



***Prometheus* shaken baby debate**

Contents

Introduction

Stuart Macdonald

The shaken baby debate

Proposition paper

Waney Squier

Shaken baby syndrome: causes and consequences of conformity

Response papers

Heather Kirkwood

Shaken baby syndrome: a fraud on the courts

Susan Luttner

Shaken baby: an evolving diagnosis deformed by the pressures of the courtroom

Niels Lynøe

Waney Squier's ordeal and the crisis of the shaken baby paradigm

Dave Marshall

Another perspective - simply my brief thoughts

Brian Martin

Has Squier been treated fairly?

Michael J Powers

Commentary on the paper by Waney Squier: ‘Shaken baby syndrome: causes and consequences of conformity’

Toni C Saad

Waney Squier and the shaken baby syndrome case: a clarion call to science, medicine and justice

Terence Stephenson

The role of the General Medical Council

Stephen J. Watkins

When experts disagree

Peter Wilmshurst

The General Medical Council’s handling of complaints: the Waney Squier case



INTRODUCTION – The Shaken Baby Debate

Stuart Macdonald, General Editor of *Prometheus*

Contact: s.macdonald@sheffield.ac.uk

***Prometheus* debates**

This debate on shaken baby syndrome (SBS – now often called ‘abusive head trauma’) is the latest (and probably the last) *Prometheus* debate. Over the years, these debates have explored such areas as the role of scientific advice in shaping government drug policy; the impact of British libel laws on innovation, and what is going wrong with our universities, areas in which innovation was central and where there was need for a critical, social science perspective. *Prometheus* offers an academic forum for its debates in which some of the constraints of academic discourse are loosened to allow free flow of ideas. Participants are not, for instance, required to explain a methodology or present a literature review.

Prometheus debates were themselves an innovation and apparently a successful one in that they attracted much attention. The mechanism is simple, though strict: the general editor approaches an individual at the heart of a relevant controversy. Possibilities are discussed and a draft proposition paper produced. Meanwhile, the general editor casts a wide net - well beyond the obvious academics – inviting knowledgeable individuals to write response papers. Only once individuals have shown an interest in a project are they sent a copy of the draft proposition paper. Authors of response papers write as individuals (not as representatives of organisations) and are not told who else is writing or has been approached. Similarly, the author of the proposition paper

is not told who is writing response papers or even who has been invited – and certainly does not suggest possible respondents. Only on publication do debate authors discover the identity of the other authors.

Shaken baby syndrome

Shaken baby syndrome is the hypothesis that certain characteristics found in the brain of a dead baby indicate that the baby has been shaken: There are three, together termed the ‘Triad’:

- swelling of the brain
- bleeding between the brain and the skull
- bleeding in the retina.

Collectively and severally, these indicate that shaking has caused the baby’s death. Niels Lynøe, reporting here some of the latest research in the area, suspects that most doctors accept the validity of the Triad. He also warns that the logic of the Triad is circular and self-contained: the baby is dead/shaking a baby can kill the baby/there are signs the baby was shaken/therefore shaking killed the baby. The logic is strained yet further because the hypothesis does not allow for delay between shaking and death, a lucid interval: if a dead baby has been shaken, the baby must have been shaken by whoever was last responsible for the baby. As Michael Powers warns in his contribution to the debate, SBS is not only a medical hypothesis, but also a legal one in that it carries immediate accusation of guilt.

‘Unified hypothesis’ is the term used by Jennian Geddes *et al.* (2003) in questioning the SBS hypothesis and whether the Triad is diagnostic of shaking at all. The haemorrhages seen in natural deaths and alleged SBS cases are indistinguishable, they suggest, and could be caused by all sorts of things that have nothing to do with shaking. These include short distance falls, infection, raised intracranial pressure and injuries incurred during birth. If the Triad is an unreliable diagnosis of shaking, then the assumptions that follow from it are equally unreliable. That was 15 years ago. Yet, the Crown Prosecution Service (CPS) in the UK still reckons the Triad provides correct diagnosis unless there is evidence to prove otherwise. Since 2011, CPS policy has been to resist challenges to the Triad diagnosis based on the unified hypothesis.

... the CPS view remains that any reliance on the so called 'unified hypothesis' to challenge the mainstream interpretation of the Triad of pathological features should be subjected to thorough testing ... (Crown Prosecution Service, nd)

Shaken baby syndrome has been accepted by the medical majority for more than half a century. The hypothesis can be traced to the work of John Caffey (see, in particular, Caffey, 1974), an American radiologist who cited a 10 cent comic in support of his contention (Benton, 1957), and inaugurated years of obsession with the role of large and muscular nannies in the shaking of their charges. SBS is now contested by a growing but still small medical minority, and staunchly defended by a minority of the majority. Though medical knowledge and experience in the area have expanded hugely, no consensus has emerged. If anything, opinion has hardened on all sides and animosity has grown. *Forensic Science, Medicine and Pathology* arranged a discussion of SBS in its Forensic Forum section in 2014. The organiser is still perplexed by the reception it received:

I did get a fair amount of flack for my Forensic Forum - again for reasons that I don't really understand. As for any discussion changing entrenched positions - in this instance I don't think so.¹

In the UK, as Stephen Watkins notes in his debate paper, the Royal College of Pathologists rounded up twenty of the chief protagonists for a closed, invitation-only meeting in December 2009. The meeting offered the opportunity to thrash out differences: according to its organisers, it was not a success:

...non-accidental injury to babies remains a subject that generates such vitriolic responses that I wouldn't want to stick my head above the parapet again²

I was not particularly bruised, but certainly saddened at how people who would call themselves scientists can forget the principles of scientific method and take up tribal warfare.³

In truth, the editors of *Prometheus* became increasingly intrigued by what such a long-standing and increasingly bitter dispute might tell us about innovation – the primary interest of *Prometheus*. It was not necessary to judge the merits of the medical arguments, or even to understand them in any depth, to realise that this dispute offered an outstanding example of support for, and resistance to, innovation, meat and drink to *Prometheus*. We pressed on, little realising just how close to the front line of battle we would be drawn.

¹ Email 31 December 2017.

² Email 31 October 2017.

³ Email 8 November 2017.

Innovation

Unlike most academic hypotheses, shaken baby syndrome has no purely theoretical dimension. SBS is always in context and the context of SBS is always the death of babies, the suspicion of crime and the intervention of the law. These are not circumstances conducive to the free and easy exchange of ideas, commonly considered essential for innovation. Even medicine and law, the two fields most involved with SBS, share few ideas, as Watkins makes plain in his contribution to this debate. Though the divide in medicine between theory and practice is deep, both still pay tribute to the same scientific method. But law is not a science; its divide, particularly in practice, is between innocent and guilty, decided not by scientific method but by adversarial technique. Medicine and law are the most uncomfortable of bed fellows. As several respondents note (Watkins, Susan Luttner and Peter Wilmshurst, for example), the chasm between the two is rarely bridged. Michael Powers, a contributor with dual qualifications, is a rare exception.

Communication between medicine and law is often little more than perfunctory. Papers published in legal journals can be interminable, mention in legal proceedings apparently the ambition of those who write them. In contrast, the list of authors may be the longest part of a medical paper and acknowledgement of their research the point of publication. Even the citation styles of law and medicine are incompatible, a barrier to understanding that neither side considers worth removing. (Finding a single style for the two traditions has tried the patience of even the editors of this *Prometheus* debate.)

From a social science perspective, high among the conditions conducive to innovation are exposure to new ideas and the ability to blend unfamiliar information with that already in use. These conditions are not evident where medicine abuts with the law. This is especially apparent in court, where the expert witness system promotes the sort of doctrinaire authority that the social sciences consider counterproductive to innovation. Much of this *Prometheus* debate focuses on the role of the expert witness, especially as played by Waney Squier, author of the debate's proposition paper. As described in detail in her paper, Squier was struck off the medical register not because the information she gave the court was wrong, but because she misbehaved as an expert witness. In other contexts, misbehaviour might be welcomed: rebels, mavericks, troublemakers, those who flout the rules play a critical role in bringing about change. Such renegades are needed to challenge established systems before advancing sclerosis renders them totally inflexible.

As individual disciplines, both medicine and the law have a fundamental interest in truth. When they join forces in court, their primary interest is in procedure. There may be good reason for this, but procedure accommodates established thinking very much better than novelty and discourages innovation. But bluntly, and Toni Saad's debate paper expresses his opinions very bluntly, the expert witness has every incentive to voice consensus opinion, the official view, rather than trouble the court with an alternative, no matter how true the expert witness believes the alternative to be. To be even more blunt, for many expert witnesses, testifying in SBS cases offers evading the truth as the only realistic alternative to offending against procedure. Not surprising then that Powers and others note how difficult it has become to for the defence in SBS cases to find expert witnesses.

Terence Stephenson is adamant in his debate paper that the expert witness has "a duty to the court which overrides any other obligations to the person instructing or paying." The court would struggle if lawyers alone had to comprehend and then explain to judge and jury the medical circumstances of a child's death. But the lot of the expert witness is not an enviable one. Always attempts to elucidate are likely to fall short, and always the expert witness must simplify to assist judge and jury. Explaining even the orthodox can be uphill work: explaining the unorthodox within the constraints of procedure can verge on the impossible. Procedure insists that expert witnesses may not stray from the single field of expertise and must always profess regard for views they think quite wrong. Exposed and lonely, it would hardly be surprising were the expert witness to appreciate the advantage of loyalty to the collective view.

The environment of a UK court is hostile to innovation; precedent is honoured, not novelty. The courts are intolerant of uncertainty and shades of grey, suspicious of the very conditions - doubt, disquiet, frustration - the social sciences consider conducive to innovation. In brief, the social sciences find disruption to existing systems essential for innovation; expertise must be challenged, information from different fields integrated, failure analysed and just about everything critically assessed. None of this is welcome in court.

"It is also important that the courtroom is not a place used by Doctors to fly their personal kites or push a theory from the far end of the medical spectrum. (capitals in original). (Crown Prosecution Service, nd)

Those who would challenge the SBS hypothesis are frequently accused by those who would not of 'cherry picking'; the term is used pejoratively and refers to selecting material that

supports an argument while discarding that which does not. From a social science perspective, academics are all cherry pickers in that they cannot possibly give equal emphasis to all relevant information. Academics must shape an argument from what fits while all the while acknowledging the rejection of what does not. Yet, as Powers notes in this debate, expert witnesses in SBS cases are considered guilty of cherry picking if they stray beyond the conclusion section of academic papers. Indeed, until recently, the Metropolitan Police investigating SBS cases followed suit and accessed only the conclusions of academic papers. Yet, the conclusion section of academic papers is all too often the vacuous part, the part where sweeping claims go unsupported, where unreasoned attempts are made to defend the scarcely defensible, where pleading for further funding and further research reach a crescendo. The social scientist is accustomed to sifting through papers with a fine-toothed comb and to questioning everything in the paper from data gathering and methodology to accuracy of expression.

The literature on innovation identifies a tussle between new and old. Adopting the new increases uncertainty and means that capital, including human capital, must be written off. Understandably, those who have invested in the old tend to be less enthusiastic about the new than those who have not. As Brian Martin explains in this debate, it is not in the interest of those who hold an established view to participate in an activity which undermines this view. Resistance to such disruption can be considerable. But is it really possible to silence dissent from the prevailing SBS paradigm for over half a century? And why such intransigence when other change in medicine and in the law has been both rapid and radical?

The innovation literature generally, and particularly Martin's response paper, sees whistleblowers (those who break ranks with the organisation) as playing an important part in innovation. Governments frequently try to provide whistleblowers with legal protection from victimisation by their own organisations. Without protection, potential whistleblowers keep quiet, a silence which only reinforces established views. The National Health Service in the UK is particularly unsympathetic to whistleblowers. But it was not the NHS that took action against one prominent SBS whistleblower: it was the unnatural combination of the medical establishment and the law that determined to eliminate the threat to the *status quo* posed by Waney Squier.

Waney Squier

Is Waney Squier, the author of the proposition paper in our debate, a whistleblower? Squier is a paediatric pathologist, based in Oxford and specialising in the pathology of the infant brain. She has often appeared as an expert witness in SBS cases and used to testify, in line with the SBS hypothesis, for the prosecution. As an expert witness, Squier was instrumental in securing the conviction of Lorraine Harris for shaking her baby in 2000, and then in securing her release on appeal in 2005. The epiphany was complete.

In March 2016, Squier was struck off the medical register by the Medical Practitioners' Tribunal (MPT) for misbehaviour as an expert witness, specifically for:

- not having due regard for the views of other experts
- straying into fields beyond her area of expertise
- citing research papers whose conclusions did not support her argument.

From a social science perspective, the charges are very strange. Without such behaviour, there would be much less innovation than our society and economy need and expect. The misbehaviour of which Squier was found guilty occurred in court, but the MPT is not a court. It is a disciplinary organ of the General Medical Council, also not a court. Both are instruments of medical authority. So, while the GMC insists that the expert witness is responsible to the court, it would seem that the medical expert witness is also responsible to extra-judicial authority. There is a fine line here. The GMC and the MPT pronounce on how expert witnesses are to behave in court, but not on what they say, as if behaviour and opinion can be kept quite separate. In fact, only orthodox opinion allows this separation. The GMC and the MPT do not condemn dissent, but the behaviour required to justify dissent is unacceptable. According to the GMC's chief executive,

... judges have the right to expect high standards of accuracy and objectivity from expert witnesses. If it becomes clear that a doctor has lost objectivity – by cherry-picking facts or research to suit their views or by working outside their area of expertise – that is a problem we must look at. (Dickson, 2016)

As Powers notes in this debate, the specific body which recommended that Waney Squier be struck off consisted of a retired senior policeman, a retired geriatric psychiatrist and a retired RAF wing commander. Worthy individuals all, no doubt. None was an expert in SBS, but her expertise was not on trial, not was her deviance from the orthodox. Rather, they examined her behaviour in defending her deviance and found that unacceptable. On appeal to the high court, Squier's licence to practice was restored, though she was still prohibited from acting as an expert

witness for three years. A good few of the respondents in this debate have something to say about the MPT, little of it flattering. Most wonder how expertise can be assessed by those with no relevant expertise themselves. The GMC itself also comes in for a deal of comment.

Squier might have faced her accusers alone, but she was far from a lone voice. The issue was timely and received massive media coverage. Sue Luttner provides this debate with an account of every twist and turn of the saga. A letter of support and outrage was signed by hundreds of the *prominenti* in law and medicine and despatched to the *British Medical Journal* (BMJ, 2016; Iacobucci, 2016). But what really distinguishes Squier from others who feel uneasy about the SBS hypothesis is that she was furious at what she saw as blatant injustice and resolved to fight back. Does this make Squier a whistleblower? Yes, it probably does.

The academic literature

The courtroom is no place for doctors to fly their personal kites, declared Royal College of Pathologists (2004). Its report of 2004 (rather than the 2016 revision) still guides the CPS in its prosecution of SBS cases. Dispute and dissent should be reserved for the academic literature. Given that the courtroom has propagated the disagreement, the observation, though oft repeated, is somewhat disingenuous. To be sure, the courtroom is no place for academic debate, but then nor is the academic literature these days. Papers published in academic journals have come to be valued much more as indicators of academic performance than as encapsulations of new thinking. Papers are written and published to be counted as much as read. Neither is the academic publishing industry what it once was. Now one of the most profitable of industries, academic publishing is more concerned with its bottom line than with academic ideals. Gone is all but the pretence that the best papers are published in the best journals: the best papers are those that are most cited, but these are no longer papers at the cutting edge of research, no longer papers that cast doubt or – worse still – report negative findings. The most cited papers tend to be those that echo established opinion, ‘water is wet’ papers that can be cited almost anywhere in support of almost anything. These are the very papers journals need if they are to increase their impact factor and thus their value to author, editor and publisher alike.

Given what is at stake, gaming by authors, editors and publishers is rife. Take - just as an example – coercive citation, the practice of requiring authors to cite papers from the journal in which they hope to publish as a condition of publication (Wilhite, A. and Fong, E. (2012). The top

journals of management appear to be the worst offenders, but medical journals have much to answer for, particularly the influence of drug companies on what is published in academic journals. (House of Commons (2011). The *New England Journal of Medicine*, a leader in the field, has been outstanding in its efforts to counter corruption in academic publishing in medicine, particularly fraud, plagiarism, ghostwriting and honorific authorship (Flanagin, Carey, Fontanarosa, Phillips *et al.*, 1998; see also Wislar, Flanagin, Fontanarosa and DeAngelis, 2011). The practices are endemic and it has met with limited success. In short, it is perhaps naive to expect courtroom contention to transfer to the academic literature for resolution. Neither encourages dissent.

