. This was because they were interviewing the accused in an investigative manner, outside of simply collecting medical information to treat the victim. As a result of not properly informing the accused of the team’s role, her statement to them about what happened to the child was determined to have been given involuntarily and was not admitted in her trial. There is a risk that, if the interviewee is not properly informed of the role of the SCAN or other similar child abuse team, any information given to them may not have been provided voluntarily. This may in turn taint any evidence if that evidence is used to form an opinion which is then presented in court by the expert.

Other medical experts may be called in a criminal trial, but they are usually experts in a medical specialty that is normally called on to provide ancillary studies for

Peel v. J. (S.), 2007 CanLII 328 (ON CJ); *R. v. Letourneau*, 2007 CanLII 345 (ON SC); *R. v. S.(I.)*, 2005 CanLII 122 (ON CJ); *R. v. J.B.*, 2004 CanLII 3905 (ON CA), and from other jurisdictions in Canada: *R. v. K.K.*, 2003 SKQB 241 (CanLII); *R. v. Foote*, 2005 NLTD 194 (CanLII).

¹⁰⁶ (January 16, 2001), Toronto (ON SC).

the forensic pathologist. As stated earlier, it is the norm for the forensic pathologist to seek assistance from experts in neuropathology or toxicology or other areas in which he or she is not an expert. These experts, however, will testify as to their specific findings, within their area of expertise, and will not normally provide the cause and manner of death in their reports or testimony.

Advocacy as a Contributor to Practitioner Error

The death or injury of a child at the hands of an adult, particularly one who is a parent or caregiver, generally evokes heightened emotion compared with the death of an adult, accounting in part for the many associations, interest groups, and abuse prevention centres that exist in North America. With some of the experts who testify in these cases, an air of advocacy permeates the testimony.

In *R. v. Stewart*,¹⁰⁷ the court said:

Defence counsel in addressing the evidence of Dr. LaRoche observed that in his opinion, the Crown's position to a large extent rests on the issue of retinal hemorrhages which he described as the "lynch-pin" of the Crown's argument. As with all of the medical evidence, he notes that the perspective of the medical profession is to be contrasted with the criminal justice perspective. The medical profession in most instances is involved in assessing the injury from the perspective of treatment rather than from cause, whereas the criminal justice focuses on cause and

¹⁰⁷ 2003 NSCA 150 (CanLII). In this case 11 medical witnesses were called by the Crown. These included a neuroradiologist; a pediatrician, who was head of a child protection team and was testifying in a criminal case for the first time; a neurosurgeon, also testifying for the first time; an ophthalmologist; a pathologist who performed the post-mortem (it was her first that considered shaken baby syndrome as the cause of death, and she had never done a post-mortem on the victim of a fall); a neuropathologist (who had never examined the brain of a purported Shaken Baby, and had examined two brains from purported falls in the past); and an emergency room doctor. The defence offered one expert; a kinesiologist. The evidence of the experts is given in great detail in the case. All the Crown experts advanced the belief that the cause of death was consistent with shaken baby syndrome, and if it wasn't, it was at least non-accidental, and could not be caused by a fall as the accused claimed. The judge accepted the evidence of the experts and convicted the accused of manslaughter. The conviction was upheld on appeal.

responsibility. As such, Mr. Murray suggests, correctly in my view, care must be taken in assessing the medical testimony.¹⁰⁸

Understandably, medical professionals whose job is to treat children who may present with injuries or illnesses that they attribute to a lack of care or even to deliberate harm by an adult who should be caring for and protecting the child, may become advocates for their patients. Needless injury or the needless death of another human being often stimulates strong opinions.

