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EXAMINING SHAKEN BABY SYNDROME
CONVICTIONS IN LIGHT OF
NEW MEDICAL SCIENTIFIC RESEARCH

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It's really an honor to be here, especially on such an important topic as Shaken Baby Syndrome (SBS), which has not received the attention it deserves in legal and medical communities until recently. To begin, let me just give you a brief glimpse of the scope of the issue in the criminal justice system. An estimated 1,500 people per year are involved in some kind of shaken baby scenario.¹ While we don't know how many people have been prosecuted, we do know that it does appear that the number of prosecutions is increasing. In 2002, there were eighty-four published appellate opinions involving Shaken Baby Syndrome convictions;² that number rose to 104 published opinions in 2006.³ The best estimate is that somewhere in the neighborhood of 200 people per year are prosecuted and convicted of offenses based on a Shaken Baby Syndrome theory.⁴

These, keep in mind, are extremely difficult cases for the criminal justice system and particularly for a lawyer representing somebody accused of one of these crimes. Child abuse is a horrific crime that has historically been underrecognized. But when the incident is unwitnessed, as it often is, proving the crime can be difficult and dependent largely on medical opinions. At the same time, a baby has died or has suffered serious injury, and the natural impulse is to want to find somebody to blame. Unlike other claims of innocence,⁵ though, these are cases in which there may be no one to blame. What happened may have been an accident or the result of natural causes that were overlooked in medical workups. These cases, from an innocence perspective, can be very challenging. While in some cases you can identify the true cause of the death or the injury, in many cases the science can't pinpoint it that

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1. Deborah Tuerkheimer, *The Next Innocent Project: Shaken Baby Syndrome and the Criminal Courts*, 87 WASH. U. L. REV. 1, 9-10 (2009).

2. Genie Lyons, Note, *Shaken Baby Syndrome: A Questionable Scientific Syndrome and a Dangerous Legal Concept*, 2003 UTAH L. REV. 1109, 1113.

3. Molly Gena, Comment, *Shaken Baby Syndrome: Medical Uncertainty Casts Doubt on Convictions*, 2007 WIS. L. REV. 701, 706.

4. Tuerkheimer, *supra* note 1, at 10.

5. As co-director of the Wisconsin Innocence Project, and a lawyer who has represented convicted individuals claiming to have been wrongly convicted in SBS cases, I approach the issues here primarily from the perspective of protecting the wrongly accused and convicted.

specifically; you don't have something like DNA, which is prototypical of innocence cases, where you can show with absolute certainty what happened in the case.

So, let me give you a quick background on what Shaken Baby Syndrome theory is about. I'm sure we've all heard of Shaken Baby Syndrome, but what is it really? It's actually just a hypothesis, and I use that word intentionally.⁶ It's a hypothesis that shaking by an adult can cause brain injuries in infants.⁷ It is based on the recognition that the infant's head is large in relation to the body, and the neck muscles are not fully developed. When a parent or caregiver, in anger, shakes the child violently, the head flops back and forth, creating rapid acceleration and deceleration motions. For decades, the hypothesis had been that these movements damage axons—or nerve connections—in the brain and stretch the bridging veins, which go through the brain to the skull, to the point that they break and bleed.⁸ The scientific proof in these cases essentially boils down to three primary features, which have come to be known as the classic “triad.”⁹ They include, first, subdural (sometimes subarachnoid) hematoma.¹⁰ That means simply bleeding on the surface of the brain between the various layers of covering membranes inside the skull.¹¹ The second part of the triad is retinal hemorrhages (bleeding in the back of the eyes),¹² and the third part is acute encephalopathy, which means brain injury, and is usually evidenced by cerebral edema, or brain swelling.¹³ The traditional hypothesis had been that if you see those three things, or only two of them, or sometimes even just one of them, what happened was a shaking incident; those things could only be explained

6. When I first gave this talk, I called SBS a theory. I have since been corrected by Dr. Norman Guthkelch, one of the first doctors—heralded as one of the fathers of SBS—to hypothesize shaking as the mechanism of injury in child injury and death cases more than 40 years ago. See A.N. Guthkelch, *Infantile Subdural Haematoma and its Relationship to Whiplash Injuries*, 2 BRIT. MED. J. 430, 430 (1971); Professor Carrie Sperling's discussion, *infra*.

7. Tuerkheimer, *supra* note 1, at 11.

8. *Id.*

9. *Id.* at 1.

10. Gena, *supra* note 3, at 707.

11. *Id.*

12. *Id.*

13. See, e.g., Matthieu Vinchon et al., *Confessed Abuse Versus Witnessed Accidents in Infants: Comparison of Clinical, Radiological, and Ophthalmological Data in Corroborated Cases*, 26 CHILD'S NERVOUS SYS. 637, 637 (2010) (“The hallmarks of shaken baby syndrome (SBS) are subdural hematomas (SDH), encephalopathy, and retinal hemorrhage (RH).”).

by shaking—nothing else but shaking—if there were no other explanation for it. So, if the parent or caregiver were to say, “I don’t know what happened,” or provided an explanation that the doctors thought was inconsistent, then physicians would put that together and say, “This *has* to be shaking—nothing but shaking.”¹⁴

So how does that translate into a legal prosecution? Interestingly, this is one area in the law where the science is used to prove all elements of the crime. In many cases it comes down to science and nothing more than that. The first element of the crime (typically some variant of homicide or abuse of a child) focuses on cause and manner of death.¹⁵ As I just explained, when doctors would see the triad, they would opine that shaking and nothing but shaking caused it. Or sometimes—more frequently today—the experts will say it was shaking with impact.¹⁶ So that explains how the child died.

It is also used to explain the mental state of the alleged perpetrator. Experts would look at this and testify the shaking had to have been done by such force—such violence—that it’s the equivalent of throwing a child out of a second- or third-story window or hitting them with a car at thirty miles an hour. Such force, they typically testify, had to be intentional, or at least reckless, and might have shown utter disregard for human life—whatever the particular statute at issue requires.¹⁷ So it establishes the requisite mental state for the crime.

And finally, this medical evidence is used to establish the identity of the perpetrator. How? Because the theory long had been that when a child suffers these kinds of brain injuries, the child goes into immediate coma, collapses, loses consciousness, and becomes immediately unresponsive, and so, therefore, the last person with the child is the one who did it.¹⁸ It ties it all up. So this is essentially a situation, as Professor Tuerkheimer has characterized it, of “medically diagnosed murder.”¹⁹ You can have these convictions without any other evidence than this.

And this is where inherent tensions between law and science emerge.

14. Or, more recently, some combination of shaking and impact. *See infra* text accompanying notes 63–64.

15. Lauren Quint, Note, *Bridging the Gap: An Application of Social Frameworks Evidence to Shaken Baby Syndrome*, 62 HASTINGS L.J. 1839, 1853 (2011).

16. Tuerkheimer, *supra* note 1, at 13.

17. *Id.* at 4.

18. *Id.* at 32.

19. Deborah Tuerkheimer, *Science-Dependent Prosecution and the Problem of Epistemic Contingency: A Study of Shaken Baby Syndrome*, 62 ALA. L. REV. 513, 552 (2011).

Science, of course, is continually evolving. It's contingent, it's tentative, and it's always developing as more research proves old theories wrong and as research refines current theories. The law, on the other hand, demands near certainty—proof beyond a reasonable doubt in criminal cases—and finality. Once it's done, it's done. We need to have final resolution of these cases. Well, as you can see, these two are in tension. So what happens in cases where the law depends almost entirely on the science—a science that may be proven wrong, that may be changing, that may be shifting, that may not be conclusive? That's what we have when we're talking about Shaken Baby prosecutions.

Let me illustrate this by talking to you about a particular case that I handled involving a woman named Audrey Edmunds.²⁰ This was the classic triad-based prosecution in 1996. Audrey Edmunds was a much-loved member of her community, an upstanding member of her church, and a community-daycare provider who was held up as a role model by other daycare providers. One morning in October 1995, the parents of this child dropped off the six-month-old infant in her care. The child was fussy and inconsolable that morning. Within an hour, Audrey called 9-1-1, reporting that the child was unresponsive; she thought the child might have choked on formula while propped up in her chair with a bottle. The emergency technicians responded, saw formula in the child's nose and throat, believed it was choking as well, and raced the child to the hospital. Once there, doctors quickly did a workup, saw the triad and concluded, no, this had to be shaking, and it had to be Audrey who did it because she was the only one with the child when she went into distress. Audrey was convicted and sentenced to prison for eighteen years.²¹

We got into this case to present new evidence that challenged every one of those three elements of the crime that I described. On cause and manner of the death, new evidence emerged in the years between the conviction and the postconviction proceedings. This evidence challenged the theory behind SBS, saying that shaking probably wasn't the cause, and, in fact, might not even be able to do this;²² it also provided alternative explanations for the triad in general and for this case in particular. It turns out that every one of those medical signs can be caused by something other than shaking. Virtually all medical

20. See *State v. Edmunds*, 598 N.W.2d 290 (Wis. Ct. App. 1999).

21. See Brief and Appendix of Defendant-Appellant at 3, *State v. Edmunds*, 2008 WI App 33, 746 N.W.2d 590 (No. 2007AP933), 2007 WL 7260137.