Peer review and the expert witness

Peer review is more honoured in the breach than in the observance. The primary loyalty of many peer reviewers is to a journal rather than to scholarship; they are more concerned with increasing journal impact factor than with the academic standards of some invisible college (see Macdonald, 2015). Where their efforts are still anonymous, they have become hard to recruit and publishers (who look to peer review to underwrite their product) are increasingly assuming responsibility for peer review.

While editors and authors treasure a thoughtful referee's report: referees are often seen by editors as a bother and by authors as an obstacle to publication. But are referees experts? Sometimes, no doubt, but nowadays the referee's main task is to check that a paper is compliant, compliant with the scope of the journal and with the approach taken by other papers, that it cites the core literature, and presents its material in the accepted fashion. There is little room here for deviant results and dissenting argument. In medicine, positive papers are many, many times more likely to be published than negative papers, papers that disagree. (Smith, 2006). Basically, then, the role of the referee is to root out deviance for the sake of the journal, to seek compliance with consensus.

Those who hold majority views, whether in the medical literature or in court, are not called upon to defend them. Why repeat what everybody knows? In contrast, those who hold minority views are obliged to defend them. This can be difficult, not simply because peer review and expert witness procedures are loaded against the new, but also because minority views are assessed in

terms of majority thinking. Until proven otherwise, the minority view is not simply incorrect but improper, its proponents discourteous and disloyal.

If the defence are able to call a 'quack', inappropriately qualified doctor or enthusiastic amateur and present their evidence as having equal value to that of a well established authority on a subject. ... (Quoted from Royal College of Pathologists, 2004 in Crown Prosecution Service, nd)

Expert witnesses, as Stephenson insists, should know what they are talking about and should not talk about what they do not know. Reasonable enough, but recall that medical expert witnesses are allowed to be expert in but a single specialism. Even in cases where there has been massive expansion of the knowledge base, the expert witness must present evidence in a silo with no connection to either other silos. In CPS minds, expertise equates to the expert acknowledging nothing beyond the silo, the dimensions of which are determined by peer review:

The expert should have recent clinical experience, peer reviewed research and should not roam outside of his or her area of expertise. (Quoted from Royal College of Pathologists, 2004 in Crown Prosecution Service, nd)

This has the perverse effect of rewarding ignorance, what Powers calls in his response paper the 'ignorance premium':

... a proponent of SBS without biomechanical expertise can say that the forces sustained in a low-level fall are insufficient to cause the Triad without crossing the boundary [into another specialism], but any medical expert maintaining that low level falls might explain the Triad will be disciplined.

In parallel is what Powers might have called the 'compliance premium': agreeing with prevailing opinion in another silo is allowed, but disagreeing is not:

How can it be right for a neuropathologist to be permitted to give evidence *accepting* the opinion of a neuroradiologist (and thereby add to its weight) when evidence *rejecting* that opinion (which would detract from its weight) is disallowed as being outwith the neuropathologist's expertise? (emphasis in original)

Powers' question would seem to have no satisfactory answer. Only orthodoxy is accepted without question as expertise: dissent must prove itself. Any challenge to orthodoxy is heresy, hence the obstacles placed in its way, and hence the rage opposition provokes among the faithful.

Rage

There must be other factors at work here which go at least some way towards explaining why the defence of the SBS hypothesis can be quite so furious. The court's expectation of a battle between adversaries must charge discussion, but the stakes are also uncommonly high wherever SBS is involved. There must be justice for a child who has lost its life and justice too for those accused of responsibility for its death. This is a far way from the context in which innovation is normally set. This is not a matter of inventing a better mousetrap and it is hardly surprising that feelings can run hot, as some of those invited to participate in this debate made clear:

I don't think I would have anything to add by way of comment to Waney's paper. I think the arguments have been rehearsed many times and, as noted by the Judge in the Appeal court, Waney is dogmatic, inflexible, inconsistent, evasive, inaccurate, unreceptive to the opinions of other experts and misleading, although not dishonest. This position rather argues against the possibility of any form of debate.⁴

In SBS cases, expert witnesses are normally paediatric pathologists, a rare breed. What few there are obviously know each other, and know equally well where each stands on SBS. Despite their overriding duty to the court, the same pathologists appear for the prosecution in SBS cases and the same (few) pathologists for the defence. Disagreement readily becomes personal.

Several of our debate papers make mention of the National Center for Shaken Baby Syndrome (NCSBS), founded in Utah in 2000 and now an international opinion leader in SBS matters. The aim of the NCSBS is "to eradicate shaken baby syndrome" believing, according to its website, that "all babies can be kept safe from harm."⁵ The NCSBS is intolerant of any deviation from established thinking and campaigns vigorously, in large part by denigrating those who do not share its beliefs. As Luttner notes in this debate, the NCSBS regards expert witnesses who question this truth are simply liars, lying for the money. Once again, when the science is beyond question, it is behaviour that is reprehensible.

The influence of NCSBS campaigning is felt well beyond the US. Several contributions to the debate mention a paper given by detective inspector Colin Welsh of the UK's Metropolitan Police at the annual conference of the NCSBS in September 2010. Heather Kirkwood, a lawyer who listened to the presentation, has published her notes of the presentation and has sworn formally on oath in the UK that the police offered the conference advice on how to undermine expert

⁴ Email 14 February 2018.

⁵ <https://dontshake.org/> (accessed June 2018).

witnesses and suborn judges.⁶ Kirkwood has a paper in our debate. So does Dave Marshall, Welsh's boss at the time. Marshall is still listed on the NCSBS website as co-author of the paper presented at the NCSBS conference, but is anxious to dissociate himself from it:

DI Colin Welsh (retired) was one of 5 Detective Inspectors on SCD5 (6) MIT [Special Crime Directorate 5 Major Investigation Team 6] of which I was the head and responsible for as DCI. I retired in August 2010. The reason my name appeared on DI Welsh's presentation was that at one stage I may have travelled with him to give a joint presentation but I did not attend the conference or write the presentation.⁷

Welsh received an award in 2014 from National Police Chief's Council for making a major contribution to improving the national standards of child death investigation.

It is hardly surprising that the police work closely with the Crown Prosecution Service in SBS cases. It is a little more surprising that the police and what the police call "prosecution bodies" work together to monitor and regulate the behaviour of expert witnesses.

A spokeswoman for the Metropolitan Police said this week that following a high-profile acquittal of a defendant in a 'shaken baby' case in 2008, prosecution bodies met with the Metropolitan Police to discuss how to manage the impact of contradictory expert witness evidence. (Coghlan, 2015)

[The Metropolitan Police] are aware of a report registered by the National Policing Improvement Agency with the General Medical Council regarding two doctors. The MPS [Metropolitan Police Service] has co-operated with a request from the GMC in June 2010 to provide any relevant information, the spokesman added. (Hosken, 2011)

Squier was one of these two doctors, Marta Cohen the other. A Metropolitan Police officer had reported them to the Human Tissue Authority early in 2010 for retaining human tissue without authority. The GMC investigated and found no wrong.

As both Stephenson and Powers note in this debate, the primary concern of the GMC is protecting the public against bad doctors, not expert witnesses. They agree that it is not the job of the GMC to take sides when medical opinion is polarised. But keeping clear of the foray is not always practical. In his contribution to the debate, Wilmshurst detects a widespread feeling that the GMC is amateurish, inconsistent and sometimes contradictory, its disciplinary systems shoddy.

⁶ A transcript of the *FILE on 4* programme, BBC Radio 4 (broadcast 15 February 2011) in which Heather Kirkwood is interviewed is available at http://news.bbc.co.uk/1/shared/bsp/hi/pdfs/15_02_11_fo4_shaken.pdf (accessed July 2018). Kirkwood's own notes of Welsh's presentation are available at <https://pennymellor.wordpress.com/2016/11/04/transcript-sbs-conference-mps-talk-on-how-do-you-influence-judges/> (accessed June 2017).

⁷ Email from Dave Marshall, 16 February 2018.

It is notable how close are the links between those investigating SBS cases and some expert witnesses. No doubt there is a shared desire to see justice done, at least in terms of the accused ‘not getting away with it.’ The police and Crown Prosecution Service in the UK seek higher conviction rates (much as academics seek the publication by which academic performance is measured) and expert witnesses may enjoy sharing this success. Strong religious conviction underwrites NCSBS activity, and is also evident in some police officers involved in SBS cases.

I have made mention earlier in this context statement of a strong faith, and to use just one quote from The Bible ‘Defend the children of the poor and punish the wrongdoer’ which is inscribed above the front door of the Old Bailey Court house in central London. This aptly describes for me the action I should take for all children. (Wate, 2015)

More remarkable is that the two groups often write and publish together on SBS. For instance, in 2010, the very year the Metropolitan Police was reporting expert witnesses for retaining human tissue and was presenting a paper on how to undermine expert witnesses at the NCSBS annual conference, the National Policing Improvement Agency was writing and publishing about SBS with other expert witnesses.⁸ One veteran expert witness in SBS cases, holder of an Association of Chief Police Officers Investigation of Child Death Lifetime Award for his services, notes in his online *curriculum vitae*:

“I have helped with a manual of police procedures ... which will, I suspect, become a standard text.”⁹

In 2015, a paper written by the founders of the NCSBS was published in the UK in the first issue of the *Journal of Investigating Child Deaths* (Reece *et al.*, 2015). The NCSBS stance is uncompromising:

Shaken baby syndrome (SBS) and abusive head trauma (AHT) continue to be the most common causes of mortality and morbidity due to physical child abuse in the United States. (p.91)

The *Journal of Investigating Child Deaths* seems to have died shortly after its first issue. It was published by the Association of Chief Police Officers.

Of publisher and lawyers

⁸ For instance, in the journal published by the National Policing Improvement Agency, (Mayes, Brown, Marshall *et al.*, 2010).

⁹ ‘Mini cv’, available at <http://www.ihrdni.org/306-045.pdf> (accessed June 2018).

Our publisher, Taylor & Francis, was once an enthusiastic supporter of *Prometheus* debates: they are an innovative adaptation of conventional academic publishing, attracting much attention and much citation. Taylor & Francis was less keen on our last debate (on the academic publishing industry) and sought to censor some of its papers. *Prometheus* editors went on strike for nearly a year before T&F eventually saw sense and apologised publicly in June 2014 for the behaviour of its managers.

... in our concern to avoid legal and copyright problems, we were overzealous in the changes we sought in the content of the journal's debate. (Jump, 2014)

Taylor & Francis has been aware since mid-2017 that a debate on shaken baby debate was scheduled for *Prometheus*. As soon as a draft proposition paper was available, *Prometheus* editors advised Taylor & Francis managers that it be run past a lawyer. This is normal practice with any contentious topic and usually takes two or three days. Not in this case. A draft proposition paper was dispatched to Taylor and Francis in October 2017 to check that it was not libelous. We heard nothing for months.

Then, early in the New Year, Taylor & Francis managers suddenly decided that all the debate papers should be peer reviewed, presumably by experts in shaken baby syndrome. The demand was inspired not to improve the quality of the papers, but to defend Taylor & Francis in any litigation:

Peer reviewing a paper ... provides ... a strong defence in court if there is any legal problem after publication. It provides a useful and reasonable defence.¹⁰

Peer review is hardly compatible with debate. Debate papers are not research papers. It is especially unsuited to a debate on SBS in that a major contention is that peer review and the expert witness system have stifled consideration of any alternative to the prevailing hypothesis. Taylor & Francis managers eventually conceded that peer review was indeed inappropriate. As an alternative, each paper would be allocated to at least two *Prometheus* editors, who would provide recommendations for editorial changes and an opinion on whether the content of papers was fair comment.

In February 2018, Taylor & Francis managers insisted on seeing all the papers in the SBS debate. The editors acceded. Taylor & Francis managers then demanded access to correspondence between the general editor and the authors of the debate papers. Managers also wanted to know

¹⁰ Taylor & Francis notes of meeting with *Prometheus* editors, 5 January 2018.

who had reviewed each paper and sought access to their confidential reports. The editors refused these demands.

By mid-February 2018, it had become clear that Taylor & Francis managers had sharpened their focus from a general view that the response papers must be libelling someone somewhere. The new suspicion was that the respondents were probably libelling Waney Squier, an odd supposition in that Squier had willingly entered into the debate and had thereby invited criticism. The solution suggested by T&F's own lawyers was ingenious – and quite daft. Squier would read all the response papers and insert bits wherever she disagreed.

... any responses which are critical/potentially defamatory of Squier [should be] run past her before publication so that we can get her comments on those allegations/criticisms, for potential incorporation into the responses so that they are balanced. This would not, however, be a right for Squier to pre-approve, veto or rewrite any of the content. ... We should make sure that the relevant authors of the responses are happy with that approach too, before the responses are sent to Squier.¹¹

By March, the idea that the debate should be 'balanced' was becoming more prominent in T&F: anyone who had anything to say about shaken baby syndrome should be given the opportunity to say it. Not far short of a hundred individuals had been approached to write responses to the proposition paper. All had been outspoken in some aspect of the interests that *Prometheus* has in the SBS issue (in innovation rather than just matters medical). Most had been unable or unwilling to write a special paper within the *Prometheus* deadline. We had anticipated that those who had little time for Squier's stance would be less eager to contribute a response to her proposition paper than those who supported it. So, special efforts were made to entice responses from the former group. Many of those invited did not respond at all or did not respond after they had seen Squier's draft proposition paper. As Martin explains in his contribution to this debate, this was only to be expected: the silent majority defends its position by staying silent.

Though T&F insisted on every word of the SBS debate being submitted for inspection by its lawyers, its managers were always anxious to avoid any accusation of censorship, the crux of our quarrel with T&F in 2014. Lawyers rather than publishers would decide all:

... it would be down to your Editorial team to decide upon and agree any changes with the authors. Taylor & Francis would not get involved in that discussion of course. If there was still disagreement at that point then we could get further legal advice.¹²

¹¹ Email from Taylor & Francis, 23 February 2018.

¹² Email from Taylor & Francis, 23 February 2018.

The *Prometheus* editors beavered away reading and re-reading the papers, consulting their authors, questioning anything that seems unnecessary or untoward. By late March it seems that T&F's internal lawyers had been satisfied. Publication of the debate could go ahead – but only after external lawyers had been consulted:

“... we have no objections to the issue being published all at once as is standard. Our only further action is that we are now sending main debate paper plus two or three responses over to a libel lawyer for a second opinion.”¹³

This second opinion was not to be delivered until 8 June 2018, when the external lawyers declared that all 11 debate papers were likely to be libelous. In what way? We never were told. Typical of the legal opinion passed on to the editors from T&F's external lawyers is:

Watkins – criticises the GMC by reference to cases such as those of Sally Clark and others.¹⁴

That's it; no more is said about the Watkins paper. Brief as the comments on other papers are, they all insist that criticism unacceptable, criticism of any kind and of anything. Criticism of the General Medical Council (GMC) is identified in all the papers inspected as particularly unwarranted. Even the paper by Terence Stephenson, then chair of the GMC, is rated along with the others as likely to be libelous, presumably because it mentions the GMC. The longest comment by far is reserved for Squier's proposition paper. In its entirety, the lawyer's comment is:

Squier -- The author criticises the "major flaws" of the published literature but this is far less of a risk than her description of the roll [sic] of the police, in particular a named Detective Inspector "and his team", the GMC and their named experts as part of an "international network" including the NCBS [sic - NCSBS] in the US effectively joining forces against her. She also appears to criticise the role played by her own lawyers and insurers.¹⁵

The head of this detective inspector's team was actually Dave Marshall, the author of yet another of the debate papers. His paper, too, is considered likely to be libelous, as are the two debate papers written by prominent lawyers in the UK and US.

In early July, Taylor & Francis managers at last responded to the editors' requests for sight of the annotation the lawyers had surely made on the debate papers. There was none. Six months in the hands of Taylor and Francis' internal and external lawyers and not a single annotation.

¹³ Email from Taylor & Francis, 22 March 2018.

¹⁴ Lawyer's comments passed on by Taylor & Francis, 8 June 2018.

¹⁵ Lawyer's comments passed on by Taylor & Francis, 8 June 2018.

This is not an issue that can be resolved by changing some sentences, which is why our libel lawyer has not gone through each article line by line.¹⁶

These months of being told that changes must be made without being told what changes must be made left editors frustrated and angry. But this is as nothing compared with the implications for academic publication of what Taylor & Francis managers eventually decided. While their initial concerns were ostensibly with whether the SBS debate was acceptable for publication, in the process they also set criteria which all papers would have to meet before they could be published in *Prometheus*, and perhaps in Taylor & Francis journals generally.