Herold J. in *R. v. Sands-Way*¹⁰⁹ recognized this air of advocacy in some of the 26 witnesses who testified for the Crown.¹¹⁰ He stated:

We had the benefit, during this trial, of hearing the evidence of many bright, highly educated, impressive and passionately dedicated physicians who spend a great deal of their time dealing with the diagnosis of and treatment of shaken baby syndrome. To say that they are passionate about the efforts which they bring to their cause, namely to understand and hopefully reduce if not totally eradicate this horrendous social illness and criminal conduct would be an understatement – one might even suggest that they demonstrate from time to time a bias and/or a cynicism as a result of their constant contact with this terrible epidemic; if they do, I can only say that they should be forgiven for it and we must simply try to nudge them back to a more objective posture. Different considerations would obviously apply in a trial by jury. I appreciate that a witness who is qualified to give expert opinion evidence must try as best he or she can to present the evidence in a totally unbiased and objective way but if they stray from time to time over the line one can only attribute that to their humanity rather than any bad faith. I found the medical evidence in this trial to be extremely informative and helpful almost without exception.¹¹¹

And further:

¹⁰⁸ *Stewart, ibid.* at para. 91.

¹⁰⁹ [2002] OJ No. 3055.

¹¹⁰ Some of the named experts who testified in this case are seen often in the Shaken Baby case law. Here they included Dr. Rao, Dr. Huyer, and Dr. Levin.

¹¹¹ *R. v. Sands-Way*, [2002] OJ No. 3055, at para. 13.

In the spring of 1998, The Honourable Fred R. Kaufman, Q.C., in his celebrated and well publicized report following the Ontario Commission on Proceedings Involving Guy Paul Morin said words to this effect:

“An investigation can be perfectly structured but flounder due to ‘tunnel vision’ or ‘noble cause corruption’ or loss of objectivity or bad judgment. Older techniques and thought processes are, at times, deeply ingrained and difficult to change.”

In his recommendation #74, tunnel vision was defined as being the single-minded and overly narrow focus on an investigative or prosecutorial theory so as to unreasonably colour the evaluation of information received and one’s conduct in response to that information. There can be no doubt that the reduction of or total eradication (dare one hope?) of the shaken baby syndrome is a noble cause. It may or may not be that which caused the tunnel vision in this case to exist which contaminated the investigatory and prosecutorial process almost from the outset. I hasten to add that none of the individuals who may have been demonstrating in good faith this severe impairment of vision testified before me and I cannot and would not attribute to them any malevolence or bad faith. Indeed, to the contrary, I think it is implicit in the quotation from Mr. Kaufman above that malevolence and bad faith are not the usual motivators – a noble cause is.¹¹²

Many years earlier, Justice Nasmith observed about the HSC SCAN team:

I can see where it would be hard to be objective when dealing with a helpless infant who has sixteen to twenty unexplained bone lesions. But based on my observations of witnesses in other cases and Doctor Driver in this case, I have serious concerns about professional objectivity in the giving of evidence, and more widespread concerns about some features of this child abuse prevention process.... Sometimes their objectivity seems undermined by their advocacy – their tendency to promote a theory – to sell it.¹¹³

And later, in the same matter, in making a finding of costs against the Catholic Children’s Aid Society of Toronto for the substantial litigation in fighting the claim of child abuse by two caregivers, he stated:

¹¹² *Ibid.* at para. 15.

¹¹³ *In the Matter of Eric D. and Tyler W.* (April 25, 1985), Toronto (ON PC).

No doubt the real fly in the ointment here is the child abuse team at the Hospital for Sick Children as they moved from a position of possible abuse to a diagnosis of abuse. This was a surprising stance for them to take and I think it underlines the need for a protection agency receiving reports under protection legislation and for Courts on these cases to continue to scrutinize the zeal of well-meaning people who are so understandably devoted to fighting the scourge that is child abuse. This zeal has created a subtle dynamic that can somehow convert a suspicion of child abuse into a presumption of child abuse.¹¹⁴

Advocacy that may contribute to practitioner error in both observer effect and confirmation bias cannot be allowed in a trial where a person is presumed innocent until found guilty. It increases the risk that a wrongful conviction will occur. In this case, the accused was acquitted, but not because the judge disbelieved the medical experts. He did accept their theories that the baby was shaken and accepted that the baby was shaken. The story from the neighbours was that, after the child had fallen down the stairs and the accused had run over to their house, she was observed to be “jostling” the baby in order to keep him awake, an action that she herself admitted to undertaking. The legal intent for manslaughter was, however, not made out by the Crown. It was determined that the accused did not have the required mental element (wanton or reckless disregard) to support a finding of criminal negligence and a conviction of unlawful act manslaughter. So, while acknowledging the possible presence of error due to motivation by a noble cause by some of the medical experts in this case, the judge stated that this error in no way affected the outcome of the trial.