22. *State v. Edmunds*, 2008 WI App 33, 746 N.W.2d 590.

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professionals now agree that the triad is not exclusively diagnostic of traumatic abuse.²³

New medical evidence also challenged the proof at trial about state of mind. It turns out that the doctors were wrong when they said that the force used to inflict the brain injuries had to have been as massive as running over the child with a car or throwing her out of a second- or third- or fourth-story window.²⁴ Instead, we now know that relatively minor trauma—even falling off of a chair or a piece of low playground equipment—can cause the kind of trauma that can lead to serious brain injuries and death.²⁵ So it did not have to have been such massive force, even if force was applied.

And the third thing that we challenged was identity. Again, the doctors at trial were wrong. A child does not always go into immediate distress, even when she suffers the kinds of injuries found in this case. We now know that there can be a lucid interval, a period of time in which a child can remain conscious and alert after injury, which can last for hours or even days.²⁶ During that time the child may be clingy and fussy, as was the child in this case, but the child can survive and be lucid—conscious and responsive—for quite a while after sustaining an injury.²⁷

Let me talk about each of these features in a little more detail. Serious questions about SBS as the cause and manner of death really began to arise around 1998 when doctors started applying evidence-based medicine standards to SBS for the first time.²⁸ Evidence-based medicine requires good scientific research, based on the scientific method, with biostatistical significance before medical professionals can come to conclusive judgments.²⁹ And when researchers went back and looked at the evidence base for SBS, they found that none of the research underlying Shaken Baby theory rose to sufficient quality under the evidence-based medicine standards.³⁰

23. See Tuerkheimer, *supra* note 1, at 17–21.

24. Brief and Appendix of Defendant-Appellant, *supra* note 21, at 39.

25. *Id.*

26. Tuerkheimer, *supra* note 1, at 4.

27. M.G.F. Gilliland, *Interval Duration Between Injury and Severe Symptoms in Nonaccidental Head Trauma in Infants and Young Children*, 43 J. FORENSIC SCI. 723, 724 (1998).

28. Tuerkheimer, *supra* note 1, at 13.

29. *Id.* at 12.

30. Mark Donohoe, *Evidence-Based Medicine and Shaken Baby Syndrome Part 1: Literature Review, 1996–1998*, 24 AM. J. FORENSIC MED. PATHOLOGY 239 (2003). After

We also learned a lot from biomechanical engineers who had been studying the thresholds for brain injuries of the type we see here. What they found was that human adults simply cannot shake an infant hard enough to inflict the kinds of head injuries that we see in these cases, but the trauma from impact, even what appears to be relatively minor impact, can do so.³¹ Forces from shaking fall well below established injury thresholds and are one-fiftieth the force of impact.³² That is to say, you can get fifty times more force from an impact than you can from shaking a child.³³ Indeed, the peak rotational accelerations for a shake are less than those of a one-foot fall onto carpet.³⁴ So we have this biomechanical evidence that says shaking can't reach those kinds of thresholds. To cause that level of trauma, you'd have to shake a child so hard that you'd inflict massive cervical-spinal injuries;³⁵ the neck would fail before the brain would suffer the extensive injuries associated with SBS. But most of these children, like the child in Audrey Edmunds's case, have no neck injuries. Similarly, many have no bruising where the person supposedly gripped them to shake them.

From the new research, we also learned a lot about alternative causes of the triad. We learned that accidental trauma, congenital malformations, metabolic disorders, hematological diseases, infectious diseases, auto-immune conditions, birth defects, re-bleeds of prior injuries to the brain, hypoxia (which simply means a shortage of oxygen to the brain), childhood stroke, genetic conditions, etc., are all now known causes of all of the triad elements previously attributed to SBS.³⁶

reviewing the literature on SBS through 1998, Dr. Donohoe concluded that the evidence for SBS was "analogous to an inverted pyramid, with a small database (most of it poor-quality original research, retrospective in nature, and without appropriate control groups) spreading to a broad body of somewhat divergent opinions. One may need reminding that repeated opinions based on poor-quality data cannot improve the quality of evidence." *Id.*

31. Ann-Christine Duhaime, Lawrence E. Thibault & Susan S. Margulies, *The Shaken Baby Syndrome: A Clinical, Pathological, and Biomechanical Study*, 66 J. NEUROSURGERY 409, 414 (1987).

32. *Id.* at 410.

33. *Id.*; Michael T. Prange, Brittany Coats, Ann-Christine Duhaime & Susan S. Margulies, *Anthropomorphic Simulations of Falls, Shakes, and Inflicted Impacts in Infants*, 99 J. NEUROSURGERY 143, 148 (2003).

34. Prange et al., *supra* note 33, at 148.

35. *Id.*

36. Patrick D. Barnes & Michael Krasnokutsky, *Imaging of the Central Nervous System in Suspected or Alleged Nonaccidental Injury, Including the Mimics*, 18 TOPICS MAGNETIC RESONANCE IMAGING 53, 65-70 (2007); Andrew P. Sirotnak, *Medical Disorders that Mimic Abusive Head Trauma*, in ABUSIVE HEAD TRAUMA IN INFANTS AND CHILDREN: A MEDICAL, LEGAL, AND FORENSIC REFERENCE 191 (Lori Fraiser, Kay Rauth-

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And even the State's experts are acknowledging these things. In Audrey Edmunds's postconviction proceedings, Dr. William Perloff, the State's pediatric expert who insisted this still had to be shaking, was asked on the record, "Is there any finding, two, or even three findings that would cause you . . . to diagnose shaken impact syndrome?"³⁷ He acknowledged there was not, stating, "Not exclusively, no."³⁸ He elaborated, "That's well recognized, the concept that no single finding is in and of itself pathognomonic No responsible, knowledgeable physician would arrive at that diagnosis on the basis of a single or two findings, but rather, the collection of those."³⁹ That's a change.

New research also emerged about the significance of retinal hemorrhages. We now know that retinal hemorrhages and a variety of other kinds of eye injuries are not pathognomonic, that is to say, exclusively diagnostic, of shaking: They can be caused by all kinds of other insults to the head.⁴⁰ The State's ophthalmologist in the Edmunds case, Dr. Alex Levin, acknowledged that new research has shown that "there may be no pathognomonic eye signs in Shaken Baby Syndrome."⁴¹ And, in fact, Dr. Perloff, under cross-examination, was

Farley & Randell Alexander eds., 2006). Prosecution witnesses will often contend that many of these mimics are rare—and indeed some are. But many are not routinely tested for, and therefore cannot be eliminated. Moreover, even for those that are statistically rare, statistics speak to averages, not individuals. The chance that any given child will die from leukemia or in a motor vehicle accident is also very small, but some do. Nationally, even small risks may translate into significant numbers.

37. Transcript of Testimony of Dr. William Perloff (State's pediatric expert), Feb. 23, 2007, *State v. Edmunds*, No. 1996CF555 (Wis. Cir. Ct. Dane Cnty.) at 19 (on file with author).

38. *Id.* at 20.

39. *Id.* at 32.

40. See, e.g., Patrick E. Lantz, *Perimacular Retinal Folds from Childhood Head Trauma*, 328 BRIT. MED. J. 754 (2004); Patrick E. Lantz & Constance A. Stanton, *Postmortem Detection and Evaluation of Retinal Hemorrhages*, 2 PROC. AM. ACAD. FORENSIC SCI. 271 (2006) (noting that retinal hemorrhages were present at autopsy in infants who had died from asphyxia/suffocation, meningitis, prematurity/congenital heart disease, in utero intracranial hemorrhage, blunt force trauma, Sudden Infant Death Syndrome (SIDS)/resuscitation, apnea/gastroesophageal reflux, and birth-related causes); Gregg T. Leuder, Jane W. Turner & Robert Paschall, *Perimacular Retinal Folds Simulating Nonaccidental Injury in an Infant*, 124 ARCHIVES OPHTHALMOLOGY 1782, 1782 (2006); Evan Matshes, *Retinal and Optic Nerve Sheath Hemorrhages Are Not Pathognomonic of Abusive Head Injury*, 16 PROC. AM. ACAD. FORENSIC SCI. 272 (2010) (concluding that retinal hemorrhages and optic nerve sheath damage are not limited to children who die of inflicted head injuries and may be linked to cerebral edema and advanced cardiac life support).