The main issue is that the debate goes well beyond discussion and criticism of the science, which is relatively safe ground in libel terms ... Perhaps there are ways for the Editors – independently of the publishers – to suggest possible changes to the manuscripts in order to retain the essence of the debate, but without making specific allegations about named individuals or organisations, unless we are able to completely verify the facts.¹⁷

Just about every paper *Prometheus* has published in the 40 years of its existence would fall foul of these criteria. So would many papers published in the journals of the social sciences as a whole.

It is hard not to notice the similarity between our publisher's treatment of the SBS debate and how the SBS hypothesis is treated in court. So slavishly did Taylor & Francis managers follow the advice of their lawyers that debate authors were treated much like expert witnesses in court. An extra-judicial medical system protects the SBS hypothesis from criticism in court, and the same procedures were extended to academic consideration of the hypothesis. Debate authors were not to mention anything outside the silo of their scientific specialisation, and were always to defer to prominent individuals and organisations. By regarding authors as expert witnesses, T&F managers could draw back from actually censoring *Prometheus* papers by censoring their style of presentation instead: "This is not an issue that can be resolved by changing some sentences..."

There is no need for censorship when infinite delay has the same effect. The publication of any critical paper - and it is the mission of *Prometheus* to publish critical papers - carries some risk that someone, somewhere will be upset. The risk can (and should) be mitigated, but can be avoided altogether only by publishing papers that please everyone, papers that say so little that they can be cited almost anywhere (Macdonald, 2011). It is through their preference for publishing such papers

¹⁶ Email from Taylor & Francis, 6 July 2018.

¹⁷ Email from Taylor & Francis, 6 July 2018.

that academic publishers make themselves very much richer, academic life very much poorer, and the contribution of critical thinking to society and the economy very much smaller.

In mid-July, Taylor & Francis managers suddenly found what they called a ‘radical solution’ to the problem of publishing the SBS debate: Taylor & Francis would not be able to publish the SBS debate because it would divest itself of *Prometheus* with immediate effect, perfectly permissible under its contract. It seems that *Prometheus* will now be published by Pluto Journals, though the first issues will not appear until early 2020. Meanwhile, the debate on shaken baby syndrome will be published separately. I am grateful to Harry Crane and Ryan Martin, founders of Researchers.One, for encouraging publication of the SBS debate papers on the Researchers.One platform and for allowing the papers to appear as a single collection. I am also grateful to the authors of the SBS debate papers; their patience has been sore tried for well over a year. They have been asked to change their papers time and time again only to be told that, no matter what they said about shaken baby syndrome, all their papers were likely to be libelous. Not a single author dropped out.

References

- Benton, R. (1957) ‘Kids get on my nerves’, *Master Detective*, 53, p.44.
- Caffey, J. (1974) ‘The whiplash shaken infant syndrome: manual shaking by the extremities with whiplash-induced intracranial and intraocular bleedings, linked with residual permanent brain damage and mental retardation’, *Pediatrics*, 54, 4, pp.396-403.
- Coghlan, A. (2015) ‘Expert witness on ‘shaken baby syndrome’ faces misconduct charge’, *New Scientist*, 6 October.
- Crown Prosecution Service (nd) *Non Accidental Head Injury Cases (NAHI, Formerly Referred to as Shaken Baby Syndrome [SBS]) - Prosecution Approach*, available at <https://www.cps.gov.uk/legal-guidance/non-accidental-head-injury-cases-nahi-formerly-referred-shaken-baby-syndrome-sbs> (accessed February 2019).
- Dickson, N. (2016) press release, 21 March, available at <http://www.gmc-uk-org/news/28451.asp> (accessed July 2018).
- Flanagin, A., Carey, L., Fontanarosa, P., Phillips, S., Pace, B., Lundberg, G. and Rennie D. (1998) ‘Prevalence of articles with honorary authors and ghost authors in peer-reviewed medical journals’, *Journal of the American Medical Association*, 280, pp.222-4.
- Geddes, J. *et al.* (2003) ‘Dural haemorrhage in non-traumatic infant deaths: does it explain the bleeding in ‘shaken baby syndrome’?, *Neuropathology and Applied Neurobiology*, 29, 1, pp.14-22.
- Hosken, A. (2011) ‘Met accused of ‘campaign’ against shaken baby witnesses’, *Today Programme*, BBC Radio 4, 8 February, available at http://news.bbc.co.uk/today/hi/today/newsid_9389000/9389553.stm (accessed July 2018).

- House of Commons (2011) *Peer Review in Scientific Publications*, Science and Technology Committee, Stationery Office, London.
- Iacobucci, G. (2016) 'GMC is urged to reinstate doctor struck off for role in "shaken baby" cases', *BMJ*, 355, 11 October, p.i5518.
- Jump, P. (2014) 'Taylor & Francis apologises over 'censorship' debate', *Times Higher Education*, 19 June, available at <https://www.timeshighereducation.com/news/taylor-and-francis-apologises-after-censorship-debate/2014017.article> (accessed July 2018).
- Macdonald, S. (2011) 'The skewed few: people and papers of quality in Management Studies', *Organization*, 18, 4, pp.467-76.
- Macdonald, S. (2015) 'Emperor's new clothes. The reinvention of peer review as myth', *Journal of Management Inquiry*, 24, 3, pp.264-79.
- Mayes, J., Brown, A., Marshall, D. *et al.* (2010) 'Risk factors for intra-familial unlawful and suspicious child deaths: a retrospective study of cases in London', *Journal of Homicide and Major Incident Investigation*, 6, 1, pp.77-97.
- Reece, R., Dias, M. Barr, M., Russell, B., Barr, R. and Runyan, D. (2015) 'White paper shaken baby syndrome/ abusive head trauma prevention', *Journal of Investigating Child Deaths*, 1, 1, March, pp.90-104, available at https://slidex.tips/queue/the-national-policing-homicide-working-group-investigating-child-death-sub-group?&queue_id=-1&v=1532013559&u=ODIuNS4xMy4xNDg= (accessed July 2018).
- Royal College of Pathologists (2004) *Sudden Unexpected Death in Infancy: A Multi-agency Protocol for Care and Investigation*, Royal College of Pathologists, London.
- Smith, R. (2006) 'Peer review: a flawed process at the heart of science and journals', *Journal of the Royal Society of Medicine*, 96, pp.178-82.
- Wate, R. (2015) *Investigating Child Deaths - Achieving a Balanced Approach Between Sensitivity and the Investigative Mind Set*, unpublished Doctor of Professional Studies by Public Works thesis, Institute of Work Based Learning, Middlesex University, June, p.93.
- Wilhite, A. and Fong, E. (2012) 'Coercive citation in academic publishing', *Science*, 335, pp.542-3.
- Wislar, J., Flanagan, A., Fontanarosa, P. and DeAngelis, C. (2011) 'Honorary and ghost authorship in high impact biomedical journals: a cross sectional survey', *British Medical Journal*, 343, available at europepmc.org/articles/PMC3202014 (accessed July 2018).



PROPOSITION PAPER

Shaken baby syndrome: causes and consequences of conformity

Waney Squier

John Radcliffe Hospital, Oxford, United Kingdom

Contact: waney.squier@gmail.com

Waney Squier is one of the world's leading paediatric neuropathologists. In March 2016, she was struck off the medical register in the UK, having been found guilty of lying and misleading the courts. As an expert witness, Squier advised courts in cases of infant head injury. Until 2010, she had been an adherent of 'shaken baby syndrome', the notion that the presence of a Triad of symptoms is evidence that a baby's death has been caused by shaking. In 2010, she changed her mind and immediately found herself in opposition to mainstream medical thinking in the area, an epiphany which was to lead inexorably to her ruin. Her striking off was overturned on appeal in November 2016, though she is still barred from giving evidence in court as an expert witness, and her reputation lies in tatters.

Introduction

While controversy is a normal and necessary part of scientific discourse, there has arisen a level of emotion and divisiveness on shaken baby syndrome/abusive head trauma that has interfered with our commitment to pursue the truth. (Guthkelch, 2012, p.201)

About ten years ago, a colleague of mine, a prominent prosecution expert, told me there was a move afoot to have me reported to the General Medical Council (GMC)¹⁸ for my evidence in shaken baby syndrome cases. I shrugged this off, telling him that I prepared my reports to the standard of my published research papers, based on my professional experience and supported by critically-reviewed and valid scientific evidence. In fact, I would be confident defending them at an international conference of my peers, something with which I was very familiar as an academic paediatric neuropathologist.

The following year, I was subject to harsh criticism in a raft of family court judgments, one of which was publicised.¹⁹ In accordance with the rules of the family court, I was not able to respond to the specifics of these criticisms.²⁰ Judges are regularly invited to reach adverse findings about the nature and quality of evidence given by expert witnesses; this is part and parcel of the adversarial process. My nonchalance may have sprung from complacency, or arrogance or sheer naivety, but it came as something of a shock to be informed, in the course of an ongoing criminal case in June 2010, that I and the other defence expert in that case (Marta Cohen) had been reported to the GMC on the basis of these critical judgments. I had failed to realise that casual comments in a hospital corridor were the first rumblings of a storm that was to engulf the next decade of my life and to alter profoundly the potential for families to defend themselves against allegations of abuse. This paper describes how a campaign was forged to suppress legitimate scientific evidence presented in courts and to silence dissent. This campaign has had a profound impact on the delivery of justice.

My professional background as a consultant neuropathologist

¹⁸ The doctors' regulatory body in the UK: "We are an independent organisation that helps to protect patients and improve medical education and practice across the UK" (<http://www.gmc-uk.org/about/role.asp>).

¹⁹ These were all cases in which shaken baby syndrome was alleged. Four of the five were infants with no marks of injury or evidence of violence. One was an older baby who had bruises following a given history of two falls in the days prior to admission (Pauffley, J. (2008) High Court Family Division FD 07C00331, 9 June; Pauffley, J. (2009) High Court Family Division, February; Hedley, J. (2009) J. F & L v A Local Authority & Anor, High Court Family Division, EWHC 140 (Fam) 14 January; King, J. (2009) High Court Family Division, EWHC 2115 (Fam), May; King, J. (2010) High Court Family Division, CM09C5011, 3 February).

²⁰ In the main, the family courts operate in secret and guard carefully the confidentiality of their proceedings, which may not be made public without express permission. An expert witness is not a party in proceedings and has no right of appeal.

I trained in medicine. After graduating, I specialised in paediatrics and then pathology. My specialist knowledge, developed over more than three decades of diagnostic practice, lies in the anatomy and physiology of the developing infant brain and how it is disturbed by disease or trauma. During this time, I have made detailed examinations of over 3000 brains of babies who have died before or after birth and in the first years of life. The great majority of my experience is with natural causes of death; babies who are born with malformations or have epilepsy or who suffer deprivation of oxygen during birth. I have published widely on these subjects. I also examined the brains of babies who had suffered trauma, both accidental and inflicted. I have published about 120 peer-reviewed papers, many textbook chapters, and have edited a textbook on the pathology of acquired damage to the developing brain. As the senior of only two paediatric neuropathologists in the UK, I have acquired more experience than any other expert in the pathology of the developing infant brain and its reactions to disease and trauma. For over twenty years, I used my expertise to give evidence in coroner's cases, in civil cases involving brain damage before or during birth, and as a prosecution expert in criminal cases involving the deaths of adults and children. I acted as an expert for both prosecution and defence in cases of suspected abuse. But the allegations against me were strictly limited to cases where I had given evidence challenging the shaken baby syndrome.

Shaken baby syndrome

The background to this matter depends on an understanding of what shaken baby syndrome (SBS) is said to be, how it came into being, and the essential controversies surrounding it.²¹ SBS is a diagnosis generally applied to babies under one year of age (the peak age is three months) who display three pathological features, known as the 'Triad'. These features are subdural haemorrhage (SDH) (bleeding into the dura, the dense fibrous membrane which lines the skull and surrounds the brain), retinal haemorrhage (RH) (bleeding into the back of the eye), and encephalopathy (some sort of disturbance of brain function, often involving brain swelling). The diagnosis does not depend on the presence of bruises or fractures or any evidence of violence. The syndrome is more

²¹ Shaken baby syndrome (SBS) has also been called 'non-accidental head injury' (NAHI) and 'abusive head trauma' (AHT) (see Christian and Block, 2009). The term 'SBS' is used in this paper because shaking is usually the assumed mechanism of injury in the absence of evidence of violence or trauma.

frequently diagnosed in boys and the baby is said to collapse immediately at the time of assault. Two further factors of circumstantial evidence are often adduced, namely that the alleged injuries are inflicted by a sole carer in the absence of any witness, and that health professionals regard the history given as unsatisfactory.

For over forty years, the medical profession has wrestled with the problem of babies who have the Triad, but who show no evidence of violence. The shaken baby syndrome hypothesis was developed by a small group of paediatricians and radiologists in the United States in the second half of the twentieth century. John Caffey, a radiologist, was the most prolific writer on the subject. In 1946, using X-rays, he described six infants with subdural haemorrhage associated with changes in the bones. These changes were thickening of the membranes around the bones and fresh or healing fractures. Caffey thought the cause was trauma, although he had no direct evidence for this. In 1972, Caffey adopted the suggestion that there was a causal relationship between shaking and subdural haemorrhage.²² But for Caffey (1974, p.397), “By far the most extensive anecdotal proof of pathogenic manual WLS [whiplash infant shaking syndrome²³] comes from the confessions to the savage shakings of dozens of infants by an infant-nurse ...”. Caffey’s evidence of the nanny’s abuse came from his personal communication with Robert Salinger, “who first detected the guilt of the infant nurse and provided me with much valuable first hand information” (Caffey, 1974, p.403). Caffey cites his other sources as an article in *Master Detective* (Benton, 1957), a 10 cent comic of the time, and another in *Newsweek* (1956), from which the medical literature still quotes (eg, Lazoritz and Bier, 2012, pp.16-17):

“The brutal and tragic career of nurse Virginia Jasper is tied to her massive physical traits. She is an ungainly six feet, weights [sic] 220 pounds and has a 52-inch waist. Police conclude that she probably had no idea of the strength of her cruelly big arms and hands.

Virginia Jasper had confessed to maltreating and shaking five infants in her care, three of whom died.

²² Guthkelch (1971) suggests, based on biomechanical research into road traffic accidents, that shaking is the cause of the thin film subdural haemorrhages covering both sides of the brain that are typically seen in infants. He notes that these haemorrhages are unlike those in adults, which are usually thicker and occur on just one side of the brain. He proposes that shaking would shear the bridging veins, which carry large volumes of blood from the brain into the venous outflow channels in the dura.

²³ One of several names for the syndrome suggested by Caffey (1974).

It seems astonishing that such a tenuous hypothesis should have been rapidly and widely adopted by paediatricians. There are two potential explanations: first, the hypothesis provided an explanation for infants with bleeding in their heads of a nature which had usually been associated with trauma, but in whom there were no external signs of trauma; and, secondly, the introduction of mandatory reporting. Mandatory reporting of suspected abuse was introduced as the direct result of a landmark paper published in 1962 by Henry Kempe and his colleagues. ‘The battered-child syndrome’ details the results of a year-long survey of babies with a collection of findings, including fractures, subdural haemorrhage, bruising, failure to thrive or sudden death. Kempe *et al.* draws the attention of physicians to their responsibility to consider the diagnosis of abuse in such cases. The paper had a remarkable effect; society expressed justified outrage at the prospect of assault on its weakest members and the mass media focused on child abuse in such television shows as *Ben Casey* and *Dr Kildare*, and in popular magazines, such as *Good Housekeeping* and *Life*. The authors were invited to meet representatives of the United States children’s bureau, police and lawyers. Within four years, statutes mandating the reporting of suspected abuse had been introduced in all but one US state (see Heins, 1984). Although mandatory reporting of abuse is not a legal requirement in the UK, in practice, according to the legal correspondent of the *British Medical Journal* (Dyer, 2005a), it is usual for even a suspicion of abuse to be reported, and a legal ruling in 2005 indicated that paediatricians must have immunity from prosecution (by parents) for even negligent investigation and reporting of abuse.²⁴

By 1974, Caffey had introduced a different definition of abuse and another term, ‘whiplash infant shaking syndrome’:

The essential elements in the infantile whiplash shaking syndrome present an extraordinary diagnostic contradiction. They include intracranial and intraocular hemorrhages, in the absence of signs of external trauma to the head or fractures of the calvaria, and are associated with traction lesions of the periosteums of the long bones in the absence of fractures and traumatic changes in the overlying skin of the extremities.” (Caffey, 1974, p.396)

It is significant that internal findings alone were now sufficient to identify abuse, perhaps because Caffey was a radiologist whose focus was on X-rays rather than clinical examination of the baby.