The potential for error and/or advocacy can actually be assessed by exploring background and affiliations when the testimony of an expert is offered. As stated earlier, once an expert is qualified under *Mohan*, any evidence proffered, even that which may be

¹¹⁴ *M.W. et. al. v. Catholic Children’s Aid Society* (February 12, 1986) York, C. 184/85 (ON PC).

tainted by advocacy, is not usually well regulated. The usual remedy is an instruction to apply less weight to such evidence. The Crown has a role to play in controlling this by calling fewer experts (when they all testify to the same thing) and ensuring that those who are called are not advocates.

THE IMPORTANCE OF BEING FORENSIC

Testing and Review

Once a decedent has been autopsied, the body is no longer in an “untouched” condition, disallowing, to some degree, true blind testing when the results of a post-mortem are completed. The evidence has been changed by the autopsy, and, should the defence wish to have the remains autopsied by their own expert, it is impossible to do so. It is also impossible for a blind test to be set up using a “dummy” case. In this regard, forensic pathology is limited when compared with other forensic sciences. Still the application of science in forensic pathology can be improved. It is possible for the defence forensic pathologist to be present at the post-mortem undertaken by the government pathologist. In my experience, this is a rare occurrence. Quite simply, defendants usually have not hired an expert at the time the post-mortem takes place. In many cases, the defendants are not aware that they are defendants until the post-mortem results determine that the death was suspicious. When defence experts are present at post-mortem, it is usually a second autopsy, or an exhumation autopsy where more often than not a first autopsy has already been performed.

The lack of access to an unautopsied set of remains should, however, present few problems if adequate tests were undertaken and sufficient samples were retained at the post-mortem. These materials should be available for testing by a defence expert.

In the same way, retained samples, images (radiographic and photographic), and trace evidence will be available for review by other experts in the government system.¹¹⁵ A true review of the results of a post-mortem by another expert will include an analysis of all the material taken at the autopsy and access to any other expert's reports on the case.

The post-mortem should also be a means of keeping bias in check with regard to other diagnostic studies that occurred prior to the post-mortem, when possible. For example, in some of the cases reviewed for this study, "suspected" fractures were testified to in court.¹¹⁶ In clinical practice, if radiologists are unsure that what they see on a plain-film X-ray is an actual fracture, they will recommend that it be treated as a fracture nevertheless, particularly if there is swelling and pain in the area. This is erring on the side of caution because, if there is a fracture, it will be properly treated, and in most cases, it does no harm to treat the individual as if there is a fracture. Once a patient has died, however, the questionable presence of a fracture matters not to the patient. But unless it is confirmed as a fracture, it can do harm to someone accused of causing the fracture or the death of the individual. This is an issue that was noted in *R. v. Stewart*, and indeed cautioned against.¹¹⁷

¹¹⁵ *Guidelines on Autopsy Practice for Forensic Pathologists: Criminally Suspicious Cases and Homicides*, 2nd ed. (Ontario: Office of the Chief Coroner, October 2007).

¹¹⁶ See, for example, *Children's Aid Society of the Region of Peel v. L.J.P.*, 2003 CanLII 52513 (ON CJ).

¹¹⁷ *R. v. Stewart*, 2003 NSCA 150 (CanLII).