41. Transcript of Testimony of Dr. Alex Levin (State's ophthalmologist), Feb. 23,

asked, “[Do] you understand that in this case Dr. Mills [the previous ophthalmologist on the case] testified . . . that that kind of eye injury is not known to occur in infants except in shaking type injury?”⁴² It can’t happen; if you have these injuries, you have shaking; nothing else could cause it—that’s what Dr. Mills had testified to at trial. Dr. Perloff responded, “I do understand that, yes.”⁴³ He was then asked, “And that’s no longer true?”⁴⁴ And Dr. Perloff acknowledged, “Well, it’s correct, it’s no longer true.”⁴⁵

Then we have new evidence that’s come out in the last ten or fifteen years that debunks the myth that short falls can’t kill.⁴⁶ There are well-documented cases now in which falls off of playground equipment or short objects have in fact led to death and injury and presence of the triad.⁴⁷ In fact, in one such study, the incident was actually video-recorded as the child was playing on a small piece of plastic play equipment.⁴⁸ It caught the child accidentally falling off, and the child died and had the subdural hematomas and the retinal hemorrhages.⁴⁹ So we now know that short falls can kill, and, again, this is something the State’s experts now agree with and accept. On cross-examination in the Edmunds case, Dr. Perloff, the State’s pediatrician, was asked the following series of questions and provided the following answers:

Q Okay. Have you ever testified that short distance falls do not cause the constellation of injuries you see in a case like this?

A Probably.

Q And that would have been your belief in 1996 [at the time of Audrey Edmunds’s trial]?

A Yes.

Q Would that be your belief today?

A I would refine that belief I think. I think I would want to qualify that statement today.

2007, *State v. Edmunds*, No. 1996CF555 (Wis. Cir. Ct. Dane Cnty.) at 159 (on file with author).

42. Transcript of Testimony of Dr. William Perloff, *supra* note 37, at 50.

43. *Id.*

44. *Id.* at 51.

45. *Id.*

46. See John Plunkett, *Fatal Pediatric Head Injuries Caused by Short-Distance Falls*, 22 AM. J. FORENSIC MED. & PATHOLOGY 1 (2001).

47. *Id.*

48. *Id.* at 4.

49. *Id.*

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Q Based on research that's emerged in the last ten years?

A Based on case reports, yeah.

Q Case reports in the peer review literature?

A Correct.

Q Case reports showing that indeed short distance falls in fact can cause these kinds of injuries, correct?

A Under specific circumstances, yes.⁵⁰

These things are changing.

And then we had the doctors admitting that, in fact, there is no scientific foundation for their prior testimony about the degree of force being the equivalent of throwing a child out of a window or hitting him or her with a car.⁵¹ At the Edmunds postconviction proceedings, Dr. Jeffrey Jentzen, one of the State's pathologists, testified:

Q Now, there is really no scientific basis, however, for saying that [falling from a third- or fourth-story building or being hit by a car at 20–30 mph is] the amount of force it takes, is there?

A No. Other than the fact we see that type of injury and those kind of injuries.

Q So sort of anecdotal, observational, cumulative kind of experience kind of thing?

A Yes.⁵²

And then we have the evidence that lucid intervals are a distinct reality: Research shows lucid intervals of up to seventy-two hours or more.⁵³ The State's pathologist, Dr. Robert Huntington, who did the autopsy in the Edmunds case, admitted that he had been wrong when he testified at trial that collapse had to follow fairly quickly after injury.⁵⁴ In his postconviction testimony, he acknowledged that, based on further

50. Transcript of Testimony of Dr. William Perloff, *supra* note 37, at 72–73.

51. Transcript of Testimony of Dr. Jeffrey Jentzen (State's expert pathologist), Feb. 22, 2007, State v. Edmunds, No. 1996CF555 (Wis. Cir. Ct. Dane Cnty.) at 29–30 (on file with author).

52. *Id.* at 30.

53. Gilliland, *supra* note 27, at 724.

54. Transcript of Testimony of Dr. Robert Huntington (State's autopsy pathologist), Jan. 26, 2007, State v. Edmunds, No. 1996CF555 (Wis. Cir. Ct. Dane Cnty.) at 44–45 (on file with author).

research and his own subsequent experience with a case involving an extended lucid interval, he now knows that lucid intervals are real, and that pathologists can't time the infliction of injury in such cases to any individual at all.⁵⁵ In the Edmunds postconviction proceedings he testified, "The lucid interval is a distinct discomfoting but real possibility."⁵⁶ He added that "this case more and more convinces me that us pathologists can know *what. When* gives us problems. *Who* we almost never can say."⁵⁷ And courts are starting to take notice.⁵⁸

So the bottom line is that scientific advances have undermined the theory that nothing can cause the triad except shaking. Scientific advances have undermined the theory that shaking alone can cause serious brain injury and death with subdural hematomas and retinal hemorrhages. Scientific advances have undermined the theory that the last person with the child must have been the abuser; in fact, the injuries typically cannot be timed, so we can't settle on identity. Scientific advances have undermined the folklore that injuries had to have been caused by force equal to a multi-story fall. And scientific advances have established many natural causes for medical findings previously attributed to shaking or abuse.

Given all that evidence, the Wisconsin Court of Appeals in the Audrey Edmunds case concluded that newly discovered evidence about these debates in the medical community presented new evidence that warranted a new trial.⁵⁹ The court wrote:

Edmunds presented evidence that was not discovered until after her conviction, in the form of expert medical testimony, that a significant and legitimate debate in the medical community has developed in the past ten years over whether infants can be fatally injured through shaking alone, whether an infant may suffer head trauma and yet experience a significant lucid interval prior to death, and whether other causes may mimic the symptoms traditionally viewed as indicating shaken baby or

55. *Id.*

56. *Id.* at 44.

57. *Id.* at 45 (emphasis added).

58. *See, e.g.,* Aleman v. Hanover Park, 662 F.3d 897, 902 (7th Cir. 2011) (Judge Posner cites some of the evidence for lucid intervals).

59. State v. Edmunds, 2008 WI App 33, 746 N.W.2d 590.

shaken impact syndrome.⁶⁰

Audrey Edmunds was granted a new trial,⁶¹ and the State then dismissed all charges against her, completing her exoneration after she'd spent eleven years in prison for this crime that she did not commit.

So if we have all these things that the medical community now seems to agree upon, what is the debate about? It turns out there's still a tremendous amount of debate. Part of that is reflected simply in shifting terminology, which itself reflects a shifting of the focus of the debate.⁶² Pediatricians and most of the medical societies now will say they don't like to use the term Shaken Baby Syndrome anymore.⁶³ SBS is not really a very safe thing to say given all this new medical evidence I have been discussing. Instead, the medical community prefers to refer to it as "abusive head trauma" or "non-accidental head injury" or other such terms—even "shaken impact syndrome," given that impact is a more likely cause of many of the injuries, as if you have to pre-condition the brain for injury by shaking it first.⁶⁴ Others point out that the term shaken impact syndrome makes little sense; if impact caused the harm, then it is injury caused by impact, and shaking is irrelevant.⁶⁵ The reason for expanding the terminology in this way is simply to reflect the fact that shaking really can't be proven anymore, at least not to the exclusion of other mechanisms, and therefore physicians need a term that encompasses a broader constellation of causes.

As a consequence, the debate now is about whether the triad can be used for diagnostic purposes and in criminal prosecutions to determine not if a child was necessarily shaken (although many doctors continue to diagnose shaking) but whether the child was harmed by intentionally inflicted abuse as opposed to accident or some natural cause. And so the medical establishment continues to assert that subdural hematomas, retinal hemorrhages, and the like are in fact indicative of abuse.⁶⁶ In support of that contention, proponents rely on studies in the research literature suggesting that there is in fact a much higher incidence of

60. *Id.* at ¶ 15.

61. *Id.* at ¶ 23.

62. Quint, *supra* note 15, at 1841 n.5.

63. 'Shaken Baby Syndrome' Given New Name, MSN.COM, <http://www.msnbc.msn.com/id/30425052/> (last visited June 8, 2012).