²⁴ “A doctor must be allowed to raise what sometimes may be no more than a suspicion with the relevant authorities without fear of litigation from the child’s parents” (Alan Craft as quoted in Harvey and Marston, 2010, p.48). “In a judgment anxiously awaited by paediatricians, the lords ruled by a majority of four to one that child protection professionals owe a duty of care to the child alone and not to the parents who may suffer as a result of an investigation that is negligent” (Dyer, 2005a).

In his definition, fractures of the bones and signs of trauma (such as bruises and abrasions) were specifically not required. For the first time, trauma by shaking could be assumed without any direct external evidence of trauma or violence.

By 1998, the cluster of features which could lead to an assumption of abuse had changed yet again; now they had mutated into a Triad of intracranial findings which no longer included bony changes. Commenting on the trial in Boston of Louise Woodward, yet another nanny (this one British and convicted of shaking the baby in her care), a group of child abuse paediatricians wrote:

The shaken baby syndrome (with or without evidence of impact) is now a well-characterized clinical and pathological entity with diagnostic features in severe cases virtually unique to this type of injury - swelling of the brain (cerebral edema) secondary to severe brain injury, bleeding within the head (subdural hemorrhage), and bleeding in the interior linings of the eyes (retinal hemorrhages). Let those who would challenge the specificity of these diagnostic features first do so in the peer-reviewed literature, before speculating on other causes in court. (Chadwick *et al.*, 1998, p.321)

The Triad was endorsed by English courts (Mackey, 2006), and by prosecution experts, declaring that “The Triad of encephalopathy, subdural haemorrhages and retinal haemorrhages as an indicator of head injury has stood the test of time” (Richards *et al.*, 2006, p.205).

In 2009, the American Academy of Pediatrics, recognising a growing scientific literature challenging the foundations of SBS, recommended that the term ‘shaken baby syndrome’ should be replaced with a “medical terminology that is inclusive of all mechanisms of injury, including shaking” (Christian and Block, 2009, p.1409). The term ‘abusive head trauma’ (AHT) was suggested although “the commonality of a described shaking mechanism along with the infrequency of impact evidence supports [*sic*] shaking as an important mechanism of AHT” (Christian and Block, 2009, p.1409). The new term perpetuated the hypothesis that trauma was the cause of the Triad and, of greater concern, the implication that a criminal act has occurred.

Abusive head trauma, or shaken baby syndrome, is the only medical diagnosis which embodies a criminal offence. It fails to separate medical diagnosis, which doctors are equipped to undertake, from allegation of a criminal act, which goes beyond the expertise of medical professionals and is best left to legal fact-finders. Deborah Tuerckheimer, a lawyer who has written extensively about SBS, describes it as a medical diagnosis of murder which, in its classical formulation, may be used to prove the mechanism of death, the intent to harm, and the identity of the killer (a cardinal feature of the syndrome being that the baby will collapse at the moment of

shaking). In this hypothesis, the perpetrator is typically the person who placed the emergency call or brought the baby for medical care (Tuerkheimer, 2011). A better term would accurately describe the objective findings and avoid speculation; ‘retinodural haemorrhage of infancy’ was suggested by Norman Guthkelch in 2012 as it allows the investigation of causation without the assumption that the answer is already known.²⁵

Scientific studies undermining the shaking hypothesis

Science progresses by development of hypotheses which must then be tested. In exactly this way, efforts were made to find scientific evidence that would support the shaken baby hypothesis (Squier, 2008).

Biomechanical studies

It was a decade and a half after the widespread adoption of SBS that the first attempts were made to validate the hypothesis. They did not succeed. Following clinical, pathological and biomechanical studies, Duhaime, Gennarelli, Sutton and Schut (1988, p.85) concludes: “It is our opinion based on the clinical data and studies outlined that the ‘Shaken Baby Syndrome’ is a misnomer, implying a mechanism of injury which does not account mechanically for the radiographic or pathologic findings”. Since then, biomechanical studies have repeatedly shown that the forces of shaking are less than those of even a short fall. Michael Jones, a biomechanical engineer and author of several papers on shaken baby syndrome, wrote recently: “No study has to date demonstrated that shaking alone, without an associated impact, exceeds the injury threshold associated with SDH” (Jones *et al.*, 2015).

Pathological and radiological studies

Pathological and radiological studies further undermined the shaking hypothesis. Subdural haemorrhage was, according to the shaking hypothesis, caused by traumatic tearing of bridging veins, the wide vessels which convey blood out of the brain into draining channels (sinuses) in the dura. These vessels leave the surface of the brain and cross the subarachnoid ‘space’, which

²⁵ Guthkelch (1971) is the first paper to suggest shaking as the cause of subdural bleeding. Guthkelch (2012) is a serious call for restraint in the consideration of retinodural haemorrhage in infancy. The paper notes that these findings cannot allow shaking to be inferred, and calls for a better understanding of the pathology of the infant brain and its coverings, and more rigorous examination of the evidence.

contains cerebral spinal fluid (CSF), the fluid that bathes the brain. The veins penetrate the arachnoid barrier layer (the second of the three membranes surrounding the brain), which contains and regulates the CSF beneath it. Bridging veins were said to be ruptured by backward and forward movements of the brain within the head during shaking. Pathology has not confirmed this hypothesis as torn bridging veins have not been demonstrated in babies with the thin films of bleeding which characterise SBS. Anatomically, if shaking caused the veins to tear, they would presumably bleed into the subarachnoid space, not into the dura. Second, if, as hypothesized, shaking caused the bridging veins to rupture, the bleeding would not be the thin film found in most SBS cases; instead, the rupture of high flow bridging veins would lead to brisk bleeding and a thick mass of blood clot, which can be verified at surgery.

Based on the anatomy, it is likely that the thin bleeds in SBS cases result from leakage from blood vessels within the dura rather than traumatically-ruptured bridging veins. The anatomy of the infant dura is different from that of the adult, being well endowed with blood vessels which may predispose it to bleeding (Mack, Squier and Eastman, 2009). Pathologists have for decades recognised that bleeding into the dura is virtually universal in new-born babies. Magnetic resonance imaging (MRI) brain scans of new-born babies show that almost half of normal, healthy new-born babies have small subdural haemorrhages, just like those of SBS. These bleeds are always associated with bleeding into the dura, indicating that these thin films of blood may originate in the dura itself and not in torn bridging veins.

Widespread but small amounts of bleeding may not be a manifestation of trauma at all, but a safety mechanism to protect the brain from pressure fluctuations during birth. This is explained by the pathophysiology of blood flow out of the brain. Blood passes out of the brain via the bridging veins into the large sinuses in the dura, then into the vessels in the neck, and then into the chest to return to the heart. During birth, pressure on the head and chest slows or impairs the return of blood from the brain to the heart. Pressures rise in the blood vessels draining the brain, but a system of valves prevents back pressure being transmitted to the vessels in the brain, which would otherwise cause bleeding into the brain tissue. Instead, the pressure is transmitted to the dura, which has a large plexus of vessels in the infant and can act as a reservoir; if the bleeding into the dura is of sufficient volume, it leaks onto its surface and forms a subdural haemorrhage. After birth, handling a baby, resuscitation and mechanical ventilation can all increase blood flow and pressure in the intracranial blood vessels (Cowan and Thoresen, 1985). Ironically, Caffey, despite

fervently promoting shaking as the cause of retinal and subdural bleeding, acknowledged that “Artificial respiration may induce excessively high intracranial and intraocular venous pressures which lead to hemorrhagic brain and eye damage and pneumomediastinum” (Caffey, 1972, p.165).

There is something even more intriguing about the pathology of birth-related subdural bleeding. Subdural bleeding is an irritant and causes an inflammatory response in the dura, but we do not yet understand the effects this may have on an infant. While almost half of healthy babies have subdural bleeding at birth, we do not know with any certainty how often these bleeds clear up without problems. Most probably do, but radiology and pathology indicate that some residual of subdural bleeding may persist for over three months; it is the commonest incidental finding in babies dying unexpectedly. About three quarters of babies with the Triad have old as well as fresh subdural bleeding. One of my areas of interest has been whether persistent bleeding could be more than just a bystander. Because migraine is thought to originate in the nerve fibres of the dura, a lot of research has been devoted to this system, which provides an anatomic and physiological link between blood and tissue injury in the dura and swelling of the underlying brain. Sensitizing the dural nerves by bleeding may potentiate brain swelling in response to trauma (Squier *et al.*, 2012). Babies who harbour an old bleed may have an exaggerated response to a minor injury (such as rolling off a bed), which would be perfectly harmless to a baby who had not been sensitised in this way. Those parents who give such an explanation when their baby presents with the Triad may well be telling the truth; bear in mind the exhortation attributed to William Osler, the great physician: "Listen to your patient, he is telling you the diagnosis" (see Maude, 2014).

The second element of the Triad, retinal bleeding, is equally non-specific. Retinal haemorrhage also occurs in about half of normal babies after birth, as well as in many natural conditions and in raised intracranial pressure of any cause (Minns *et al.*, 2017). Severe retinal haemorrhages have been linked to resuscitation and life support rather than trauma. The third and least defined element of the Triad is encephalopathy, which is usually taken to mean some sort of disturbance of brain function. It may show itself in a wide range of clinical manifestations, anything from a grumpy, irritable and/or vomiting baby to a baby with seizures and rapidly-lethal brain swelling. Jennian Geddes, a highly experienced neuropathologist, made detailed microscopic studies of the brains of infants who had died with a diagnosis of non-accidental injury, looking for the pathology which might cause these symptoms. She showed that the majority do not have mechanical tearing of nerve fibres; instead, they show predominantly the effects of failure of blood

and/or oxygen supply and swelling, which are entirely non-specific (Geddes, Hackshaw, Vowles *et al.*, 2001; Geddes, Vowles, Hackshaw *et al.*, 2001). This has been confirmed in brain imaging studies (Stoodley, 2004).

There are two corollaries of this observation. First, if there is no evidence of traumatic damage to the brain, there may not have been any trauma. Secondly, the shaking hypothesis states that the baby will collapse immediately as a result of widespread traumatic tearing of nerve fibres, which causes immediate loss of their function. However, hypoxia and brain swelling occur at rates which vary considerably from case to case, so that there is opportunity for delayed deterioration or a 'lucid interval' to occur. In other words, the baby may appear well or only mildly symptomatic after an event that causes slowly progressive brain swelling or encephalopathy. This undermines the hypothesis that a baby must collapse immediately after assault, which is used to confer culpability on the person looking after the baby at the time.

Lack of an evidence base

As evidence-based medicine became the norm, researchers began to address a serious problem: the lack of evidentiary support for the ever-evolving SBS hypothesis. Thousands of articles have been written on the subject of shaken baby syndrome and thousands of parents have been prosecuted on the basis of the hypothesis. Much of the published literature suffers from major flaws, particularly of methodology and case selection. On the basis of a systematic review of the clinical and radiographic characteristics of abusive and non-abusive head trauma, Piteau *et al.* (2012, p.321) observe that:

This meta-analysis was made difficult by inconsistencies in the criteria used to determine the etiology for head trauma, inconsistencies in defining and reporting clinical and radiographic variables, and a moderate to high degree of statistical heterogeneity between studies. As there are no standardized criteria for the definition of abuse, most authors developed their own criteria, and many of these are fraught with circular reasoning. The diagnosis of AHT relies on historical features, clinical findings, and radiological interpretations, and it is these same criteria that are used to categorize head trauma as abusive and non-abusive.

A two-year comprehensive review of over 3,700 published papers by the Swedish Agency for Health Technology Assessment has supported these observations. It concludes that there is virtually no evidence to support shaking as a cause of the Triad or any of its elements (SBU, 2016). Support for the hypothesis - and only weak support - is found in just two papers, each depending

on confessions. In one of these studies, comparison is made between the timing of confessed shaking and the objective assessment of timing of bleeding on brain scans. There is no correlation. The authors themselves note that confessions are not scientific evidence. The Swedish study concludes that, given the lack of an evidentiary basis, it is ethically improper for physicians to testify that the Triad findings are caused by shaking.

Confessions may be unreliable because a perpetrator is not truthful about the mechanism of injury or omits critical evidence, perhaps in an attempt to limit the perceived violence of an attack. Alternatively, as often happens, police officers interrogating a suspect may tell the suspect that the baby must have been shaken to have caused the pattern of intracranial injuries. A study of suspected abuse cases in the United States found that, when compared with clinical evidence, most confessions are unreliable and that confessions were made to shaking alone even when there was clinical evidence of impact (Dias, 2011). Whatever the reason, confessions do not provide evidence of sufficient reliability to assist in understanding the causes of intracranial bleeding.

If the evidence available today indicates that shaking is unlikely to be the cause of the Triad, we are left with the question: What is? One of the most important observations of the last decade has been that retinal and subdural haemorrhages, just like those seen in supposedly shaken babies, occur in about half of all healthy new born babies. This indicates to me that we are looking at a process reflecting the anatomy and physiology of the immature brain. Head trauma, accidental or inflicted, accidental falls, venous thrombosis, blood clotting disorders, genetic conditions and various forms of childhood stroke have all been described radiologically and by pathology in association with subdural and retinal haemorrhage (Barnes, 2011; Squier, 2011). As with cot deaths (sudden infant death syndrome), our understanding of infant deaths is still incomplete and other causes are almost certainly as yet unknown. Indeed, some babies exhibiting the Triad may simply be a subgroup of cot death babies. There is extensive demographic overlap between cot death babies and those diagnosed with shaken baby syndrome; notably an identical peak age at 12 weeks, male predominance (two-thirds of each group are male), and a history of prematurity as well as many common exogenous factors, such as minor infections, maternal smoking, alcohol and drug use, and social deprivation. By definition, cot death babies die in their sleep. However, babies who have been discovered in the course of dying may suffer prolonged oxygen deprivation while medical assistance is summoned and before they are fully resuscitated. The subsequent resuscitation, with restoration of blood flow to the hypoxic brain and its surrounding membranes

and fluctuating blood pressures caused by resuscitative efforts and mechanical ventilation, causes leakage of blood through blood vessels weakened by hypoxia, leading to subdural and retinal bleeds (Squier, Mack and Jansen, 2016).

The controversy

For many years, the medical theory underlying shaken baby syndrome went largely unchallenged. The uniformity of opinion within the medical profession provided the certainty necessary for the courts to convict hundreds of parents and caretakers across the United Kingdom and elsewhere for allegedly violently shaking children in their care. As our understanding of the medical issues has developed, it has become clear that much of the received wisdom rests on incomplete knowledge of infant anatomy and physiology - and on simplistic beliefs. The current crux of the controversy is whether it is possible to assume a shaking mechanism from finding the Triad or its components. On the basis of current science, it is not.

The Metropolitan Police strategy to improve rates of conviction in shaken baby cases

In 2001, the neuropathological studies by Jennian Geddes caused me to stop short. I read in depth many articles on every aspect of SBS; to my shame, I had not done this earlier. Despite subscribing to the hypothesis; I had depended on textbooks and standard teaching. I became convinced that there was little scientific support for the shaken baby theory and that there were many alternative causes for the Triad. I had changed my mind, and the evidence I gave in family and criminal courts in infant death cases changed. I could no longer assert that the Triad was sufficient evidence to make a diagnosis of abuse.

Things came to a head in May 2009 with a widely-disseminated family court decision by Justice King (2009). In this opinion, King held that a mother had shaken her 13-week old infant, causing his death. When the baby fell ill and was admitted to hospital, the baby was found to have the Triad, but had no bruises, fractures or other evidence of violence or maltreatment. This was typical shaken baby syndrome. There was no suggestion of past abuse or violence in the family. The hospital doctors had attributed the death to congenital heart disease and the pathology, agreed

by pathologists from both sides, confirmed that the subdural haemorrhage was some weeks old, pre-dating the baby's collapse.

In addition to endorsing traditional shaken baby theory, King made harsh criticisms of my evidence and that of a fellow pathologist because we had concluded that the evidence did not support a finding of abuse or shaking. Instead, we agreed with the admitting hospital doctors and suggested the baby collapsed from a natural cause. We set out the possibility that this was essentially a cot death which had been complicated by hypoxia, resuscitation and life support. In accordance with the rules of the family court, I was not a party in the trial so was unable to challenge or appeal the criticisms. A raft of similarly-critical family court judgments soon followed. My only recourse at that time (2009-10) would have been to report myself to the General Medical Council so that these criticisms could have been examined in a public forum. As it happened, I did find myself before the GMC, but I was not the one who made the referral.