If a pathologist is advised of a suspected fracture, determined as such by X-ray, it can easily be confirmed at post-mortem both grossly and histologically. In other words, it can be assessed both by removing the bone at autopsy and looking at it to see if it is fractured, and by taking tissue for viewing under the microscope. Gross observation and histological examination can also determine that the radiologist was in error, and that no fracture exists. As has been demonstrated in some of the cases above, the suggestion of a fracture on an X-ray can cause a non-suspicious death to be viewed as a suspicious one. It is not simply important for the pathologist to independently confirm or deny the presence of trauma diagnosed by a clinician prior to the decedent's death; it is his or her duty to do so, and it is crucial. As seen in these pediatric forensic cases, the presence of questionable trauma has been the basis for making a determination that the death was homicidal when the findings of the post-mortem only allowed for a death to be called undetermined.

Most other areas of forensic science utilize some type of review prior to a final determination of a result by an expert. Most police services that undertake fingerprint identifications have them independently confirmed by a second technician or identification officer. The manner in which it may be done, and the question of true independence, may be an issue.¹¹⁸ The Centre of Forensic Sciences (CFS) controls for bias and error through annual proficiency testing of its technicians and scientists. Proficiency testing is more a method of ensuring that the experts apply the proper technique and retain the necessary level of skill to continue to perform their job. The scientists are aware of when they are being tested for proficiency purposes, since the test

¹¹⁸ For example, if an officer makes an identification of an individual by fingerprint comparison, and then tells another officer the result and asks the officer to check it, this is not truly independent review. For it to be independent, the suspect fingerprint would have to be put through the same process by both technicians,

cases are identified as such. Last year, the CFS introduced true blind testing: a case is sent in unidentified as a test case, and no one except the quality assurance staff is aware of it. To date, only one of these tests has been done.¹¹⁹ In 1998, Justice Kaufman recommended that “efforts should be made to increase the use of blind and external proficiency testing for analysts.”¹²⁰ In the recent past, quality assurance in the form of internal peer review has been introduced for use by all forensic pathologists in the Province of Ontario.¹²¹ A form is included in the guidelines, and a choice provided in the depth of the review that may be undertaken by one forensic pathologist reviewing another forensic pathologist’s autopsy report. The reviewing pathologist may assess all materials (autopsy report, photographs, microscopic tissue slides, and toxicology report) or some of them.

There is no doubt that a complete and independent review of all the materials from every post-mortem would add significantly to the workload of the practitioners in the system in Ontario, and it may not be warranted in all cases. However, a complete internal peer reviews should perhaps be undertaken in cases where the cause and manner of death are currently the subject of contention, such as “shaken baby syndrome” or “undetermined, but consistent with child abuse due to the presence of metaphyseal fractures.” A full internal peer review would in many cases require awaiting the completion of independent tests, such as toxicology and neuropathology, which usually

independently of each other, effectively running the print twice, with neither knowing that it has already been done.

¹¹⁹ Pers. com. Kimberly Johnston, CSFS.

¹²⁰ Ontario, *The Commission on Proceedings Involving Guy Paul Morin: Report* (Toronto: Ontario Ministry of the Attorney General, 1998), Recommendation 26. Also available at: <http://www.attorneygeneral.jus.gov.on.ca/english/about/pubs/morin/> at 9, Recommendation 26.

¹²¹ *Guidelines on Autopsy Practice for Forensic Pathologists: Criminally Suspicious Cases and Homicides*, 2nd ed. (Ontario: Office of the Chief Coroner, October 2007).

take many months, but it is possible to expedite these ancillary studies if a need is identified.¹²²

The need for a complete review of each case may be minimized if the forensic pathologist is working in a forensic unit with similarly trained and experienced colleagues with whom to confer as the case is undertaken. Any question that arises can then be instantly reviewed by a number of similarly trained and experienced experts before the post-mortem is even completed. This review cannot occur if the forensic pathologist is the only expert undertaking post-mortems in a hospital setting. A forensic environment would also guard against the expert giving a determination of the cause of death, which is unsafe to rely on in a court.