64. Quint, *supra* note 15, at 1841 n.5.

65. Lyons, *supra* note 2, at 1124.

66. Gena, *supra* note 3, at 711.

subdural hematomas and retinal hemorrhages in cases of abuse as opposed to accident or natural causes.⁶⁷

This research, however, is problematic. Any research in this field suffers inherent and unavoidable challenges, given that one cannot conduct prospective randomized trials by shaking or otherwise abusing children and seeing what their brains look like afterward. Researchers instead often study groups of children who have suffered brain injuries by retrospectively sorting them into groups depending on whether the researchers believe they were abused or were alternatively injured by accidental or natural processes.⁶⁸ Only then can they compare the abuse cases to the non-abuse cases to see what kinds of brain injuries and related indicators appear in each category. The validity of the research, therefore, depends entirely on whether researchers are accurately identifying which cases reflect abuse and which do not. But often the very diagnostic signs that are used to sort cases into these two categories are the same signs that the studies are purporting to measure; the research suffers from a circularity problem. As a consequence, most studies probably over-count the number of cases that are intentional, that are inflicted abuse. That is to say, the studies suffer from selection bias, observer bias, or both.

Selection bias is apparent in the criteria the studies use to put a case into the inflicted abuse category: The researchers rely on things like confessions, adjudications, or clinical findings such as the presence of subdural hematoma.⁶⁹ It might sound reasonable at first to rely on things like confessions, adjudications, and clinical findings, but there are problems. Confessions, for example, might be highly unreliable in these contexts, especially when the medical community is telling this parent or this caregiver, “The signs are all there, this had to be shaking, what did you do?” It’s not unusual for them to say, “Well, I found the child in distress, I jostled them, I must have shaken them a little.” And that then is often deemed a confession.⁷⁰ There are many more reasons—beyond

67. *Id.*

68. *Id.*

69. *Id.*

70. Judge Posner, for example, has commented on the problematic nature of confessions under such circumstances. *Aleman v. Village of Hanover Park*, 662 F.3d 897, 907 (7th Cir. 2011).

If a question has only two answers—*A* and *B*—and you tell the respondent that the answer is not *A*, and he has no basis for doubting you, then he is compelled by logic to “confess” that the answer is *B*. That was the vise the police placed

what I can get into today—why confessions might not be very reliable.

Adjudications of guilt are also not very reliable in this context. The adjudications themselves are based on the presence of the triad, which is what the researchers are trying to test for. Reliance on adjudications means that the factors that are being tested for their reliability in distinguishing abuse from non-abuse are the very same factors that adjudicators used to distinguish abuse from non-abuse for creating the two test categories.

And the same thing applies to the presence of subdural hematoma. Researchers are testing to see if the presence of subdural hematoma is more likely to appear in intentional abuse cases, yet they're using the presence of subdural hematoma to put the case in the category of intentionally inflicted abuse. It's a circularity problem.

Then we have observer bias as well. What this refers to is simply that you're more likely to see something when you want to see it, even in the

Aleman in. They told him the only possible cause of Joshua's injuries was that he'd been shaken right before he collapsed; not being an expert in shaken-baby syndrome, Aleman could not deny the officers' false representation of medical opinion. And since he was the only person to have shaken Joshua immediately before Joshua's collapse, it was a logical necessity that he had been responsible for the child's death. Q.E.D. A confession so induced is worthless as evidence, and as a premise for an arrest.

Id. at 907. Judge Posner elaborated:

Not being a medical expert, Aleman could not contradict what was represented to him as settled medical opinion. He had shaken Joshua, albeit gently; but if medical opinion excluded any other possible cause of the child's death, then, gentle as the shaking was, and innocently intended, it *must* have been the cause of death. Aleman had no rational basis, given his ignorance of medical science, to deny that he had to have been the cause.

Id. at 906. To the extent the research that relies upon confessions provides any details about the nature and content of the confessions, they appear to fit this pattern. In one study, for example, the researchers examined seven cases with purported confessions. Dean Biron & Doug Shelton, *Perpetrator Accounts in Infant Abusive Head Trauma Brought About by a Shaking Event*, 29 CHILD ABUSE & NEGLECT 1347 (2005). They reported that the confessions in the seven cases included numerous statements by the accused abusers. Case 1: the suspect said "he gave her a bit of a shake." *Id.* at 1351. Case 2: the suspect "stated that he had shaken the infant 'out of anger' for 2–3 minutes." *Id.* Case 3: the suspect said he "gave him a little shake." *Id.* at 1352. Case 4: the suspect said he "gave her a 'bit of a shake to stop her crying.'" *Id.* Case 5: the father said he "often vigorously bounced the infant on his knee after feeding." *Id.* Case 6: the father said "he became upset at the infant's crying and shook him 'vigorously . . . three hard shakes.'" *Id.* at 1353. Case 7: the mother said she shook the child approximately ten days earlier, "just a few times, not very many." *Id.* at 1354.

context of scientific research.⁷¹ This occurs even in such sciences as, say, fingerprints, which was long held up as entirely objective and was the gold standard in forensic science before DNA came along. We know this from research such as the work by Dr. Itiel Dror and his colleagues, who took five pre-eminent, world-class fingerprint examiners and gave them an actual case file with fingerprints that they had examined in real case work five years earlier.⁷² Each of the examiners had previously said these fingerprints matched the suspect.⁷³ When presenting these same fingerprints to the examiners again five years later, the researchers did not tell the examiners it was the same case they had worked previously.⁷⁴ This time, unlike five years earlier, the researchers introduced observer effects;⁷⁵ that is, they gave the examiners non-domain-specific information. The researchers essentially told the examiners that they wanted to see if the latent prints matched a particular individual (to whom they had, unbeknownst to them, previously matched the latent prints); however, they also gave the examiners information this time that would lead them to believe that person could not be a match.⁷⁶ Four out of five of the examiners gave a different opinion this time⁷⁷: Three said there was no match, and one said there wasn't enough information to make a call.⁷⁸ Only one out of five stuck to his original determination.⁷⁹

71. See, e.g., Karl Ask & Pär Anders Granhag, *Motivational Bias in Criminal Investigators' Judgment of Witness Reliability*, 37 J. APPLIED SOC. PSYCHOL. 561 (2007); Karl Ask et al., *The 'Elasticity' of Criminal Evidence: A Moderator of Investigator Bias*, 22 APPLIED COGNITIVE PSYCHOL. 1245 (2008); Itiel E. Dror & David Charlton, *Why Experts Make Errors*, 56 J. FORENSIC IDENTIFICATION 600 (2006); Keith A. Findley & Michael S. Scott, *The Multiple Dimensions of Tunnel Vision in Criminal Cases*, 2006 WIS. L. REV. 291; Andrea F. Greenhoot et al., *Prior Beliefs and Methodological Concepts in Scientific Reasoning*, 18 APPLIED COGNITIVE PSYCHOL. 203 (2004); D. Michael Risinger et al., *The Daubert/Kumho Implications of Observer Effects in Forensic Science: Hidden Problems of Expectation and Suggestion*, 90 CALIF. L. REV. 1 (2002).

72. Dror & Charlton, *supra* note 71, at 605.

73. *Id.*

74. *Id.*

75. *Id.*

76. *Id.*

77. *Id.*

78. *Id.*

79. *Id.* See also Itiel E. Dror et al., *Cognitive Issues in Fingerprint Analysis: Inter- and Intra-expert Consistency and the Effect of a 'Target' Comparison*, 208 FORENSIC SCI. INT'L 10 (2011); Itiel E. Dror, David Charlton & Ailsa E. Peron, *Contextual Information Renders Experts Vulnerable to Making Erroneous Identifications*, 156 FORENSIC SCI. INT'L 74 (2006); Itiel E. Dror & Robert Rosenthal, *Meta-analytically Quantifying the Reliability and Biasability of Forensic Experts*, 53 J. FORENSIC SCI. 900 (2008); Itiel E. Dror et al., *The Impact of Human-Technology Cooperation and Distributed Cognition in*

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That kind of thing surely is happening in these shaken baby or inflicted abuse categorizations as well.