The first complaint was made to the GMC on 1 April 2010, based on the King judgment. It was not Justice King who made the complaint, but rather the national policing improvement agency (NPIA). This now defunct body was established in 2007, its stated objective being to support the delivery of more effective policing and to foster a culture of self-improvement (Brough, Brown and Biggs, 2016, p.68). I knew nothing of the complaint at the time. In June 2010, I learned more. A second complaint to the GMC was timed to coincide with an ongoing case at the Old Bailey in which I was about to give evidence for the defence. The complaint was based on a collection of critical family court judgements. Again, the complaint did not come from any of the critical judges, but from the NPIA, this time in association with detective inspector Colin Welsh. Welsh was a member of the Metropolitan Police child abuse squad and - significantly - the investigating officer in the Old Bailey case in which I was involved. This was a high profile case - a paramedic working for the London ambulance service was accused of killing his son. The prosecution proposed shaken baby syndrome and the Metropolitan Police were clearly anxious to succeed, having recently been criticised for their handling of the notorious Baby P case (Ramesh and Butler, 2010).²⁶ That a second complaint had been made to the GMC, automatically triggering

²⁶ According to the *Guardian* newspaper (which had access to the original full serious case review):

... police officers made a series of mistakes that meant they missed a chance to charge Baby P's mother with assaulting him several weeks before his death. The toddler was first taken to the Whittington hospital with extensive bruising in December 2006. Doctors thought the injuries were suspicious and he was put on Haringey council's child protection register. But police did not photograph his bruises for a week and failed to photograph his home, a potential crime scene. Officers did not visit the home with the social worker and

a GMC hearing, was announced to the court by Welsh even before I was aware of this. Marta Cohen, a pathologist who had also challenged the SBS hypothesis, was the other defence expert in this case and was similarly the subject of a complaint to the GMC.

The Atlanta lecture

It would not have been convenient for the police to have had our evidence heard at the Old Bailey trial. This was made clear a few months later, in September 2010, when Welsh gave a presentation entitled ‘A national co-ordinated approach to cases of non-accidental head injury in the UK’²⁷ at a conference of the National Center on Shaken Baby Syndrome²⁸ in Atlanta, Georgia. It would seem that Welsh concluded his PowerPoint presentation at the Atlanta conference with:

As a result of these submissions and others received previously from other sources in the UK ... [redacted] now face full ‘fitness to practice’ hearings.²⁹

A fuller version of this point is available from notes of the Welsh presentation made by Heather Kirkwood, a lawyer attending the NCSBS conference:³⁰

kept no detailed notes of conversations with the mother. The Crown Prosecution Service asked police to get an independent medical review of the toddler's injuries and a specialist was identified to carry it out. But nothing happened, because the detective in charge was suddenly transferred to another section in the Metropolitan Police without formally handing the case over to another officer. This was a clear breach of standard operating procedures. (Ramesh and Butler, 2010)

²⁷ According to the NCSBS website (accessed April 2018), detective chief inspector Dave Marshall, then head of the murder investigation team of child abuse investigation command, the unit in which Colin Welsh served, was co-author of the Welsh presentation. Dave Marshall retired in August 2010 and insists that he neither wrote the presentation nor attended the conference (personal correspondence).

²⁸ Founded in 2000, the National Center on Shaken Baby Syndrome, is a public charity with (according to its website) a mission to:

Prevent shaken baby syndrome and promote the well-being of infants generally through the development and implementation of programs, policy and research; and to support and educate families, caregivers and professionals. The NCSBS works nationally and internationally with hospitals, public health, pediatricians, social workers, home visitors and other similarly aligned individuals and organizations to provide education and resources to families and professionals that will ultimately keep babies safe. The NCSBS is a leader in the development of shaken baby syndrome/abusive head trauma (SBS/AHT) prevention programs, training courses and public education campaigns. Each year, the National Center's resources and services reach over a million people worldwide. (available at <https://www.dontshake.org/about-us> (accessed October 2017))

²⁹ The redaction refers to Dr A and Dr B (me and Marta Cohen). From September 2010, I made a series of requests for a copy of the PowerPoint slides from Welsh's presentation, directly to the Metropolitan Police and then as a Freedom of Information request. Despite the presentation being given at a public meeting, my requests were repeatedly refused until a highly redacted set of almost entirely blank slides was received in 2013.

³⁰ The account given here is based on the notes taken by Heather Kirkwood (published in November 2016 as ‘Transcript SBS conference MPS talk on ‘How do you influence judges’) available at <https://pennymellor.wordpress.com/2016/11/04/transcript-sbs-conference-mps-talk-on-how-do-you-influence-judges/> (accessed April 2018). See also a discussion with Kirkwood at the Atlanta conference, published in June 2012 as ‘‘Backdoor’ tactics show through’, available at <https://onsbs.com/2012/06/12/back-door-tactics-show->

[Now] matter of course to ask prior to trial and serve order ... on all doctors who are about to give evidence as experts ... on their fitness to practice. ... Re Dr. A: had to inform GMC of Court of Appeals and family (orders). Dr. A and B now waiting on fitness to practice. May be struck off, possibility they will be struck off.

Question from Carole Jenny [in audience]: hasn't A already been struck off?

Walsh [*sic*]: No. Some terms on B.

The context is that the Metropolitan Police child abuse investigation command was, according to Welsh, in “dire straits in investigations—very bad results in criminal courts” between 2008 and 2009. He outlined the approach to improving the command’s performance in shaken baby cases, basically a campaign involving the police, the Crown Prosecution Service, lead and junior prosecution counsel, and medical prosecution experts in pathology, paediatrics and ophthalmology.

Shortly into the talk, I realized that the ‘national coordinated approach’ referenced in the titled of the talk was essentially a description of the joint efforts of New Scotland Yard, prosecution counsel, and prosecution medical experts to prevent Dr Squier and Dr Cohen from testifying for the defense on their findings in specific cases as well as on their published and peer-reviewed research. (Heather Kirkwood as quoted in Diable, 2011)

Colin Welsh presented press cuttings about three cases in which the police had not been successful in their prosecution. These were cited as examples of systemic failure in the prosecution of SBS cases, signalling a need for improvement. I had prepared reports for the defence in all three. Welsh complained about the “Same handful of experts showing up at trial, role was to confuse jury with complexity of science and provide alternatives ...”. The solution he advocated to this problem was greater scrutiny. The literature on which the defence witnesses relied had to be more carefully scrutinised:

Research papers by witness. They attempt to bandy about “peer reviewed”,. What does that mean? Reviewed by defense witnesses in same case or earlier trial. Always get full articles, used abstracts before, juries can be seriously misled.

To keep abreast of the new literature being presented by defence experts, Welsh had resolved that the police would maintain its own up-to-date reference library. The police would, in future, be getting full papers, rather than just the abstracts on which they had previously relied (a surprising

through/ (accessed April 2018) and an interview Kirkwood gave to Andrew Hosken on the Radio 4 *File on Four* programme (BBC, 2011).

admission of a casual approach to the use of literature). And then there had to much greater scrutiny of expert witnesses themselves:

Question everything, qualifications, employment history, testimony, research papers presented by these experts, go to their bodies to see if we can turn up anything unusual. Previously unusual to object to testimony? no longer. Collect reports and evidence for previous cases. Go through with fine tooth comb. If suggest rare brain condition, then find out if made same suggestions in last five trials, maybe not as rare.

Colin Welsh went on to discuss the judiciary and how judges might be influenced by what he called the ‘back door’?

HOW DO YOU INFLUENCE JUDGES

- a. Make formal complaint. Felt that was inappropriate (would put backs up), wouldn’t listen to copper.
- b. So deal by back door. Prosecution counsel quite willing to take forward, had contact outside of trial with judges.

Welsh expressed the view that family court judges are far more experienced and competent than criminal court judges, and discussed the possibility of taking a judgment made in the family court into criminal court proceedings of the same case. Family court judgments are typically detailed and set out the judge’s view of the entire case, including personal assessment of experts from whom the judge has heard. Were these opinions to be introduced into criminal proceedings (and this is not usually allowed), they could be seriously prejudicial. Welsh, however, told the Atlanta audience that he had had some success in this respect. He referred specifically to the appeal of three cases of shaken baby syndrome in which I had prepared reports.³¹ When I gave evidence at this appeal, the panel of judges had been provided with the family court judgment of Justice King, which was critical of me, and they quoted from it. According to Kirkwood’s notes, Welsh told the conference that the this information had been provided to the criminal court in order to “Cast doubt on her [Squier’s] evidence, prepared to maintain an unsubstantiated theory. ... tell court of this witness. That can now be used in every case in which she gives evidence”. According to Kirkwood, Welsh concluded his presentation with:

³¹ R. v. Henderson; R. v. Butler; R. v. Oyediran (2010) EWCA Crim 1269. See Anon (2010) ‘Shaken baby syndrome – guidance on management of expert evidence’, *Criminal Law and Justice Weekly*, 16 July, available at www.criminallawandjustice.co.uk/clj-reporter/R-v-Henderson-R-v-Butler-R-v-Oyediran-2010-EWCA-Crim-1269 (accessed October 2017).

We're confident we have a pretty good model ... problems are at trial ... simple fact juries were being confused by defense witnesses so had to deal with this. This was top of list, not just the police, others too, prosecution had to deal.

Other complaints

In early 2010, the Metropolitan Police approached the human tissue authority (HTA) with concerns about my handling of tissues I had received in the course of preparing an opinion for the defence. The tissues were typically pathological specimens and sections of brain retained at forensic autopsy and forming part of the evidence in criminal cases. It was usual for the police to retain control of this material, delivering it to my laboratory in order for me to make a neuropathological examination and prepare a report for the court. The HTA supervises and controls handling of human tissues, and infringement of the Human Tissue Act is a criminal offence. My laboratory's procedures were scrutinised and found to be robust; the HTA was rapidly satisfied with them. The Metropolitan Police refused to release the name of the individual who had complained to the HTA.

At about the same time, another pathologist who had given evidence challenging SBS was also the subject of an HTA enquiry. Again, the HTA was satisfied that the procedures of the pathologist were perfectly in order. In that instance, the name of the complainant was released. He was Tony Risdon, a retired paediatric pathologist from Great Ormond Street hospital, who later gave evidence for the GMC in my fitness to practice (FTP) hearing.

The police and expert meetings

In May 2012, the Metropolitan Police provided me with a document entitled 'Minutes of a meeting to discuss issues affecting expert medical evidence at New Scotland Yard, Wednesday 28th October 2009'.³² It was heavily redacted; consisting of nine almost blank pages, but concluded that:

It is now inconceivable that the defence will be able to successfully deploy these experts in similar cases in the future.

³² Welsh and his team held meetings in June and October 2009. A Freedom of Information request for details of these meetings was initially refused on the grounds that the request was vexatious. Following a complaint to the information commissioner, the request was again refused, but this time on the basis that it would involve disclosure of personal data, although four of the nineteen individuals who were present at the meetings and responded to the request indicated that they would be content for their names to be revealed. It was later disclosed that two of the GMC's experts who gave evidence against me, Richard Bonshek and Tony Risdon, attended the meetings. A third, Neil Stoodley, did not respond to a request for this information.

The experts were Marta Cohen and me. Welsh and his team felt they had effectively deprived the defence of two expert witnesses. Cohen and I had given evidence for the defence in a number of criminal trials which did not result in convictions. We gave the same evidence in the same cases in the family division, but here it engendered the critical judicial comments used by the police in support of their complaints to the GMC.

The fitness to practice hearing and the appeal

Following my 2010 fitness to practice hearing, I was told that the GMC would continue to investigate my case. The hearing was based on six cases chosen by the police for scrutiny by the GMC, each involving an allegation of shaken baby syndrome which I had challenged. For almost three years, the GMC tried to find an expert to write a report criticising me. The GMC approached the professional bodies of pathologists and neuropathologists, which were unwilling to furnish lists of suitable experts. It then wrote to individual pathologists in this country. Replies refusing its request mentioned the significant controversy and acrimony that had marred the field of shaken baby syndrome, and the bad feeling that may have led to the matter being brought before the GMC.

In June 2012, Colin Smith, a professor of neuropathology, was invited to provide a report and replied, “As I have spoken publicly on issues related to this doctor’s views in this field I feel I could not approach this in an unbiased way.”³³ So, it was something of a surprise that in March 2013 Smith wrote the report for the GMC on which its case against me was founded. In preparing his report, Smith reviewed judgments from the family courts in five of the cases. He concluded that I had fallen seriously below the standard expected of an expert witness in two of the cases he was asked to review. In most of these cases where there was a criminal trial, judges or juries had found the prosecution’s evidence lacking and rejected it. The essence of his criticism set shaken baby syndrome centre stage:

An overwhelming view that comes across when reviewing these cases is that of a refusal to accept subdural haemorrhage as being due to trauma in cases where there is no absolute external evidence of head trauma (skull fracture, bruising, soft tissue swelling), and a refusal to accept shaking as a cause of intracranial injury. (Colin Smith to GMC, March 2013)

³³ Colin Smith during his cross examination on day 28 of the fitness to practice hearing.

Smith's report was the foundation for the GMC's case. It was revised several times and, with considerable input from a legal team, honed into a 142-page, 490-paragraph document setting out the allegations against me, which eventually formed the GMC's opening statement. The GMC ignored entirely not only new research, but also the content of my evidence. I was criticised not for my views, but for the words I used in expressing them and, ironically, for the manner in which I used scientific literature to support them. I welcomed this opportunity for a public hearing on shaken baby syndrome, since by 2013 the flaws in the hypothesis were well recognized. I considered that the views I expressed about SBS were properly backed by science and by my own considerable experience in the developing infant brain and its pathology.

Preparing for the fitness to practice hearing

In December 2013, I was referred for a fitness to practice hearing, expected to be heard within nine months. The hearing opened in Manchester in October 2014, was adjourned, went to judicial review and reopened in September 2015. It lasted until March 2016.

There were two years of intense preparation; while I welcomed the opportunity to defend myself, I did not anticipate the difficulties and extraordinary frustrations of preparation. My defence was funded by the Medical Protection Society; the defence organisation of which I had been a member for almost 40 years (since I left medical school). I was to learn very soon the difference between indemnity and insurance. The society does not function as an insurance company, but offers discretionary indemnity.³⁴ This meant that the organisation was to take full control of the handling of my case, including the choice of the legal team which was to represent me. I had worked with some excellent lawyers over the preceding 15 years and knew several who understood the issues of shaken baby syndrome, who knew me well and who were strongly supportive of me. Some were willing to act *pro bono*. I put their names to my MPS representative and asked if one of them could be my counsel. My request was rejected outright; not only could I not choose my own legal team, but I would have to fund my own defence if I did not agree to the

³⁴ "A qualifying applicant shall, in relation to any qualifying claim in respect of which an indemnity has been requested and/or granted comply absolutely with the directions of the Society, and shall not (without the consent of the Society) take any steps in relation to such claim and shall (at the Society's request) co-operate fully with the Society, its representatives and any appointed advisers in the handling of such claim, in particular, but without limitation, by pursuing and fully assisting the Society in the pursuit of any rights of recovery available from third parties" (Articles of Association, Medical Protection Society, June 2015).

MPS choice of legal counsel. This threat was repeated on a number of occasions up to a fortnight before the hearing began.

In preparing for my first hearing in 2010, I was advised from the very beginning to admit that I had been in error and to accept restrictions placed on my licence. I had refused then, and continued to refuse, to accept that I had done anything more than choose unfortunate words or explain myself inadequately. My legal team refused to grapple with shaken baby syndrome,³⁵ and hours, days and weeks were spent probing my use of specific words in reports written seven or eight years previously rather than exploring the flawed and illogical opinions of the GMC's experts, including Colin Smith, on this subject. I was to dance to the GMC's tune and ignore the SBS elephant in the room, despite the fact that it was fundamental to the original police complaints to the GMC and to the entire case against me.

The hearing

Finally, in October 2015, my case was heard by the Medical Practitioners Tribunal Service (MPTS) on behalf of the GMC.³⁶ The panel hearing the case included two lay members; a retired administrator from the Royal Air Force and a retired policeman. A retired community psychiatrist specialising in dementia represented the medical profession. None of the panel had been trained in law and none had any knowledge of paediatrics or pathology. The GMC called four medical witnesses, all with a prosecution background. Tony Risdon was one; he works almost exclusively for prosecuting authorities and has never given evidence for the defence in a trial.³⁷ Colin Smith was another; he now works solely for the prosecution:

Over the last 18 months or so, I just do not have time to take on defence cases, so that practice has essentially stopped. (Colin Smith in transcript of *Squier v. GMC*)

The question of Colin Smith's bias arose in closing submissions.

Professor Smith's lack of independence or 'bias' is partly of a scientific nature. This is not suggested pejoratively. It is simply a matter of fact. He holds certain scientific views, which are accepted by many and which are highly controversial to others. The thrust of his prejudice is illustrated in his own published words in the paper 'Shaken baby syndrome'

³⁵ "The context of the controversy surrounding NAHI is highly relevant but only to the extent that it makes it much harder for you behave [sic] in accordance with the principles of Good Medical Practice" (letter from MPS representative to Waney Squier, February 2015).