Education and Research

Numerous North American universities offer forensic science programs and degrees, but they have eschewed the forensic medicine model that remains prevalent in Europe and Asia. In these institutes of forensic medicine and allied victim sciences, medical and allied experts are streamed into forensics from early on in their post-secondary education. Forensic doctors in these other jurisdictions not only perform post-mortems, but also undertake examinations of living individuals thought to be the victims of child abuse or sexual assault; in other words, they are also clinical forensic practitioners. Because these individuals are trained to be “forensic,” as discussed above, the potential for bias and advocacy in their findings is largely minimized, thereby reducing practitioner error.

¹²² Expediting of toxicology in these cases would be the most difficult unless other options for toxicology testing were available to the forensic pathologist. The fast-tracking of other ancillary testing may also depend on extra funding and a non-governmental source of testing.

Situating forensic education in a dedicated post-secondary institution also allows for important research to be undertaken on questionable – and indeed long-held accepted – theories in forensic science. Research on these issues will reduce methodological error in forensic medicine and science. In the United States, the National Institute of Justice, which is the research arm of the federal Department of Justice, exists solely to solicit and provide funding for areas of research, including forensics, that have an impact on the justice system. Canada has no similarly devoted federal funding body, and therefore research must be undertaken in the university environment. This is not being done to any great degree at present because there are no post-graduate programs in forensics, undergraduate research is rarely funded, and there is simply no funding earmarked for forensic-related research.¹²³ The only way in which methodological error can be avoided in forensic medicine and forensic science at large is by true scientific testing of theories and methods currently in practice. In addition, research improves and enriches existing methodologies and provides a tool for the evolution of new and better methodologies.

There appears to be an urgent need to establish some type of forensic institute at a Canadian university. Toward this end, a preliminary proposal to establish a Centre for Forensic Medicine and Science at the University of Toronto has recently been made. The centre would act as a hub to unify the entire forensic community, including, among others, such divergent departments and institutions as hospital departments (Sunnybrook trauma, HSC SCAN) and faculties in the university (medicine, nursing, criminology, forensic science, law, mental health, bioethics). This proposal has recently been endorsed

¹²³ Dr. M. Pollanen, in an attempt to obtain funding to undertake research in a forensic pathology-related area, discovered that forensic research did not fall within the guidelines of research areas funded by any of the three largest federal funding bodies: MRC, NSERC, and SSHRC (pers. comm.).

by the dean of the Faculty of Medicine and continues to meet with approval as it is presented to the broader university population.¹²⁴

The Role of the Justice System

Although the regulation of experts must be undertaken in part by the experts themselves, the role that the courts play in inviting experts to testify, allowing them to testify, and allowing them to opine outside their area of expertise should be assessed.

We have already seen that every expert opinion that is offered is subjected to the *Mohan* test, and if an opinion is offering novel scientific evidence, to the test outlined in *J-L.J.* More recently, the decisions in *Truscott* and *Trochym* have opened up the possibility of applying the test for novel scientific evidence more broadly, perhaps to contentious areas in forensic pathology, such as shaken baby syndrome.

The courts tend to allow a lot of latitude in opinion to anyone who holds an MD (and this may be true of other highly educated experts as well). In a number of cases cited above, the medical experts were actually qualified to give opinions on the cause and manner of death of the child. If the experts are not forensic pathologists, and many are not, this capacity exceeds what they would undertake as a duty in their professional practice. In appeals where one of the grounds is that a certain expert who testified on some aspect of a pediatric death was testifying outside his or her area of expertise, the ground of appeal is rarely given effect.¹²⁵ That such experts do often testify outside an area of expertise seems apparent. Once experts are allowed to give an opinion, however, if they stray too far, the judge will limit what they have testified to by charging the jury to

¹²⁴ M. Pollanen, P. Collins, M. Evison, A. Gotlieb, and K. Gruspier, Proposal to Establish a Centre for Forensic Medicine and Science at the University of Toronto (January 2008).