Another problem with so much of the research is its misunderstanding of statistics, leading to what is known as the Prosecutor's Fallacy. The flawed argument from the studies, which makes the Prosecutor's Fallacy, goes like this: The data shows that subdural hematoma and retinal hemorrhage are statistically correlated to intentional abuse;⁸⁰ the child presents with subdural hematoma or retinal hemorrhage;⁸¹ therefore this child is probably a victim of abuse.⁸² This argument is similar to the argument that used to be made (and sometimes is still made, erroneously) in DNA cases: The chance of a random match to this DNA profile is one in a thousand; this defendant matches; therefore he's guilty. To put it another way, with this DNA data, prosecutors might claim that the chance the defendant is innocent is one in a thousand. But that's not true. What if the defendant was locked up in prison somewhere at the time? Then the chances that he's guilty are zero, even though his DNA matches, and even though the odds of a random match are very low, because Bayes' Theorem teaches that you have to take into account prior probabilities when you look at these statistics; that is, you have to consider the base rate.⁸³ Let me explain that to you by analyzing the Prosecutor's Fallacy in some of the research relied upon to support the diagnosticity of portions of the triad for abuse.

If abuse is but a fraction of all subdural hematoma cases (that is, its base rate is low), then the presence of subdural hematoma does not mean abuse even if almost all abuse cases have subdural hematomas. For example, one of the papers relied upon to prove the diagnostic reliability of subdural hematoma for abusive head trauma is one with a rather telling title: "Nonaccidental Head Injury Is the Most Common Cause of Subdural Bleeding in Infants [Under One] Year of Age."⁸⁴ The

Forensic Science: Biasing Effects of AFIS Contextual Information on Human Experts, 57 J. FORENSIC SCI. 343 (2012); Dror & Charlton, *supra* note 71; Glenn Langenburg et al., *Testing for Potential Contextual Bias Effects During the Verification Stage of the ACE-V Methodology when Conducting Fingerprint Comparisons*, 54 J. FORENSIC SCI. 571 (2009).

80. Tuerkheimer, *supra* note 1, at 32.

81. *Id.*

82. *Id.*

83. James Joyce, *Bayes' Theorem*, STANFORD ENCYCLOPEDIA OF PHILOSOPHY, <http://plato.stanford.edu/archives/spr2009/entries/bayes-theorem/> (last modified Sept. 9, 2008).

84. Jakob Matschke et al., *Nonaccidental Head Injury Is the Most Common Cause of*

researchers sorted the cases into various categories of causes of injury or death: malformation, perinatal infections, metabolic issues, and Non-Accidental Head Injury (NAHI, the category they were studying).⁸⁵ The data showed that a much higher percentage of NAHI cases had subdural hematoma than any other cause of death in the 715 autopsies of infants that they studied.⁸⁶ Of those categorized as having died from abuse (NAHI), 82.4% of the children had subdural hematomas.⁸⁷ For other causes of death, only 5.2% of the children had subdural hematomas.⁸⁸ From that, the researchers concluded, as the title of their article asserts, if you have a subdural hematoma then you've likely got abuse, because "NAHI . . . is the most common cause of [subdural bleeding] in infants."⁸⁹

But that is not really what this research shows. That's because NAHI cases constituted such a small percentage of all causes of death found in this study that the total number of cases with subdural hematoma in non-NAHI cases swamped the total number of cases with subdural hematoma in NAHI cases.⁹⁰ That is to say, while subdural hematomas were present more frequently in abuse cases than others, those abuse cases with subdural hematomas made up only a small percentage of all studied cases. What the numbers show, in fact, is that subdural bleeding was present in fifty patients, and only fifteen of those, or 30%, were classified as abuse.⁹¹ This is the Prosecutor's Fallacy; the researchers ignored the base rate (that is, the rate at which abuse is present compared to all cases of infant death).⁹² The vast majority—70% of the subdural hematomas—were in cases where there was no abuse.⁹³ So, you can't look at this and say, "Well, we have an 82% rate of matching between subdural hematomas and inflicted abuse, and therefore if you have a subdural hematoma, it's abuse." That does not follow, because under the data in this study, 70% of the time when you have a subdural hematoma, in fact,

Subdural Bleeding in Infants <1 Year of Age, 124 PEDIATRICS 1587 (2009).

85. *Id.* at 1588.

86. *Id.* at 1589–90.

87. *Id.* at 1590.

88. *Id.* at 1587.

89. *Id.* at 1594.

90. *Id.* at 1589–90.

91. *Id.* at 1589.

92. See William C. Thompson & Edward L. Schumann, *Interpretation of Statistical Evidence in Criminal Trials: The Prosecutor's Fallacy and the Defense Attorney's Fallacy*, 11 LAW & HUM. BEHAV. 167 (1987).

93. Matschke et al., *supra* note 84, at 1589.

it's not abuse.

Other studies suffer the same flaw. A study by Bechtel and colleagues compared a cohort of children with head trauma.⁹⁴ Sixty-seven cases were determined to be accidental, while fifteen were determined to be inflicted.⁹⁵ Among those classified as abuse cases, 80% had subdural hematomas.⁹⁶ Among those classified as accidental, only 27% had subdural hematomas.⁹⁷ But again, the researchers overlooked the fact that the base rate of abuse was relatively low, so the total number of accidental cases swamped the abuse cases. Put numerically, a total of twelve out of fifteen of the "abuse" cases had subdural hematomas, while more than that—eighteen out of sixty-seven—in the accidental group had subdural hematomas.⁹⁸ It's just simply not true to say that because there is a higher statistical relationship between subdural hematomas and abuse than between subdural hematomas and non-abuse, that when you have a subdural hematoma it is probably abuse.

Let me just say a couple of other quick words here in conclusion. The shifting and unsettled science in this area is creating legal issues that are also shifting and unsettled. The issues range from the admissibility of expert opinions on either side of the medical debate under *Daubert v. Merrell Dow Pharmaceuticals, Inc.*⁹⁹ and whether medical opinions on matters of disputed science will continue to be enough to convince juries of guilt beyond a reasonable doubt, to the standards and rules that should govern postconviction reconsideration of SBS convictions in light of the changing science. These are all important questions, posed by the unique nature of these science-based prosecutions, which the legal system will

94. Kirsten Bechtel et al., *Characteristics That Distinguish Accidental from Abusive Injury in Hospitalized Young Children with Head Trauma*, 114 PEDIATRICS 165, 176 (2004).

95. *Id.* at 165.

96. *Id.* at 167 tbl.3.

97. *Id.*

98. *Id.*

99. *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993). The *Daubert* analysis here can get quite muddled. Admissibility under *Daubert* really depends on what specific evidence one is seeking to introduce. If the issue is whether theories about inflicted injuries come in under *Daubert*, the answer's almost certainly "Yes, of course." Nobody disputes the reality of inflicted abuse. Nobody disputes there are many signs that can give clues that a particular case might be abuse. But if the theory is that the pattern of subdural hematoma, retinal hemorrhage, and encephalopathy observed in a case could be caused solely by the rotational acceleration-deceleration forces of shaking, that's an entirely different matter.

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need to sort out as the medical science develops.¹⁰⁰

100. For a more in-depth analysis of these medical and legal issues, including admissibility under *Daubert*, see Patrick D. Barnes, Keith A. Findley, David A. Moran & Waney Squier, *Shaken Baby Syndrome, Abusive Head Trauma, and Actual Innocence: Getting It Right*, 12 HOUS. J. HEALTH L. & POL'Y (forthcoming 2012).

Dr. Patrick Barnes*

So I'm not going to say too much more than Professor Findley has already said except to tell you from a physician's point of view for twenty years, from the time I finished training at Oklahoma and then Harvard in 1977 through about 1997, that I pretty much walked in lockstep with the child abuse profession in the authoritarian era of medicine, during which what your teachers taught you, you never challenged. And now we're in the authoritative era of medicine where, believe it or not, medicine is now required to have an evidence base—in other words, sound scientific methodology and biostatistical significance as the bases for universal standards and guidelines of medical practice—so that we're not subjectively diagnosing and treating patients differently across this country, which results in different outcomes. And one of the last areas of medical practice that has not lived up to the evidence-based medicine standard has been dealing with child abuse cases, particularly regarding Shaken Baby Syndrome.

During the nanny case in Boston in 1997, in which I was a prosecution witness, I learned quite a lesson from the highly qualified experts on the defense side. At that time, I thought these people were crazy. What are they saying? And so, I have had to step outside of our shell within pediatrics and pediatric radiology and go to the real experts in brain injury, which are really in the neurosciences: neurosurgeons, neurologists, neuropathologists, and biomechanical scientists. And this was not only with regard to the issue of shaking versus impact. Let there be no misunderstanding: I am a child health and safety advocate. I am the co-founder of a child abuse task force in northern California. I am part of the suspected child abuse and neglect team (i.e., SCAN team) at our hospital, just like I was at all the other children's hospitals where I worked before, including Oklahoma Children's, Boston Children's, and now at the Packard Children's.