³⁶ The GMC adjudication service, funded by the GMC, and reporting to the GMC and to Parliament.

³⁷ Defence closing statement, *Squier v. GMC*, November 2016.

and forensic pathology' [Smith, 2014]. (Robert Francis, counsel for Waney Squier, in closing submission in *Squier v. GMC*, November 2016)

The defence declared that Tony Risdon was "firmly of the view that everything is abusive" and that "the claims made against Dr Squier could equally be made against Prof Risdon (and I'm sure will be)."³⁸ Neil Stoodley, a paediatric neuroradiologist and another witness for the GMC, "appeared to be willing to jump to conclusions adverse to Dr Squier without checking the material" and "asserted in his report that Dr Squier had failed to refer to his report in her own, when it was clear that his report was written after hers. He agreed he only made the comment by way of potential criticism."³⁹

There was a mantra throughout the six month trial that the issue was not who is right and who is wrong about the diagnosis of shaken baby syndrome. The focus of my examination was my choice of words rather than my underlying research and opinions, which were never questioned. However, in considering whether my opinions were not honestly held or were deliberately misleading or biased, it was difficult to avoid at least some consideration of what was right or wrong about the shaken baby hypothesis and its evidential basis. All four medical witnesses for the GMC admitted that the hypothesis on which they based their opinions in the individual cases before the GMC, and indeed against me, was unproven.⁴⁰

Three medical experts, one biomechanical expert and six character witnesses (one a past president of the GMC) gave evidence before the tribunal. I was supported by over 140 testimonials by leading medical and legal experts and by many petitions from parents. Nevertheless, in March 2016, the panel determined that I should be struck off the medical register. A letter to the *British Medical Journal* protesting at the decision to strike me off was signed by hundreds of doctors and experts (Scheimburg, I., Fleming, P., Reyes-Mugica, M. *et al.*, 2016). I appealed against the decision and in November 2016 my appeal was heard by Justice Mitting, who restored my licence to practise. But the prediction of the Metropolitan Police, expressed in 2009 - "It is now inconceivable that the defence will be able to successfully deploy these experts in similar cases in the future" - had come to pass.

³⁸ Defence closing statement, *Squier v. GMC*, November 2016.

³⁹ Defence closing statement, *Squier v. GMC*, November 2016.

⁴⁰ Defence closing statement, *Squier v. GMC*, November 2016.

Charges upheld on appeal

Although Justice Mitting ruled that my name should be restored to the medical register and that I should be allowed to resume my diagnostic practice, he upheld certain charges that he felt should disbar me from giving evidence in UK courts for 3 years. The original charges fell into three main categories:

1. I had made assertions in support of opinions which were insufficiently founded on the evidence available to me.

These charges were completely overturned. Evidence was provided to the court to demonstrate that there were factual foundations for my opinions.

2. I had expressed opinions in a field outside my expertise.⁴¹

Early in his judgment, Mitting wrote:

When the Triad fell to be considered, any specialist, with the possible exception of a forensic pathologist, who supported or doubted the Triad as indicative of NAHI, would be bound to be expressing an opinion outside his specialism. There can be no proper criticism of a neuropathologist, neuroradiologist or ophthalmologist/ophthalmic pathologist for explaining why he supports or doubts the majority view and in doing so, expresses a view about symptoms or pathological findings outside his own discipline. It is neither improper nor professional misconduct for an expert in one specialism to do so. The boundary line between a proper explanation of support or doubt and trespassing impermissibly outside the expertise of the witness is imprecise and difficult to identify in any particular case. (Mitting, 2016, para.17)

Nonetheless, Mitting went on to find that I had strayed beyond my expertise. An example is given in the Appendix.

It is important to view these allegations in the context of the role of defence experts in these cases, who may find it impossible to avoid trespassing outside their areas of expertise when they are outnumbered by prosecution experts. In my experience, this was normal. In some cases, I have been one of only two, or even the sole, defence expert when up to twenty witnesses have been called

⁴¹ According to the GMC:

The role of an expert witness is to assist the court on specialist or technical matters within their expertise. ... When giving evidence or writing reports, you must restrict your statements to areas in which you have relevant knowledge or direct experience. (General Medical Council, 'Acting as an expert witness', available at https://www.gmc-uk.org/Acting_as_an_expert_witness___archived.pdf_51771128.pdf, withdrawn in 2013 (but accessed November 2017).

by the prosecution. My instructions were to review the case material, which includes all the prosecution reports having a bearing on my own report. If incorrect or illogical or unfounded evidence in the reports of prosecution experts, even from another specialism, is not flagged, it may be put before the court. In raising such matters, I have been found to have gone beyond my area of expertise. Even making clear that an expert from another specialism is required would not, according to the GMC, prevent such an allegation. In one case, Mitting found that I had not been objective and unbiased because I had maintained a differential diagnosis. The basis of the criticism was that another expert had virtually excluded an alternative diagnosis and that my choice of words in my *addendum* indicated it was not a hypothesis with which I disagreed. According to Mitting:

The principal conclusion was, however, well-founded. Professor Bell's report and the negative result of HIV immunocytochemistry did all but exclude the hypothesis of HIV/AIDS infection. Dr. Squier's choice of words in her *addendum* demonstrates it was not a hypothesis that she was willing to discount. The MPT were entitled to find both allegations - in reality one allegation - proved. (Mitting, 2016, para.134)

This exemplifies the very different approaches of law and medicine. Law depends on a binary system with only two possible results: right or wrong, guilty or not guilty. In medicine, things are never as certain and there are always unknowns. An absolute diagnosis is possible in relatively few cases and almost invariably a list of alternative diagnostic possibilities (a differential diagnosis) must be constructed and ranked in order, depending on the facts of the specific case. It is often not possible to whittle this list down to a single cause and it would be a dereliction of duty to discard a diagnosis that cannot be reliably excluded on the basis of the available diagnostic tests. 'All but' (the term used by Mitting) is not sufficient to discard a diagnosis. If the test cannot be done, we simply do not know the answer. In the medical arena, getting this wrong may deny a patient the chance of investigation or treatment. In the legal arena, it may result in false convictions and/or the destruction of families.

In cases of babies with the Triad, this process has gone awry. Belief in abusive head trauma as the cause of the Triad has become so entrenched that consideration of natural diseases before trauma is assumed is often only perfunctory. If there is no evidence of trauma, then shaking is assumed. Not knowing becomes an assumption of abuse rather than just not knowing.

3. I had relied on research papers which did not support my opinion in the way I had suggested.

My use of the literature was the basis for the majority of the GMC's allegations against me. In my regular scientific writing, I have probably cited some 6,000 research papers in the 120 or so papers I have published. There has been no criticism of my citation. I follow standard scientific practice. In my medico-legal reports, I follow exactly the same practice, but in these reports I also provide the pdfs of the sources so the reader can determine their validity. However, Mitting upheld what he described as my deliberate mis-citation of research papers. He wrote:

Baldly stating, without qualification, that a research paper is a proper foundation for the proposition that the expert is seeking to advance is justified if that is the conclusion of the research paper; but if it is not, it should not be cited, without qualification, as supportive. From a detailed analysis of Dr. Squier's practice in relation to research papers which were the subject of charges, it seems that she often cited a research paper, not for its conclusion which did not support her opinion, but for some nugget within it which might do. When she did that, she was not fulfilling her duty as an expert witness." (Mitting, 2016, para.34)

Elsewhere in his judgment, Mitting comments on my citation of Arbogast *et al.* (2005), noting in this case that "The MPT determined that to state the conclusion without the qualifications misrepresented the paper. Their finding was justified." (Mitting, 2016, para.46). Later, he accuses me of 'cherry-picking'.⁴²

She did cherry-pick the Vinchon, Hoskote, Greenes and Schutzman, Christian and Arbogast papers [see Appendix]. Given that she understood these papers well, she must have known that she was not citing them fairly or accurately. Her mis-citation can only have been deliberate. In that respect her actions and omissions were deliberately misleading. (Mitting, 2016, para.53)

Cherry-picking is normal scientific practice, it is using the valid data from a paper (the results) rather than relying on the authors' speculation. Such criticism is an example of the problems which arise when science and the law meet, and of a fundamental misunderstanding of the way in which scientists cite literature. "Baldly stating" that a paper is the foundation for a proposition is normal practice in science. This is because a strict word limit is generally imposed on scientific articles. Further, it avoids the potential traps of selective citation and subjective qualification of the data. In reports for the court, introducing a lengthy debate on the potential range of interpretations of the results can be a hostage to fortune.

⁴² The term means selecting from a paper material that supports an argument.

The value of a scientific paper lies in the results, as long as they have been generated by valid methods. The results contain what Mitting calls the ‘nuggets’. The conclusions of a scientific paper are no more than the authors’ speculation on the meaning of their findings. A paper’s conclusions are really of no inherent value; they are opinion rather than evidence. Relying exclusively on them is as unsound as police reliance on the abstracts of scientific papers. The standard medical text is quite explicit on the matter:

If you are deciding whether a paper is worth reading, you should do so on the design of the methods section, and not on the interest value of the hypothesis, the nature or potential impact of the results or the speculation of the discussion (Greenhalgh, 2014, p.28)

Examples of the charges which were upheld with respect to my use of the literature are in the Appendix. The following example is given here to make the point that there is a range of opinion among judges deciding on this matter. Mitting found I had calculated to mislead, a very serious offence in the eyes of the GMC:

The MPT was right to find that Dr. Squier had failed to be objective and unbiased in relation to sub-charge 18(e) and, for the reasons already explained, that her actions and omissions in that respect were misleading and irresponsible. The MPT’s finding that Dr. Squier’s actions and omissions in this respect were deliberately misleading was also justified. As already noted, at the end of her cross-examination, she accepted that she understood the research very well. It would have been obvious to her that the Hylton [Hylton and Goldberg, 2004] and Martinez-Lage [Martinez-Lage, Ros de San Pedro, Puche *et al.*, 2006] papers were not well described cases of babies who have choked. For someone who, like her, well understood the research, those words were calculated to mislead. They were far more than an unfortunate choice of words. Even if, because of her firmly held views about the Triad, Dr. Squier had persuaded herself that the two cases described in the papers might, if more were known, support her hypothesis, she did know that, as written, they did not. She did, therefore, know that to describe them as “well described cases ... of babies who have choked” was misleading. (Mitting, 2016, para.102)

This view is in direct conflict with that of Justice Saunders who heard this case in the criminal trial. He wrote of my use of these two papers:

She said it was not meant to mislead but it was, she says, in order to raise discussion. But you may think that is not the object of a court report. Now, in fairness to Dr Squier, she would, of course, have realised, or she should have done, that her report would be seen by a number of other experts in the field who had already prepared reports in this case. So, the chances of her - if she was trying to mislead - getting away with it, as it were, would be minimal because no doubt those other experts would have been familiar with those reports, or at least would go and look them up. So, the experts in the case would know what the true position is, and no doubt would make that known to the court. You may think that supports her suggestion. She was not trying to mislead anyone. It was just rather

unfortunately phrased. (Saunders, J., 2008, R v. Nosheen Arshad T., 7384, Luton Crown Court)

On reflection, I could have written more and perhaps should have written more. In doing so, I might have avoided unfortunate phrasing. Far from calculating to mislead, these papers were cited to make the court aware of an alternative explanation for the baby's collapse. My view was based on the specific facts of the case in question, where choking and aspiration were considered to be the cause of collapse by the doctors who first examined the baby in hospital.

Validating expert evidence

The criticism of my use of scientific literature to support my opinions has far wider ramifications than my case; it sends a clear message of the dangers an expert witness may face should the expert's evidence be based on published research. By common consent, the quality and objectivity of expert evidence depends on citing good quality research to support it (Baddley, 2017).⁴³ Citing good quality research is the essence of evidence-based medicine, which is regarded as current best practice for physicians (Greenhalgh, 2014). It is a requirement for experts in the courts:

The onus will be on the party proffering the evidence, and the party's experts, to refer to properly conducted empirical research (testing and observing) which substantiates the hypothesis and does not undermine it. (Law Commission, 2011, para.5.66)

[You must] give details of any literature or other material which has been relied on in making the report. (Ministry of Justice, 2017, para.3.2 (2))

Experts should take into account all material facts before them. Their reports should set out those facts and any literature or material on which they have relied in forming their opinions. (Civil Justice Council, 2014, para.13)

⁴³ See also:

Scientific experts and academics play a crucial role in developing new findings and insights to help inform policy, with implications across the range of human activity – from health and environmental policy through to competition policy, consumer protection and financial regulation – to name just a few. (Baddeley, 2017, p.1)

In improving the quality of experts' research, it is essential that all relevant research is reported publicly and is accompanied by robust and objective statistical analysis, assessed via a robust critical review process. (Baddeley, 2017, p.4)

Mitting considers a situation in which there is a genuine disagreement on a scientific or medical issue, or where it is necessary for one party to advance a particular hypothesis. He cites Justice Wall in establishing the duty of an expert:

...the expert who advances such a hypothesis owes a very heavy duty to explain to the court that what he is advancing is a hypothesis, that it is controversial (if it is) and to place before the court all the material which contradicts the hypothesis. Secondly, he must make all his material available to the other experts in the case. (Mitting, 2016, para.34 (1))

The General Medical Council has not considered such a situation and has seen giving a ‘balanced opinion’ as the primary duty of the expert witness:

You must give a balanced opinion, and be able to state the facts or assumptions on which it is based. (General Medical Council, 2007, para.9 (withdrawn 22 April 2013))

In fact, the GMC does not consider the special circumstances in which the expert witness is placed; its general guidance to doctors disclosing confidential information about patients is identical:

... make sure any opinion you include is balanced, and be able to state the facts or assumptions on which it is based. (General Medical Council, 2018, para.7 (c))

It is easy to understand how weight of opinion might be mistaken for balanced opinion, and how minority opinion might be seen as unbalancing.

In practice, the approach of the courts to the use of scientific evidence to support expert opinion is inconsistent and conflicting; it is by no means usual for scientific evidence to be expected or demanded. All three of the GMC’s medical experts told the MPT panel they did not rely on literature to support their views. When asked about his failure to cite any medical literature in his report to the MPT, Neil Stoodley was uncompromising:

I did not [cite any literature], and I did not feel the need to in this case in terms of the conclusions that I came to ... there is a spectrum of opinion and I believe that my views are what is commonly referred to as ‘mainstream’ opinion. If you were to substitute ‘textbook’ for ‘mainstream’, then I think that would fairly summarise my position in this and in other cases. (evidence to MPT, 2 November 2015)

Tony Risdon, a pediatric pathologist, told counsel questioning his citing practices that:

The use of a reference to peer reviewed literature in pathology reports varies quite a lot. Some pathologists quote a lot of references, others do not; I am one of the ones who does not. (evidence to MPT, 27 October 2015)

Asked by counsel why his witness statement contained no references at all, Richard Bonshek, an eye pathologist, explained:

May I add that that understanding would have come from my participation in the working party groups? I think also it is fair to say that at that stage of providing reports, many individuals did not in their initial reports provide a literature base for their observations and opinion. (evidence to MPT, 20 October 2015)

Colin Smith did cite research, but not always correctly, as Mitting observed:

Professor Smith stated, in evidence accepted by the MPT that the authors could discriminate between traumatic and ischaemic causes of axonal injury. In fact they only did so in 2 out of 18 cases. Unfortunately, this proposition was not put to Professor Smith in cross-examination. As a non-expert, I set out my understanding of the passage on which he relied with some diffidence, but it does, in the end, seem to me to be reasonably clear. It supports rather than undermines Dr. Squier's opinion. The MPT was wrong to find this sub-charge proved. (emphasis in original) (Mitting, 2016, para.123)

Replacing scientific evidence with mainstream belief is not scientifically valid, does not safeguard against error and cannot help the courts to distinguish between hypothesis and knowledge. The issue is not what the majority of doctors think, but rather what is supported by reliable scientific evidence. Yet, in the family division, in cases of suspected child abuse, reliance not on science but on the mainstream view is the accepted, even the preferred, practice:⁴⁴

Time and again, when giving evidence, experts spoke of their own experience. It seems to me that the experience of these eminent clinical experts, acquired by them day after day in practice, is highly relevant, particularly where there is a paucity of top quality research to assist the court [sic]. (King, 2009, para.196, available at <http://www.familylawweek.co.uk/site.aspx?i=ed53850>, accessed October 2017)

This reverence for experience and precedence over evidence is not confined to UK courts. Christopher Fabricant, director of strategic litigation for the innocence project in New York, has recently declared that:

⁴⁴ In May 2009, Justice King told the family court:

Dr. Cohen and Dr. Squier each believe that in the absence of additional external injuries, such as grip marks or fractures, there is no reliable evidence of shaken baby syndrome. Dr. Squier does not accept the Triad to be a strong indicator of shaken baby syndrome. These views are, undoubtedly, controversial. They go against the mainstream of current thinking and the analysis of the Court of Appeal in R v. Harris. Dr. Al-Sarraj told the court that his views are in line with mainstream opinion. Mainstream opinion in all the other specialities is the same as his, that is to say that hypoxia cannot cause subdural haemorrhages. Al-Sarraj told the court that there are 40-44 neuropathologists in the country of whom a maximum of 10 or 12 are forensic neuropathologists. To his knowledge, the only neuropathologist in the UK believing that hypoxia can cause subdural haemorrhages is Dr. Waney Squier. In addition, he said there are two or three other people who share her opinion who are working in different, but related, specialities, of whom Dr. Cohen and Dr. Scheimberg (Dr. Cohen's co-author) are presumably two. Dr. Al-Sarraj said: "They come in all the defence cases, so you do not realise that they are in such a minority". (King, 2009, para.199, available at <http://www.familylawweek.co.uk/site.aspx?i=ed53850> (accessed October 2017)

Courts - unlike scientists - rely too heavily on precedent and not enough on the progress of science. ... At some point, we have to acknowledge that precedent has to be overruled by scientific reality.⁴⁵

Current, objective, empirical evidence is needed to re-assure the courts in a controversial area in which science is rapidly changing and medical experts are locked in disagreement. Without it, unsupported opinion has currency in court, as Peter Richards, a paediatric neurosurgeon trenchantly observed when acting as an expert witness in 2013:

... anything that is said by anybody relating to these events has to be accepted as informed opinion rather than scientifically verifiable fact. This includes my own opinions. (Peter Richards as quoted in Baker, J. (2013) *Wiltshire council v. N and J and A*, EWHC 3502 (Fam), para.46, available at <http://www.familylawweek.co.uk/site.aspx?i=ed123147> (accessed November 2017))

When opinion is shared by others, it becomes all the more affirming as others overlook that it is no more than opinion:

Majority mainstream medical opinion is of the view that what is likely to be required to produce such injuries is the backwards and forwards movement of the unsupported infant head pivoting on the neck. (Neil Stoodley, statement given in *Squier v. GMC*, 2016, EWHC 2739 (Admin))

In a young child, the 'Triad' is generally regarded as strong presumptive evidence, although not conclusive proof, of an abusive head injury caused by the application of severe rotational acceleration/deceleration forces ... This is usually considered to have been caused by shaking and hence the term 'shaken baby syndrome'. (Tony Risdon in statement given in *Squier v. GMC*. 2016, EWHC 2739 (Admin))

Opinion, no matter how established it is, cannot be a reliable foundation for decisions of such gravity as removing babies from their families. Judges are not doctors and scientists, but they cannot abdicate their gatekeeping responsibilities; they must separate science from subjective speculation convincingly masquerading as science (see Fabricant and Carrington, 2016; Giannelli, forthcoming). The difficulty of separating opinion from science is compounded when a single joint expert is appointed to advise the court in each particular specialism, as is usual practice in the family division.⁴⁶ When opinion is so highly polarised and entrenched, it is hard to imagine that a single expert can give advice encompassing the full spectrum of opinion. There is a real need for

⁴⁵ ABC News, 20 August 2017, available at <http://abcnews.go.com/amp/Technology/wireStory/fallen-forensics-judges-routinely-disavowed-science-49322677> (accessed October 2017).

⁴⁶ Julia Cheetham to Medical Practitioners Tribunal, *Determination on Facts*, 17 March 2016, *passim*, available at <http://www.insidejusticeuk.com/pdf/mpts-determination-of-facts.pdf> (accessed October 2017).

a range of opinions to be put before the courts. If too narrow a range of expertise is available to the court, the court may be misled by an impression of certainty. A more sophisticated awareness of the complexity and uncertainty of the medical issues is required, along with a medicolegal system that welcomes serious debate, even if the result is the upending of conventional wisdom. This is how science progresses. My experience before the MPT suggests it is safer for experts to abandon scientific principles, not to cite literature and to give simple unsupported opinion. This is not only contrary to the rules set out for experts, but must also obstruct the safe delivery of justice.

Silencing dissent

Despite repeated objections on the part of the GMC that my case was not about the science of shaken baby syndrome but about my conduct as an expert, there can be no doubt that the campaign waged over the last decade was a sustained, ruthless attack on expert witnesses who challenged the mainstream view of the shaken baby hypothesis. What was seen as important was not whether the science was right, but whether a majority thought it right.

A crucial point in these verdicts is whether the court accepts the existence of shaken baby syndrome which is supported by an overwhelming majority of practitioners. (Tony Risdon as quoted in Dyer, 2005b)

The campaign in the UK coincides with a much broader campaign in the United States, where those who challenge the mainstream views in abuse diagnosis are labelled ‘denialists’:

Child abuse denialism has as its base a very small number of physicians who perpetuate false science while ignoring the bulk of the scientific literature and the experience of the overwhelming majority. The child abuse denialists come from various disciplines - radiology, pathology, pediatrics, endocrinology, neurosurgery, emergency medicine, orthopedic surgery, even psychiatry. The names are familiar, they reference one another in the literature and they show up in court, often together and all too frequently. (Strause, 2016, p.587)

Denialism is tarnishing the name of several prominent academic institutions. Licensing bureaus could have a role by limiting practice. Admirably, the British General Medical Council has curtailed the activity of some rogue witnesses who were dubiously deemed medical experts. (Strause, 2016, p.588)

The international network behind the campaign was evident from the outset. Recall that towards the end of his Atlanta presentation, Colin Welsh suggested that Dr A (me) and Dr B (Marta Cohen)

were likely to be struck off the medical register and that this was already known to Carol Jenny, one of the foremost proponents of shaken baby syndrome in the United States.

Far more sinister was the behaviour of the GMC at my appeal. When Mitting decided that my practice should be restricted, counsel for the GMC drew up a suggested list of conditions to impose on my licence. Counsel requested that I be barred from giving evidence in UK courts, but went much further, requesting that I not provide any pre-litigation advice as an expert for the possible purpose of litigation in the UK or anywhere else. Not only did this far exceed the GMC's stated case to consider my conduct as an expert in the courts, it also went far beyond the GMC's jurisdiction, which does not extend to anywhere else. It suggests the involvement of a foreign agency acting through the GMC in an attempt to silence my views both within and outside the UK. The request was refused by the judge.

Three experts in the UK were targeted in this campaign: Marta Cohen, Irene Scheimberg (who was vexatiously reported to the Human Tissue Authority (see Cavendish, 2011)) and me. Previously, Jennian Geddes had been attacked for her views. In a report for my defence, Geddes said that her work:

... was inevitably seen as a threat by experts who tended to appear regularly for the prosecution, and the idea that in some cases there might be grounds for doubt - even for believing rather than automatically rejecting, the story provided by a carer at the time of an infant's collapse - was hotly opposed. Our questioning ... provoked antagonism from doctors both in the UK and in the United States, and those of us involved in original research in the field found ourselves the subject of forceful attacks in expert reports, lectures and public presentations. (Jennian Geddes in statement given in *Squier v. GMC*, 2016, EWHC 2739 (Admin))

The cases chosen by the police for their complaint were a highly selective sample of my evidence in the courts; in each I had acted for the defence when there had been an allegation of shaken baby syndrome. There was no criticism of my expert evidence in medical negligence cases, the coroner's courts, cases in which I had acted for the prosecution or cases in which I had acted for the defence but my conclusions agreed with the prosecution case. In some of these cases, my evidence was not only accepted, but received very positive comment.

In his first report, Colin Smith, the neuropathologist, complained of my "refusal to accept shaking as a cause of intracranial injury." Sometimes the bias was more subtle. In one of the cases before the GMC, I had proposed that a baby died as the consequence of the sequence of events

following a short fall. In the same case, Richard Bonshek, an eye pathologist instructed by the prosecution, wrote: “if natural causes of such bleeding can be excluded and there is no history of severe trauma (the fall which is stated to have occurred would not have caused such bleeding), then the most likely situation is that there has been non-accidental injury.” In making an assessment regarding the potential effect of the fall which had been described by the baby’s mother, he went through exactly the same process as I did. He weighed up the potential forces (damaging effects) resulting from the fall and decided they would not cause harm. I did the same, but concluded that they could cause harm. Bonshek is a pathologist and no more a biomechanical expert than I am. He was not criticised; on the contrary, he gave evidence for the GMC. Smith, the neuropathologist, similarly cited biomechanical literature to support his view, but criticised me for doing so.⁴⁷ The difference between us is that Bonshek and Smith support the mainstream view, but I do not:

Other medical experts in the cases reviewed in the Squier case were not similarly censured for saying that the forces of shaking are sufficient to cause the Triad, although such biomechanical evidence was beyond their expertise too. Similarly, neuropathologists and neurosurgeons could say without any fear of GMC censure that the forces resulting from low level falls are insufficient to cause the syndrome, but medical experts expressing doubts about this view risk a GMC charge that they have gone beyond their expertise by giving biomechanical evidence. (Powers, 2017, p.1)

Even Judge Mitting, who is not a doctor, was clearly persuaded to adopt the mainstream belief in his understanding of Hylton and Goldberg (2004) and Martinez-Lage *et al.* (2006) papers: “On any view, both papers described classic brain injuries in babies following upon vigorous or forceful shaking” (Mitting, 2016, para.96). Mitting has overlooked the fundamental premise for my case - that this hypothesis is controversial or even frankly wrong. Rather than addressing these issues in medical journals or open discussions, the police and its expert team (through the GMC) preferred to eliminate from the courtroom any views that contradicted their own. They did so in a

⁴⁷ In his closing statement for the defence, Robert Francis drew attention to the inconsistency:

... in the same paper [Smith] asserted that experimental studies using lambs supported the shaking hypothesis. When asked about this he seemed unable to understand that the inconsistency between a statement in the paper that the lamb studies to support the shaking as a mechanism even though there were significant anatomical differences between lambs and babies, when a very similar point was used to suggest Dr Squier was not entitled to rely on biomechanics. In other words, if the conclusion of study fitted his existing view it could be taken into account, but not if it did not. (Francis, R. (2016) *Squier v. GMC*, EWHC 2739 (Admin))

manner designed to inflict maximum damage on those who present dissenting views, not to mention those families caught up in the shaking diagnosis.

The consequences

The police campaign and the GMC hearing have, of course, had enormous professional and personal consequences for me. But far graver are the broad, pernicious effects on the administration of justice in the UK. Leading medical experts are discouraged from engaging in an informed debate for fear of professional opprobrium and of suffering a similar fate at the hands of the GMC.

Those who transgress the boundary of expertise but stay with the conventional view are unlikely to attract GMC scrutiny or censure. (Powers, 2017, p.1)

The risk of being accused of misconduct in this way has deterred experienced and knowledgeable doctors from offering their opinions in the courts, a point acknowledged by Justice Baker in a judgment of 2013:

I have been informed that a number of doctors commonly instructed in these difficult cases are not at present accepting instructions.⁴⁸

The GMC's interest in controlling expert witnesses is resulting in fewer doctors coming forward to assist the courts when doing so places them at risk of GMC action. As the Squier case shows, this is having an adverse impact on the administration of justice. (Powers, 2017, p.2)

One barrister with much experience of shaken baby cases noted in 2011 that:

The pool of experts who are willing to give evidence for the defence is a shrinking one, and it doesn't reflect the science. It's a shrinking pool because these experts do not wish to enter into an arena where they are going to be attacked and criticized. (Michael Turner quoted in BBC, 2011, pp.16-17)

Today, in cases of suspected abusive head trauma, defence opinion has essentially been removed from the courts, though it is well understood that shaken baby syndrome is not supported by scientific evidence, and that existing research casts considerable doubt on, or indeed disproves,

⁴⁸ Baker, J. (2013) *Judgment*, Re L and M (Children) EWHC 1569 (Fam), para.120, available at <http://www.familylawweek.co.uk/site.aspx?i=ed114560> (accessed April 2018).

the basic elements of traditional shaken baby theory. Instead, the courts are offered old hypotheses, deeply entrenched in mainstream belief and supported not by science but by repetition and reputation.

... I was challenging what had been believed for very many years and had been the basis for prosecutions, care orders and so on. I think what upset me was that they were rubbishing my hypothesis or my suggestion that there might be another cause in favour of something that was only a hypothesis anyway, this so called Triad, this diagnostic of shaken baby syndrome. (Jennian Geddes as quoted in BBC, 2011, p.9)

The message is clear: any expert who questions mainstream opinion faces not only the risk of unwelcome publicity, but also a GMC investigation, with all that this entails. The greater evil is that this leaves parents and caretakers essentially defenceless against unsupported medical claims with the unthinkable consequences of wrongful incarceration and the removal of babies from innocent parents.

The way forward

A number of suggestions might be made. There have been calls for a public inquiry into the way in which our courts deal with matters of scientific uncertainty (eg, British Medical Association, 2016, para.140a). One such call stressed that “That inquiry should be held before any more miscarriages of justice are occasioned by acceptance of scientific overconfidence” (Watkins, 2016). Courts must be able to hear the full range of opinion in matters of controversy. These are matters of great public interest and many families are affected by them.

In order to improve the objectivity of expert witnesses, they should not be drawn from the same pool, a defence club and a prosecution club. Reimbursement of expert witnesses should not be determined by whether they appear for the prosecution or the defence. Acting as an expert witness should no longer be an occupation for the brave (or foolhardy) or those seeking to supplement their income, but should become a matter of civic duty akin to jury service. Alternatively, employing authorities could be requested by the courts to provide experts with specialist knowledge as required for specific cases. The courts would reimburse the authority and independent experts would undertake this work as part of their contractual obligation.

In the United States, concerns have been voiced about the validity of forensic techniques which are “ultimately no more than a house of cards built on unvalidated hypotheses and

unsubstantiated or non-existent data” (Fabricant and Carrington, 2016, p.2). Precisely the same can be said of the shaken baby hypothesis and the remedy must be the same: “... fundamental due process norms compel the conclusion that prosecutors, defense attorneys, forensic experts, and their respective governing bodies have an ethical, moral, and legal obligation to revisit convictions resting on discredited scientific evidence and provide appropriate remedies” (Fabricant and Carrington, 2016, p.15).

Conclusions

On 21 March last year, Michael Mansfield, Clive Stafford Smith and many other lawyers and doctors wrote a letter to the *Guardian* newspaper, protesting at my striking off:

It is a sad day for science when a 21st-century inquisition denies one doctor the freedom to question ‘mainstream’ beliefs. It is a particularly sad day for the parent or carer who ends up on the wrong end of another doctor’s ‘diagnosis’ that an infant was shaken, when the child may have died from entirely different, natural causes. (Mansfield, Stafford Smith, Bohan *et al.*, 2016)

The only protection against unsupported or incorrect theories may be the ‘marketplace of ideas’, which depends on free and open debate between those with opposing views. When this debate is stifled, even egregious errors may go uncorrected. Yes, there were times when the words I used were poorly chosen. How many of us can examine texts written a decade ago and not squirm in embarrassment at an unhappy choice of words? We are none of us perfect, a point made succinctly by Thomas Bingham in his dissenting judgment of 1988:

“The law does not require of a professional man that he be a paragon, combining the qualities of polymath and prophet” (see Rowland, 1999).

I am often asked if it was worth risking my career to stick to my guns and continue to promote the view that the SBS hypothesis lacks scientific validity and that alternative explanations for the Triad must be sought. There is no question about this. A lifetime of examining thousands of baby brains has given me some insight into the way the developing brain and its covering meninges respond to natural disease and trauma. I have read the literature and, in doing so, benefited from the experience of hundreds of doctors describing thousands of cases. I have learned from the rigorous intellectual approach of engineers, clinicians and other pathologists. This makes me certain that we have to depend on objective scientific evidence in formulating our views. I am not alone. In the last few years, I have been approached by countless colleagues who share with me their reservations about the SBS hypothesis. Asked to commit this view to paper and assist parents accused of shaking their babies and struggling to prove their innocence, they are typically more guarded: “No, I can’t. It’s more than my career is worth.”