¹²⁵ See the evidence of Dr. Mian in *R. v. Smith*, and Dr. Rao in *Pengelly*.

give the opinion less weight. It is entrenched in our law that the charge on the weight to be given to any expert's testimony is what will temper that testimony and ensure that it is not used for an improper purpose, as seen in *Marquard*. In my opinion, this is insufficient in some cases. As stated by Sopinka J., in *Mohan*:

Dressed up in scientific language which the jury does not easily understand and submitted through a witness of impressive antecedents, this evidence is apt to be accepted by the jury as being virtually infallible and as having more weight than it deserves.¹²⁶

Apart from the fact that *Marquard* appears to allow a very broad scope for expert opinion, if it is limited, there is a real danger that any limiting instruction given by the judge to a jury may not be fully heeded. This concern is enhanced by the sheer abundance of numerous medical experts giving absolute opinions on a cause of death, and by the fact that these experts are easily led to opine further than they should. Since they are not forensically trained and experienced, they are therefore not aware of the true limits of their testimony. A lack of forensic training and experience, often coupled with active advocacy or an overendowed sense that they are doing the "right thing," allows counsel to lead these experts down the "hypothetical" path. In my opinion, the courts must begin to either limit the number of experts who opine in these cases, or very clearly outline the boundaries of what they will be allowed to testify to. Defence counsel should, when possible, object when an expert opines outside an area of expertise, and perhaps the judge should intervene even if the defence does not object. The *ex post Marquard* remedy of giving such statements limited weight, on the rare occasion it is applied, does not appear

¹²⁶ *Mohan*, *supra* note 15 at p. 9.

to be effective. Indeed, the court may want to revisit this part of *Marquard* as well as enforce other decisions that take a stricter approach to prejudicial evidence of limited probative value; or to expert evidence on issues of credibility; or to expert opinions that are very close to addressing the ultimate issue. Credibility determinations and decisions about the ultimate issue are best left to the trier of fact.

If an ophthalmologist is testifying about retinal hemorrhage, the testimony should be limited to the fact that the hemorrhages were present and should include a full discussion of all possible causes, replete with an examination of the type of publication or experience on which this opinion is based. Similarly, a radiologist must discuss the limits of any diagnosis – based on the uncertainty that arises from the use of a particular diagnostic tool – and any other limits on the interpretation of an anomaly seen on an image. Limiting this type of testimony presupposes that counsel and the trier of fact have sufficient knowledge of the subject matter to ensure that the evidence is fully presented in this way.

Of course, the Crown must set out the elements of the offence, and our legal system is an adversarial one. But Crown attorneys are also officers of the court, which means that part of their job is to ensure justice is done – not just that they “win” their case. Some may say that because our system is adversarial, the defence is equally responsible for challenging any evidence presented, in kind. This is true, but the reality is that the defence in these types of cases is at a distinct disadvantage. Very few experts in the field of forensic pathology are available to the defence. In Canada, there are no independent forensic pathology corporations. Forensic pathologists, if they are employed, are employed by the government or hold part-time positions (their other job is at a hospital). The reason for the lack of experts in this area is not just a scarcity of available

positions, but the fact that those positions are very poorly paid in comparison to other areas of medicine and even other areas of pathology. This is a general trend in the field of forensic expertise, since in Canada all forensic experts (except for private toxicologists, those employed by some private DNA labs, and the handful of retired experts in other fields) are government employees. Another factor is the strict limiting of funds that Legal Aid places on the hiring of experts. The lack of experts in Canada will often require that a defence attorney look outside the country, yet there simply is not enough money to pay for international experts, who often require substantial fees. Even if funding were increased to allow for the regular use of such experts, the system runs the risk of miscarriages of justice because of the testimony of “liars for hire.”

The need for an external and expensive defence expert has not been the norm in Canada’s legal history, nor should it become a future trend. This can be accomplished only if the courts continue to draw from a pool of true forensic experts, those who are educated and trained to be forensic experts. As that is currently not the case, the defence is at a distinct disadvantage. Limiting the number of Crown experts to a trickle as opposed to a flood will minimize overwhelming the defence.