So, we now approach these issues more carefully. What we have found with advanced technology is that there are a number of conditions that have nothing to do with trauma—for example medical illnesses including infections, bleeding or clotting problems—that can have

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findings that mimic abuse. And, in some very young infants (e.g., under six months of age) who were thought to have been shaken or battered, their symptoms and signs actually extended from birth injuries or conditions. And this not only includes brain injury and bleeding, but also bone injuries or fractures, especially with the more recent revelations that nutritional deficiencies have come back, like vitamin D and vitamin C deficiencies, which can cause Rickets and Scurvy. The rebuilding of our medical evidence base has not only prompted us to challenge the traditional tenets of child abuse, but to develop more effective multidisciplinary social and medical approaches that are more comprehensive and more compassionate. We should not only endeavor to conduct careful social investigations in cases of suspected child abuse, including proper child protection that is thoughtful of the rights of family and other caretakers, but we must also insist that the affected child receives a complete and thorough medical evaluation so that we don't misdiagnose and mistreat.

Professor David Moran*

I've been asked to react to Professor Findley's talk, and I just wanted to try to put this in a concrete format that we can understand. In the summer of 2001, when my oldest daughter was about six months old, I put her in a backpack (the kind that you strap to your back) to go for a hike. In trying to get her out of that backpack after the walk, I dropped her, and she landed on her head, and she very briefly lost consciousness. So I rushed her to the University of Michigan Medical Center in Ann Arbor, where I live, and by the time I got her in the car she regained consciousness, and she was fine by the time she was examined at the hospital. The reason I'm not in jail today is because she did not present these three symptoms that Professor Findley and Dr. Barnes are talking about: encephalopathy—in other words, damage to the brain; retinal hemorrhaging—blood in the eyes; and a subdural hematoma—blood underneath the skull in the brain.¹⁰¹

Now, what we've learned in recent years is that, contrary to what generations of doctors were taught, you can have those symptoms and it not be abuse, and in fact, it's probably not abuse. Even if there is a correlation between those symptoms and abuse, because the number of cases of infants suffering head injuries not caused by abuse is so much greater than the number of cases in which it is abuse, any given case is probably not abuse, even if that case includes those three symptoms.¹⁰² But hundreds of people are being prosecuted every year on the basis of these three symptoms and these three symptoms alone—the so-called triad of Shaken Baby Syndrome.¹⁰³ And those of us now who are in the innocence movement, those of us who are working in innocence clinics, are trying to find these cases where people were wrongly convicted, but we're never going to find all of them. We're only going to find a few. And so to summarize what Professor Findley said, there are two things that we've learned that are wrong with this theory. First of all, other

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101. See *supra* text accompanying notes 9–13.

102. See *supra* notes 94–98 and accompanying text.

103. See Emily Bazelon, *Shaken*, N.Y. TIMES MAG., Feb. 6, 2011, at 30, 32. (“There is no exact count of shaken-baby prosecutions, but law-enforcement authorities think that there are about 200 a year. In an estimated 50[%] to 75[%] of them, the only medical evidence of shaken-baby syndrome is the triad of internal symptoms: subdural and retinal hemorrhage and brain swelling.”).

things can produce these symptoms, and I'm very briefly going to tell you about one of our cases we had in Michigan that demonstrates that. And secondly, it's hard to shake a baby hard enough to produce these symptoms without doing profound other damage that's almost never seen: neck fractures and severe bruising to the trunk of the child that would have to be grasped in order to do the shaking.¹⁰⁴

So I'll tell you briefly about a case we had in Michigan. One of the five people that we've exonerated was a woman named Julie Baumer.¹⁰⁵ Her little sister was a methamphetamine addict and had a baby named Philipp Baumer in the summer of 2003, and he was instantly a sick baby. He spent the first week of his life in neonatal ICU; he didn't thrive, and he didn't suck the bottle properly. The mother then went back to her life as a drug addict, and her older sister, Julie, adopted the baby, but the baby was never well.

Julie was constantly taking the baby to the doctor: he wasn't eating, he wasn't gaining weight, and then six weeks later, on October 3, 2003, he crashed. He just lost consciousness. Julie was actually visiting with a priest at the time to talk about formalizing the adoption under Catholic doctrine when the priest noticed that the baby was really doing poorly and urged her to take him to the ER, which she did.

The doctors looked in the baby's brain, and they saw a large amount of blood in the brain, and they looked in the baby's eyes, and they saw retinal hemorrhaging in the eyes, and they identified encephalopathy. That's the triad. Julie ended up being convicted of felony child abuse. The baby survived, but he's profoundly disabled as a result of all the blood in the brain. Philipp will never walk, he'll never talk, and he's blind. Julie was convicted of first-degree child abuse and sentenced to ten to fifteen years in prison merely on the triad and the fact that she was the last person known to be with the baby.¹⁰⁶

Julie's story has a happy ending really by luck. Julie is an extremely devout Catholic, and a nun visited her in prison. This nun, Sister Lois, took an interest in Julie's case and contacted a professor at a Catholic law school, Ave Maria Law School. The professor did something that Julie's attorney hadn't done, which is contact a radiologist. Julie's

104. See *supra* text accompanying note 42.

105. Ms. Baumer's case is described in detail in the Bazelon article, *supra* note 103, at 37, 44, 46, 47. The complete trial transcripts and many other documents are on file with the author.

106. Bazelon, *supra* note 103.

attorney never got a medical expert competent to read the scans that were taken of this baby's brain. When those scans were sent out to, among others, Dr. Barnes at Stanford, all of these people said, "Oh, my God, this is venous sinus thrombosis," which is a type of stroke that is particularly prevalent among small children around Philipp's age, six weeks old.¹⁰⁷

Julie's conviction was overturned, and we ended up participating in the re-trial. On October 15, 2010, Julie was acquitted of all charges after six prominent doctors from around the country, including Dr. Barnes, came to Michigan to testify that this was a case of venous sinus thrombosis.¹⁰⁸ These doctors were so convinced and so disturbed by the misdiagnosis in this case that they all testified for free, a fact that the prosecutor actually tried to use against them: "You're testifying for free, you must be some kind of nut."¹⁰⁹

So, abuse of children, abuse of infants is a real problem. Children are killed by caregivers, children are killed by babysitters, by parents and by others; but it's very important that the science—the medical science—re-examines the evidence to make sure that they are identifying the right cases in which abuse occurs as opposed to something else. And law can help push science and the medical profession to do that re-examination. Dr. Barnes himself is proof of that because he was a believer of the old dogma, and it was a legal case that changed his mind. A case in which a woman was being prosecuted for shaking a baby caused Dr. Barnes to go back and re-examine the evidence and see that the science was not there to support Shaken Baby Syndrome.¹¹⁰ But unfortunately there are still lots of other people who have been trained in the old ways and who are still doing it the old way.

And so I come back, I'll end with my story about taking my daughter in 2001 to the University of Michigan Medical Center. Like I said, I was very lucky that she apparently didn't have all of the symptoms of the triad because, when I was working on the Baumer case, I talked to the

107. See Karen S. Carvalho et al., *Cerebral Venous Thrombosis in Children*, 16 J. CHILD NEUROLOGY 574 (2011).

108. Bazelon, *supra* note 103, at 44.

109. *Id.*

110. The case in question was the high-profile murder prosecution of English nanny Louise Woodward in Massachusetts. Dr. Barnes was a prosecution witness at Ms. Woodward's trial and testified that the baby had been violently shaken to death. Dr. Barnes later changed his mind. See *Frontline, The Child Cases: Interview: Dr. Patrick Barnes*, PBS (June 28, 2011), <http://www.pbs.org/wgbh/pages/frontline/the-child-cases/interviews/patrick-barnes.html>.

head of the Pediatric Child Abuse Unit at the University of Michigan Medical Center. This doctor said to me that if these three symptoms are there, and this is almost an exact quote, “they may be the nicest people in the world, but you know they’re guilty.” That sent chills down my spine, because that woman has testified against scores of people in Michigan, and I know that some of them—not all of them—but some of them are almost certainly innocent.

Thanks very much.

Professor Carrie Sperling*

Well, I guess I get the last word. That rarely happens.

I got involved in a Shaken Baby case back in 2003.¹¹¹ A criminal defense attorney from Dallas, who is also a good friend of mine, called me and said, "I've got this Shaken Baby case, and it takes a lot of briefing, there's a lot of science involved, I really need your help in filing pre-trial motions and sitting second chair at trial."¹¹² I had never researched the issue of Shaken Baby. I didn't really know that much about it. At first I had this reaction of, "Shaken Baby, why do you need my help?" He said, "I'll explain it to you later, just agree to help me, but I'm telling you, there is no such thing as Shaken Baby."¹¹³ And I thought, "Right, whatever, but as long as you agree to pay me, I'll do it."¹¹⁴ So I got involved in a case in which there were very clear birth injuries. The baby was delivered with forceps and had injuries on both sides of his head, which were noted in the medical records. The child had been sick basically from birth: failing to thrive; failing to gain weight; failing to keep anything down; vomiting all the time; parents taking him back and forth to the hospital, to the doctor. Finally, the baby collapsed the very first time the father was alone with him. When the baby arrived at the

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111. *State v. Eliason*, No. C-10840 (3d Dist. Ct., Henderson Cnty., Tex. 2003).

112. The attorney was Bruce Anton, a partner at Sorrels, Udashen, and Anton in Dallas, TX.

113. There were few articles at that time challenging the foundations of Shaken Baby Syndrome. Some of the articles we cited in a motion for new trial included: Patrick D. Barnes, *Ethical Issues in Imaging Nonaccidental Injury: Child Abuse*, 13(2) TOPICS MAGNETIC RESONANCE IMAGING 85, 85-94 (2002); Donohoe, *supra* note 30, at 239; Owen Dryer, *Brain Haemorrhage in Babies May Not Indicate Violent Abuse*, 326 BRITISH MED. J. 616, 616-17 (Mar. 2003); Eva Lai Wah Fung et al., *Unexplained Subdural Hematoma in Young Children: Is It Always Child Abuse?*, 44 PEDIATRICS INT'L 37-42 (Feb. 2002). Few doctors challenged the orthodoxy that when the triad appears and the baby was not in a high-speed car accident or the victim of a multi-story fall, it must mean the baby was violently shaken. It took many years before multiple articles questioning that orthodoxy began to multiply. See Tuerkheimer, *supra* note 1, at 4 ("Regarding the force necessary to cause these injuries, jurors heard the explanation typically offered in these cases: the force was equivalent to a fall from a second- or third-story window, or impact by a car moving at twenty-five to thirty miles an hour.").

114. In the end, I didn't get paid for that case or any of the Shaken Baby cases I've worked on. What I saw in that first trial convinced me of the injustices that accompany so many of these cases, and I have devoted hundreds to thousands of pro bono hours to free people I believe were wrongly convicted of Shaken Baby.

emergency room, the doctors saw a subdural hematoma and retinal hemorrhages, and they claimed the father must have shaken the baby.¹¹⁵

Dr. Ronald Uscinski, a neurosurgeon practicing at Georgetown University Medical Center, was our expert.¹¹⁶ He testified that he sees chronic subdural hematomas from birth injury.¹¹⁷ Often, it's his job to operate on those chronic bleeds. "What were the state's experts talking about?" he asked. "They don't know what they're talking about, they're not neurosurgeons. They don't have to go in and operate on them like I do. I'll show the jury some of these surgeries I've done, and they can see what it's like." And he did.

The trial went very well. Our client was convicted, but of a lesser charge. He was sentenced to a year instead of the life sentence he was facing. I saw it as a huge failure, though. It wasn't good for the family, and it wasn't good for anyone involved that this father spent a year in prison simply for being the person alone with the baby when it collapsed from older injuries.¹¹⁸ After that trial I became very interested in Shaken Baby, and I thought, "This is a turning point. As soon as people start finding out about these cases, and how little support there is for this shaken baby diagnosis,¹¹⁹ this will all change." Well, it's eleven years

115. One of the treating physicians testified that to reach a diagnosis of SBS, he looks for brain injuries, retinal hemorrhages and a story inconsistent with those findings. When the parents cannot sufficiently explain the injury, he diagnoses the condition SBS. *Eliason*, No. C-10840.

116. In 1998, Dr. Uscinski testified for the defense in the Louise Woodward trial, the famous British nanny case in Boston. Mark Anderson, *Does Shaken Baby Syndrome Really Exist?*, DISCOVER MAG. (Dec. 2008), available at <http://discovermagazine.com/2008/dec/02-does-shaken-baby-syndrome-really-exist/>. Later, he also wrote an article challenging the SBS diagnosis. Ronald H. Uscinski, *Shaken Baby Syndrome: An Odyssey*, 46 NEUROLOGIA MEDICO-CHIRURGICA 57 (2006).

117. Uscinski, *supra* note 116, at 59.

118. The further harm in this case was that the baby had suffered brain damage. The defendant was working. His health insurance covered his son and his rehabilitation expenses. When he went to prison, he lost his job, he lost his insurance, his son had to go on to the state's Medicaid plan, and the State of Texas later demanded he pay for the costs of his son's medical care while he was in prison. The costs, as you can imagine, were enormous. As for being the person with the baby when he collapsed, the consensus of many prosecution experts at the time was that a baby who presents with the triad must have been shaken immediately before loss of consciousness. See Tuerkheimer, *supra* note 1, at 18 ("In the past, defendants prosecuted for SBS were identified by the science—that is, by the certainty of doctors that the perpetrator of abuse was necessarily the person with the infant immediately prior to the loss of consciousness. However, studies have since shown that children suffering fatal head injury may be lucid for more than seventy-two hours before death.").

119. See sources discussed *supra* note 113.

later, and now things are starting to change; maybe. We're here at Oklahoma City University School of Law talking about the issue, right? And I've had some successes along the way in a few different cases.

The most recent success may not be a complete success yet. One Justice Project client is now out of prison after serving thirteen years of a more than twenty-five year sentence.¹²⁰ But like many postconviction cases, the prosecutor continues to press for "justice" and wields the threat of another trial to secure a plea bargain for time served.¹²¹

We also have a current postconviction case that I really can't understand how anyone would call it Shaken Baby. The baby doesn't have a bruise on his body. He's five months old, with a history of traumatic birth, infections, pneumonia, and seizures. A month before he died, the baby was in the hospital for six days with uncontrollable seizures. After that, the parents were frequently calling the doctor, saying, "The baby's vomiting three times a day, sometimes more. What can we do? What can we do? What can we do?" They were going back and forth to the hospital. Eventually, the baby had another serious seizure, and the father was attempting to resuscitate him on the way to the hospital. At the hospital, the doctors had trouble intubating the baby. By then, the hypoxic brain injury was such that the baby wasn't going to survive. In a case like this, it just seems so simple to me that there's got to be some other explanation.¹²² It can't be shaking. Of course, that's what we've alleged, and we've presented reports from eight respected experts saying that this is not a case of Shaken Baby.

At the same time we were working on this recent case, Emily Bazelon, a reporter at the *New York Times Magazine*, published a fairly extensive piece about the Shaken Baby Syndrome controversy.¹²³ I noticed, a couple of weeks after the article ran, a letter to the editor saying, "I stand behind the conclusions of my 1971 paper—that there are

120. Gregory Pratt, *New Trial Ordered for Man Convicted in 1998 Shaken Baby Case; Attorneys Claim New Evidence Proves Innocence*, PHOENIX NEW TIMES (Feb. 9, 2011, 2:07 PM), http://blogs.phoenixnewtimes.com/valleyfever/2011/02/new_trial_ordered_for_man_in_1_1.php.

121. Gregory Pratt, *Death Threats and Race-Baiting in Court as Judge Glenn Davis Orders Armando Castillo Released on Bond*, PHOENIX NEW TIMES (Feb. 16, 2011, 1:25 PM), http://blogs.phoenixnewtimes.com/valleyfever/2011/02/death_threats_and_race-baiting.php.

122. See, e.g., Steven C. Gabaeff, *Challenging the Pathophysiologic Connection Between Subdural Hematoma, Retinal Hemorrhage and Shaken Baby Syndrome*, 12(2) W. J. EMERGENCY MED. 144 (May 2011).