Ongoing education for lawyers and judges has become a priority in today’s technologically advanced society. In these cases that involve scientific evidence, there appears to be some uncertainty as to how to deal with the evidence. As one scholar has noted: “[J]udges are lawyers. And lawyers were smart kids who disliked math and science. So they went to law school.”¹²⁷ Although this may be somewhat exaggerated, it is only fair that judges be made aware of the frailties of forensic evidence in these areas

¹²⁷ M.J. Saks, “Merlin and Solomon: Lessons from the Law’s Formative Encounters with Forensic Identification Science” (1998) 49 *Hastings LJ* 1140.

and be kept up to date on the ongoing controversies and true scientific advances before having to make a decision on their merits. Judges should be educated about the limits of the expertise in these areas so that they feel confident in shutting down such testimony even if neither counsel objects. An extra-departmental centre in a Canadian university that includes the faculty of law can only be of great assistance to the justice system. Within such a centre, education can be provided that, on the one hand, assists lawyers and judges in better understanding the strengths and limits of science, and, on the other hand, exposes forensic scientists to legal concepts such as the presumption of innocence and reasonable doubt. These concepts will help to counter observer effect (“think dirty”) and confirmation bias.

The courts should be encouraged to utilize the method for testing non-novel evidence as provided in *R. v. Trochym*.¹²⁸ This has opened the door for lower courts to apply the test of novel scientific evidence to evidence that in the past has been accepted merely by precedent. It would be most interesting to see if the theoretical and “scientific” underpinnings of the diagnostic criteria for shaken baby syndrome would survive scrutiny of this type.

An alternative but perhaps similar approach has been suggested by Alan Gold.¹²⁹ Prior to *Trochym*, Gold proposed a practical “litmus test for experts.” Simply, he suggested that an expert be assessed to determine if

- they are scientifically literate;
- they know and appreciate the scientific method; and

¹²⁸ *R. v. Trochym*, [2007] 1 SCR 239, 2007, SCC 6.

¹²⁹ A.D. Gold, *Expert Evidence in Criminal Law: The Scientific Approach* (Toronto: Irwin Law, 2003).

- they are aware of illogical reasoning.

Gold stated that failing the test virtually guarantees the presence of junk science.¹³⁰ He contended that the most important factor that will separate the good from the bad expert opinion evidence is methodology. He contended that a good expert witness will be scientifically literate, or will be versed in the scientific method. In other words, this expert will understand the concepts of accurate recording of meaningful data, experimental design, and quality research; how to draw conclusions from his or her data and what they mean; and, most important, the fundamental theory of falsifiability. Gold's book is an excellent review of expert evidence in criminal law in Canada and provides a critical analysis of numerous recent judgments, concentrating on, but not limited to, cases where psychological evidence has been proffered. His chapter on basic concepts in science should be recommended reading for all lawyers, all judges, and many experts.¹³¹

CONCLUSIONS: PROBLEMATIC AREAS AND SOME SUGGESTIONS FOR IMPROVEMENT

The suggestions outlined below are not limited to cases in which a child has died. Rather, they are suggested for all areas of forensic science and their consumers.

1. Expand the role of education and research. Situated in service-based, funding-restricted government ministries, forensic science and forensic medicine have never been able to undertake evidence-based scientific research to any adequate degree. Education is limited to what other interacting government-based ministries or officials require. It is

¹³⁰ *Ibid.*, 231.

¹³¹ *Ibid.*, 79.

clear that academic institutions do not provide a platform for research in this area¹³² and that the establishment of a dedicated forensic institute is overdue. Scientific research that is forensically structured and focused is the only way in which to decrease the three types of error identified in the introduction to this study. A dedicated forensic institute will also be able to provide ongoing education to the justice system and should be closely allied with it for the purpose of education, particularly in the areas of scientific evidence, as forensic science was created by and for the law.

To avoid the results of any research being blemished by bias, funding for a forensic institute must be immediate and guaranteed. Forensic research should not be funded by any commercial interest that may have a stake in the outcome of the research. As noted above, the U.S. Department of Justice has made funding of forensic research a mandate. The Ontario provincial government should do the same. Because the criminal law power resides in the federal government and similar problems have been identified in other provinces, the federal government should commit to funding in this area as well.¹³³

2. Discontinue the use of “child abuse experts” in criminal trials and carefully assess their use in CAS hearings until such time that balanced training and educational programs for them can be constructed, or limit the use of numerous experts of this sort in a single trial. Untrained in forensics, child abuse experts are clearly advocates. The courts allow these individuals to opine outside their area of expertise to provide opinions on the cause of death or the cause of trauma in a living child. The *Marquard* remedy of

¹³² The forensic science program at the University of Toronto at Mississauga has been in existence since 1993. It remains a program of the Department of Anthropology, without its own funding or autonomy to do its own research, and without a graduate program.

¹³³ In 1999, the federal government spent over \$1 million to send a team of forensic experts to Kosovo to investigate crimes against humanity. The team’s findings were never even presented to the prosecution at

limiting the weight of these opinions is of dubious effectiveness. It is true that the most vulnerable in our society will always need a voice to speak for them, but the platform should not be the criminal courts. If the cause of death of a child is undetermined by a forensic expert, then perhaps it truly is undetermined. If the Crown can make a case for guilt on circumstantial evidence, then it should; but it should not rely on overwhelming the trier of fact with numerous “experts” spouting unscientific interpretations. In the past few decades, medical advances have allowed for the continuation of life in cases of children who, if born prematurely in previous years, would have died. As yet, the consequences of these efforts at preservation of life in the premature infant are not truly understood. Advances in medical imaging have allowed the radiologist to see things that have previously not been seen inside the human body, and for some reason these findings have been interpreted as suspicious rather than developmental.

Counsel should be, first, an officer of the court, but in these cases it appears that they are stacking the deck to win their case.

3. Discontinue the allowance of non-scientifically tested theories to be advanced in the courtroom, particularly those that address the ultimate issue. Trochym has revived a tool to test areas of science that were previously accepted on precedent. Shaken baby syndrome would be an excellent area with which to test the tool. It should not be assumed that a medical doctor is an expert in any area involving a human body. Where *Trochym* does not apply to exclude the opinion evidence, the limits of what constitutes “approaching the ultimate issue” should also be more strictly defined. The courts cannot abrogate their responsibilities once an expert is qualified to give evidence and opines

the International Criminal Tribunal for the Former Yugoslavia. The prevention of wrongful imprisonment

outside his or her area of expertise. They should not rely solely on instructions to the trier of fact to give less weight when experts testify outside their area of expertise.

4. A review of the manner in which deaths are investigated in Ontario may be in order.

Currently, the coroner and the police make crucial decisions at the scene.¹³⁴ This practice is potentially problematic because the coroner is not the forensically trained expert, and the police may appear to be potentially biased since they are conducting a criminal investigation (or deciding whether something is criminally suspicious) as well as supposedly acting as agents in a coroner's investigation. It is the forensic pathologist who must go to court and give evidence in the case, and it is therefore particularly important that forensic pathologists (and other involved forensic experts) make their own primary observations of the scene. To rely on anyone else's observations is to utilize secondary information, and this is effectively hearsay, which, while allowed in the foundation for an expert's opinion, is not preferred.

of Canadian citizens should be equally as fundable.

¹³⁴ This issue is not discussed in depth in this study. The method of death investigation would not be obvious from the cases examined in this study, as the coroner does not have to make a report that she or he will then be subpoenaed to testify on. However, it is certain that a coroner attended all the cases discussed in this study, as it is legislated in Ontario that they do so. This suggestion derives from my own experience as a forensic expert who normally attends the scene. In cases where I have not attended the scene, there are crucial areas of my report that I cannot address, such as post-mortem interval and issues surrounding the taphonomic versus human interference with remains. In cases of multiple fire fatalities, my job is almost impossible if I have not identified the individuals and separated them at the scene. Given these limitations on my own set of cases that cannot always be clarified by scene photos, I suggest that, in some cases, the attendance of the forensic pathologist at the scene will be of paramount importance for interpretation.