123. See Bazelon, *supra* note 103.

occasions when violent shaking can cause severe or even fatal brain damage.”¹²⁴ The letter was signed by Dr. Norman Guthkelch from Tucson, Arizona. Norman Guthkelch could be called, perhaps, the father of Shaken Baby. He wrote one of the earliest papers on the topic, entitled “Infantile Subdural Hematoma and Its Relationship to Whiplash Injuries.” He made connections between his own observations of infants with subdural hematoma and no sign of an impact to the head with other studies that showed monkeys can get concussions if you put them on a sled and stop the sled abruptly.¹²⁵ The monkeys got these whiplash injuries, and at a certain threshold of force they could suffer concussions or develop subdural hematomas.¹²⁶ Dr. Guthkelch made a connection between the stories he had heard of parents shaking their children and the research on whiplash injuries in other scenarios.¹²⁷

When I saw that the letter came from Tucson, Arizona, I thought, first of all, “He’s still alive and reading about this topic?” And, most importantly, I thought, “He’s living right down the road from me.” I asked a student of mine to find him. She did. We wrote him a letter asking if we could meet with him, he obliged, and we headed to Tucson. We had tea with Dr. Guthkelch. He’s ninety-six years old now, and he was the first pediatric neurosurgeon in the United Kingdom. We talked to him about Shaken Baby, and we talked to him about his experiences and what he thought about the development of the science. We decided that day to ask him if he would review our case and give us his opinion.

This meeting led to others, and I remember one visit when I was talking with him. I kept saying, “Well, the Shaken Baby theory” this and “the Shaken Baby theory” that. He finally stopped me, and he said, “Carrie, you’ve got to stop saying that.” Imagine a ninety-six-year-old, learned Englishman demanding you stop speaking. You immediately stop, wondering what transgressions you’ve made with your language. He looked at me, paused, and said, “It is not a theory. It was merely a hypothesis, and so you have got to quit calling it a theory because it’s not even a theory.” His admonishment had a profound effect on the way I now see these cases. He’s right: There was never sufficient evidence for this hypothesis of shaking to become a theory.

And so we had Dr. Guthkelch review the records in our case. Within

124. A. Norman Guthkelch, *Letters: Shaken*, N.Y. TIMES MAG., Feb. 25, 2011, at 8.

125. Guthkelch, *supra* note 6, at 430–31.

126. See Bazelon, *supra* note 103, at 34.

127. See Guthkelch, *supra* note 6, at 430.

a couple of days, he called me, and he said, "I can't sleep. I'm troubled by this. Why is this man in prison, and how are we going to get him out?" and "I can't understand why anyone would prosecute this man. When are we going to get him out?" And I said, "Well, we're working on it." And he said, "Well, what does that mean? When are we going to get him out?" And I said, "Well, these cases are difficult." He seemed unsatisfied. "What do you mean they're difficult? Let's call John McCain." Pessimistically, I said, "I'm not sure that'll help. I don't think that'll help."

But it does lead one to wonder why it's so difficult to get the prosecutor's attention when the medical history is so profound and so many experts have testified that there's no evidence of abusive injury. Every postconviction case is difficult. A jury convicted this person. The defendant had an attorney. Why do you get to come back to the courts to re-litigate? And in Shaken Baby cases, you often have a child that died—one of the most horrible tragedies we can experience. So it's tough.¹²⁸ Also, people don't necessarily make decisions based on the law and the facts and the science. Sometimes we make decisions based on emotion, and then we figure out the law and the facts and the science to support our decisions.¹²⁹ This decision-making process is further complicated because these are very emotional cases. What if we acquit someone who actually did abuse a baby? What if somebody really did shake the baby and kill the baby? What might that person do to other children? What if we're wrong about all of this science?¹³⁰ They're very emotional cases.

There's also a theory called negative corpus.¹³¹ It was used by arson investigators for a long time.¹³² The theory plays out like this: investigators look at every possible accidental cause they can think of, and if they can't find support for a single accidental cause, it must be

128. Shirley Ree Smith's case is a tragic illustration of just how difficult it is to overturn convictions in these cases. See Carol J. Williams, *U.S. Supreme Court Reinstates Conviction in Baby's Death*, L.A. TIMES (Nov. 1, 2011), <http://articles.latimes.com/2011/nov/01/local/la-me-shaken-baby-court-20111101>.

129. See Carrie Sperling, *Priming Legal Negotiations Through Written Demands*, 60 CATH. U. L. REV. 107, 114 (2010).

130. N. Vidmar, *Generic Prejudice and the Presumption of Guilt in Child Abuse Trials*, 21 LAW & HUM. BEHAV. 5, 5 (1997).

131. See Dennis W. Smith, *The Pitfalls, Perils and Reasoning Fallacies of Determining the Fire Cause in the Absence of Proof: The Negative Corpus Methodology*, 2006 INT'L SYMP. FIRE INVESTIGATION SCI. & TECH. 313, available at <http://www.kodiakconsulting.com/page19/assets/Neg%20Corpus.pdf>.

132. *Id.*

arson.¹³³ This theory was good enough to pass for fire science for a long time. Only recently have experts and courts seen the problematic nature of this unscientific reasoning.¹³⁴ But the same reasoning continues to go on in Shaken Baby cases. Child abuse experts will say, “Well, the parents haven’t given me a good reason why this baby ended up with these injuries, so it must be shaking or non-accidental head trauma.”¹³⁵ Of course, parents and other caregivers are not equipped to explain the many processes that can cause the triad of symptoms seen as diagnostic of Shaken Baby Syndrome. And this kind of reasoning unfairly, and unconstitutionally, shifts the burden of proof to the defendant.¹³⁶ The defendant is expected to prove the cause rather than the State.

The other reason I think these cases are difficult is just bad lawyering. We’ve come to find that lawyers (and judges) don’t really understand science,¹³⁷ they don’t understand how to use experts like Dr. Barnes, and they don’t consult with experts early enough or often enough. In this most recent case we had, we were telling the judge at our status conference, “We’re nearly ready to file our petition, but we’ve got about ten doctors, and we’ve still got to get their reports.” The judge said, “Ten? Are there even ten specialties in medicine?” And we said, “Yes, and they’re all important to finding a cause in this case.” They’re all important: neurosurgeons, neuropathologists, pathologists, pediatric neuroradiologists, biomechanical engineers, ophthalmologists, and emergency medicine specialists; you go down the list. So, yes, in these cases you may have ten experts. You have to round them up, and you have to plead with them to do it for free when you’re with a project like ours. You do this knowing that if you actually get a hearing, they can be harassed because they’re working the case for free.

Of course, the more difficult scenario is when you do get a trial. At trial, the State will bring doctor after doctor, many treating physicians and many from special child abuse teams, and these doctors spend their lives helping kids. They spend their lives saving kids’ lives. When they

133. *Id.*

134. *Id.*

135. For example, this is the exact issue we are facing in the *Eliason* case. *State v. Eliason*, No. C-10840 (3d Dist. Ct., Henderson Cnty., Tex. 2003).

136. See Patrick D. Barnes, *Imaging of Nonaccidental Injury and the Mimics: Issues and Controversies in the Era of Evidence-Based Medicine*, 49 *RADIOLOGIC CLINICS N. AM.* 205, 208 (2011).

137. See Erica Beecher-Monas, *Blinded by Science: How Judges Avoid the Science in Scientific Evidence*, 71 *TEMP. L. REV.* 55, 72 (1998).

take the stand, they are often the ones who've tried to save this baby's life, and they testify on behalf of the State that this triad of injuries means that the baby was shaken; it also means that your client, the defendant, must have shaken the baby because he was the last person with the baby. And what does the defense present? We bring in a bunch of expert doctors who must disclose that they've been paid to review the case and paid to travel. In my 2003 case, we had Dr. Uscinski. "Yes, he's a neurosurgeon from Georgetown. Yes, he does a lot of these surgeries. Yes, he knows what he's talking about." But the State wanted to know, "How much did you pay him? How much, Dr. Uscinski, did you get paid for testifying today?" Dr. Uscinski answered the question, "\$30,000." Displaying shock and horror, the prosecutor responded, "\$30,000? For one day's testimony and a review of medical records?" This testimony does not play well with a juror already predisposed to believe that you can pay an expert to say anything.¹³⁸

Yes, these cases are expensive. And now, if you hire only Dr. Uscinski at \$30,000, you would be ineffective because you need Dr. Barnes, a pediatric neuroradiologist; you need biomechanical engineers; you need specialists if there's some sort of disease process going on; you need all sorts of experts. You need ten doctors. Who has the money to do all that?

These cases are tough. They're really tough. But I do think that things are changing. I was just speaking to my colleagues today about how amazing it is that we're in Oklahoma City, Oklahoma, talking about these issues. I don't think another law school in the country has done anything like this. And so, it's very exciting to be up here talking about the changing science in the Shaken Baby context. Only with more education and attention to this blind spot in the criminal justice system will we be able to correct the injustices that have most certainly occurred. I appreciate your time. Thank you very much.

138. See, e.g., Neil Vidmar & Shari Seidman Diamond, *Juries and Expert Evidence*, 66 BROOK. L. REV. 1121 (2001).