If history is to be believed, the campaign to silence experts who seek to apply scientific principles will ultimately fail for the critics cannot change the structure and workings of the infant brain. Even the most vicious attacks on those who cannot accept mainstream opinion will not change the anatomy or workings of the infant brain. Nor should these attacks daunt the determination of those who seek the truth. Oscar Wilde put it well enough in his short collection of philosophies for the young: “If one tells the truth, one is sure, sooner or later, to be found out” (Wilde, 1894). Within months, Wilde also found himself in court. Cross examined by Edward Carson on whether his advice was good for the young, Wilde responded, “Anything that stimulates thought is good” (Linder, nd). Indeed; and anything that stifles thought is bad.

APPENDIX

Specific charges upheld at the appeal heard by Justice Mitting (2016) against the decision of the Medical Practitioners Tribunal (2016)

1. Expertise

Paediatric medicine

In a report for the family court, dated 8 December 2008, I had written:

Choking can cause a rise in intra-thoracic pressure which will in turn lead to raised pressure in the veins of the brain. This may be sufficient to cause rupture and bleeding from the very thin walled vessels found in a chronic subdural membrane. These vessels rupture spontaneously so even a mild rise in intracranial pressure can cause fresh bleeding. (see Mitting, 2016, para.77)

The GMC alleged that this was outside my field of expertise and within the field of paediatric medicine. Mitting agreed. Reviewing what Bo Erik Thiblin, an epidemiologist, wrote and said shows this in a different light. Thiblin wrote in his report:

I cannot determine any better than anyone else whether choking occurred or not. If it is convincingly shown that choking did not occur, it would seem inadequate to argue using this possibility. If however there is evidence that choking could have occurred, it is reasonable to put forward a hypothetical argument about the way this could be connected to the findings shown. The reason why this is reasonable is the weak evidential position for AHT-hypotheses generally and that in this particular case there were no other signs of trauma.

Supporting my proposition that choking was a differential diagnosis to be considered in this case, Mitting conceded that “[the MPT] was not entitled to find that there was no, or no real, evidence of choking for her to consider” (Mitting, 2016, para.81). So, how can we understand Thiblin’s apparent *volte face* in stating the opposite: that choking is for clinicians to deal with and not for the pathologist preparing a differential diagnosis? The answer is in the live evidence, which Mitting did not hear. During the cross examination of Thiblin, this exchange took place:

Q First of all, do you agree that choking cannot be assessed by way of any pathology in the brain?

A As far as I know, there are no specific signs in the brain from choking. It should be on specific signs for hypoxia, I guess.

Q Choking is actually a clinical phenomenon dealt with in life by clinical paediatricians?

A I am not really sure I understand.

Q Let me come back. Sorry. Do you want to say something?

A Can you rephrase the question? I do not really understand.

Q Yes. Let me put it another way. Neuropathologists, indeed pathologists, do not deal with choking events? You may deal with a baby who has died after having choked?

A Yes. In what way does a clinician deal with a shaking event? That I did not get.

Q Choking?

A Choking. Okay.

Q It is my pronunciation. Clinicians?

A Yes. That is for clinicians to deal with, of course.

Thiblin's first language is Swedish; the difference between what he wrote in his report and what he said during cross examination is explained by simple misunderstanding. As a result of the misunderstanding, I was found to have trespassed into the field of paediatric medicine. "What she did, in plain view, was to advance and stick to a hypothesis which she was in no position to support as a neuropathologist" (Mitting, 2016, para.82).

Biomechanics

I should not have explained why I thought a parent's account that a baby had fallen was a sufficient cause for the pathology I identified, despite my repeated disclaimer that I was not an expert in biomechanics. Mitting wrote:

Dr. Squier was giving evidence in support of her proposition that the most likely explanation was a short fall onto a carpeted floor. Her examination-in-chief concluded with the sentence, "that would appear to be the most likely explanation." There was at least a significant risk, more likely a high probability, that any juror listening to her would treat her evidence about biomechanics as expert evidence. It was not. Her subsequent disclaimer, in cross examination, of expertise, on two occasions, may well not have dispelled the impression given earlier, that she knew what she was talking about, as an expert. The MPT were right to find this sub-charge proved. (Mitting, 2016, para.56)

2. Use of literature

I had written a report stating that "There are well described cases in the literature of babies who have choked and presented with subdural and retinal haemorrhages (Hylton 2004, Martinez-Lage 2005)." Mitting objected:

Neither report was as she described it. The Hylton paper gave a brief description of a single case: a five month old girl was admitted to hospital because of uncontrollable seizures. CT scans revealed bilateral subdural haematomas, interhemispheric and subarachnoid haemorrhages. Ophthalmological examination revealed bilateral retinal haemorrhages. A single sentence described the history given by her father, "Her father has shaken her vigorously, allegedly in an attempt to rescue her from a choking spell." The end result was that the child was placed in foster care. (Mitting, 2016, para.94)

The Martinez-Lage paper also concerned a single 3½ month old baby, who was admitted to a paediatric intensive care unit having experienced an acute episode of loss of consciousness. The history described by the parents was, "The parents referred that the child became choked during food intake. The infant vomited, got a congested face followed by cyanosis, and became unconscious. During transport to an emergency department, the father applied the Heimlich manoeuvre shaking the baby forcefully." (Mitting, 2016, para.95)

The original criticism stemmed from Richard Bonshek, an eye pathologist who was also an expert witness in the case. In her judgment from 2009, Justice King (2009, para.248) said, “Dr. Bonshek referred to Dr. Squier's use of these articles as being ‘disingenuous’. I feel driven, with regret, to agree.” The term was used by Bonshek when he was discussing the case with other expert witnesses at a meeting prior to trial. According to my personal notes, he said:

So again I think the fact, I think it's ingenuous [*sic*] to make that statement. I do know that if you take the trouble to go through ... and read the titles of the articles then you get some more information so not it actually known in the body of the report and to use it as a well described, I think is a bit naughty really.

So, ‘a bit naughty’ became ‘disingenuous’ which became ‘irresponsible’ in the view of Mitting.

The parental history of the event, that both babies choked and were afterwards shaken in an attempt to resuscitate them from the ensuing collapse, provides two possible explanations for the findings. We cannot know whether the choking or the shaking caused the pathology. The shaking hypothesis is just that - a hypothesis - and to exclude the possibility that choking was causative depends on either total rejection of the parental explanation or a bias based on an inherent belief in SBS. Neither view can be justified according to the judgment in the appeal of Lorraine Harris:.

‘The clinical history is perhaps the most important clinical tool available to the clinician and to reject the carer’s version of events in favour of another requires the highest possible level of medical evidence. After all, the Doctor is effectively accusing the carer of lying.’ (Anslow as quoted in Gage, 2005, para.149. See Mackey, 2006)

And with regard to SBS:

At the heart of these appeals, as they were advanced in the notices of appeal and the appellants’ skeleton arguments, was a challenge to the accepted hypothesis concerning ‘shaken baby syndrome’ (SBS); or, as we believe it should be more properly called, ‘non-accidental head injury’ (NAHI). The accepted hypothesis depends on findings of a Triad of intracranial injuries consisting of encephalopathy (defined as disease of the brain affecting the brain’s function); subdural haemorrhages (SDH); and retinal haemorrhages (RH). (Gage, 2005, para.56; see also Dyer, 2005b)

Mr Horwell, in his final submissions invited the Court to find that the Triad was proved as a fact and not just a hypothesis. On the evidence before us we do not think it possible for us to do so. Whilst a strong pointer to NAHI on its own we do not think it possible to find that it must automatically and necessarily lead to a diagnosis of NAHI. All the circumstances, including the clinical picture, must be taken into account. (Gage, 2005, para.70)

In a case from June 2008, I prepared a report for the defence lawyers and wrote in my report:

Serious head injury from short falls is very unusual. However, there are published reports showing that low level falls can cause serious intracranial injury and this mechanism of injury cannot be dismissed out of hand (Vinchon 2005, Hoskote 2002, Greenes and Schutzman 1998). Vinchon describes 55 infants hospitalised with severe intracranial injury after household falls (including 13 from a seat, 9 from the arms of an adult, 9 from a table, 2 from a bed). In Hoskote's paper two infants suffered SDH after short falls, one from a father's arms and one from a bed. Greenes and Schutzman describe 14 babies, all 8 months or less in age, with asymptomatic intracranial haemorrhage after falls down 9 stairs or less.) Falls even from low levels of less than 3 feet can generate far greater forces to the head than impulsive action (or shaking). (Van Ee personal communication 2007 ... Prange 2003). Ipsilateral subdural haemorrhage and retinal haemorrhage has been described in accidental household falls (Christian 1999). Thus the literature supports the view that a low level fall could have caused the fall in this case.⁴⁹ (cited in Mitting, 2016, para.35)

In upholding the allegation against me, Mitting said:

In each case, Dr. Squier was guilty of misstatement by omission; in the case of the Vinchon paper, by omitting the authors' clear conclusion about the coincidence of abusive injury and retinal haemorrhage in small babies; in the case of the Hoskote paper, by omitting their conclusion about the useful predictors for NAHI, including retinal haemorrhage; in the case of the Greenes and Schutzman paper, by omitting reference to the benign outcomes; and in the case of the Christian paper, by omitting reference to the height of fall in two out of three cases and the benign outcome in all. The MPT reached its conclusions largely on the basis of the expert evidence which it heard, which assisted its understanding of the papers. Their thrust was, in any event, clear. The MPT's findings were justified. (Mitting, 2016, para.41)

My response is that the papers are cited to show that head injury can result from low falls. I cited the data I took from each. The conclusion of Vinchon *et al.* are anything but "clear", as Vinchon *et al* admit:

The importance of an RH for the diagnosis of child abuse is well established; however, the evaluation of its incidence in child abuse is almost impossible because the diagnosis of child abuse is in great part based on the presence of an RH, providing a circularity bias. In addition, RHs have been reported after indisputable accidental trauma such as traffic or household accidents, especially after a fall down a staircase. ... In the construct of our study, however, we could not obviate the circularity bias, and the evaluation of the incidence of RH in child abuse remains a self-fulfilling prophecy. (Vinchon *et al.*, 2005, p.383)

This difficulty is acknowledged in Hoskote *et al.* (2002), the authors admitting that, if it is accepted that the evaluation of the incidence of RH in child abuse is a self-fulfilling prophecy, any

⁴⁹ There was a typographical error here and the sentence was actually to be read as "a low level fall could have caused the head injury in this case."

“conclusion about the useful predictors for NAHI, including retinal haemorrhage” (Mitting, 2016, para.41) must be similarly invalid. The benign outcomes in the cases described by Greenes and Schutzman in their 1998 paper are similarly irrelevant. The final outcome depends on a host of other factors operating later in the history; for example, whether the child was subject to a prolonged period of hypoxia or resuscitation and ventilation, which may of themselves lead to bleeding in the head and the eyes. This also applies to Christian *et al.* (1999), where additionally the fall height itself is immaterial to the data taken from the three cases described. This paper was cited to draw the attention of the court to the subdural haemorrhage and retinal haemorrhage being both one-sided and on the same side in that case; a remarkable feature which should provoke reflection on the mechanisms by which these two phenomena are caused and related.

References

- Arbogast, K., Margulies, S. and Christian, C. (2005) 'Initial neurologic presentation in young children sustaining inflicted and unintentional fatal head injuries', *Pediatrics*, 116, pp.180-4.
- Baddeley, M. (2017) 'Experts in policy land - insights from behavioral economics on improving experts' advice for policy-makers', *Journal of Behavioral Economics for Policy*, 1, 1, pp.27-31.
- Barnes, P. (2011) 'Imaging of nonaccidental injury and the mimics: issues and controversies in the era of evidence-based medicine', *Radiologic Clinics of North America*, 49, pp.205-29.
- BBC (2011) 'Shaken babies', *File on 4*, Radio 4, broadcast 15 February, transcript available at http://news.bbc.co.uk/1/shared/bsp/hi/pdfs/15_02_11_fo4_shaken.pdf (accessed October 2017).
- British Medical Association (2016) 'Agenda', Annual Representative Meeting, Belfast, June.
- Brough, P., Brown, J. and Biggs, A. (2016) *Improving Criminal Justice Workplaces: Translating Theory and Research into Evidence-based Practice*, Routledge, Abingdon.
- Caffey, J. (1972) 'On the theory and practice of shaking infants. Its potential residual effects of permanent brain damage and mental retardation', *American Journal of Diseases of Children*, 124, 2, pp.161-6.
- Caffey, J. (1974) 'The whiplash shaken infant syndrome: manual shaking by the extremities with whiplash-induced intracranial and intraocular bleedings, linked with residual permanent brain damage and mental retardation', *Pediatrics*, 54, 4, pp.396-403.
- Cavendish, C. (2011) 'Is shaken baby syndrome a myth?', available at <http://keran-henderson-innocent.blogspot.com/2011/04/is-shaken-baby-syndrome-myth-times.html> (accessed October 2017).
- Chadwick, D., Kirschner, R., Reece, R., Ricci, L. *et al.* (1998) 'Shaken baby syndrome - a forensic pediatric response', *Pediatrics*, 101, 2, pp.321-3.
- Christian, C., Taylor, A., Hertle, R. and Duhaime, A-C. (1999) 'Retinal hemorrhages caused by accidental household trauma', *Journal of Pediatrics*, 135, 1, pp.125-7.

- Christian, C. and Block, R. (2009) 'Abusive head trauma in infants and children', *Pediatrics*, 123, pp.1409–11.
- Civil Justice Council (2014) *Guidance for the Instruction of Experts to Give Evidence in Civil Claims*, London, August.
- Cowan, F. and Thoresen, M. (1985) 'Changes in superior sagittal sinus blood velocities due to postural alterations and pressure on the head of the newborn infant', *Pediatrics*, 75, pp.1038-47.
- Diable, N. (2011) 'Expert witnesses', *Defence Brief*, 19 April, available at <http://defencebrief.blogspot.com/2011/04/expert-witnesses.html> (accessed February 2019).
- Dias, M. (2011) 'The case for shaking' in Boos, S., Feldman, K. and Jenny, C. (eds) *Child Abuse and Neglect: Diagnosis, Treatment and Evidence*, Elsevier-Saunders, St. Louis, pp.364-72.
- Duhaime, A-C., Gennarelli, T., Sutton, L. and Schut, L. (1988) 'Shaken baby syndrome': a misnomer?', *Journal of Pediatric Neurosciences/ Rivista di Neuroscienze Pediatriche*, 4, 2, pp.77-86.
- Dyer, C. (2005a) 'Parents wrongfully accused of child abuse cannot sue doctors', *British Medical Journal*, 330, 7498, p.981.
- Dyer, C. (2005b) 'Diagnosis of 'shaken baby syndrome' still valid, appeal court rules', *British Medical Journal*, 331, 7511, p.253.
- Fabricant C. and Carrington, T. (2016) 'The shifted paradigm: forensic science's overdue evolution from magic to law', *Virginia Journal of Criminal Law*, 4, 1, pp.1-115.
- Gage, J. (2005) *Judgment*, R v. Harris, Court of Appeal, EWCA Crim 1980, available at https://www.nacdl.org/uploadedFiles/files/resource_center/topics/post_conviction/Harris.pdf (accessed April 2018).
- Geddes, J., Hackshaw, A., Vowles, G., Nickols, C. and Whitwell, H. (2001) 'Neuropathology of inflicted head injury in children. I. Patterns of brain damage', *Brain*, 124, pp.1290-8.
- Geddes, J., Hackshaw, A., Vowles, G., Nickols, C., Scott, I. and Whitwell, H. (2001) 'Neuropathology of inflicted head injury in children. II. Microscopic brain injury in infants', *Brain*, 124, pp.1299-306.
- General Medical Council (2008) *Acting as an Expert Witness*, London, July, available at http://www.gmc-uk.org/Acting_as_an_expert_witness___archived.pdf_51771128.pdf (accessed October 2017).
- General Medical Council (2018) *Confidentiality: Disclosing Information for Employment, Insurance and Similar Purposes*, available at https://www.gmc-uk.org/static/documents/content/Confidentiality_-_Disclosing_information_for_employment_insurance_and_similar_purposes.pdf (accessed April 2018).
- Giannelli, P. (forthcoming) 'Forensic science: Daubert's failure', *Case Western Reserve Law Review*, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3031227 (accessed October 2017).
- Greenes, D. and Schutzman, S. (1998) 'Occult intracranial injury in infants', *Annals of Emergency Medicine*, 32, 6, pp.680-6.
- Greenhalgh, T. (2014) *How to Read a Paper. The Basics of Evidence-based Medicine*, BMJ Books, London.

- Guthkelch, A. (1971) 'Infantile subdural haematoma and its relationship to whiplash injuries', *British Medical Journal*, 2, pp.430-1.
- Guthkelch, A. (2012) 'Problems of infant retino-dural hemorrhage with minimal external injury', *Houston Journal of Health Law & Policy*, 12, 2, pp.201-8.
- Harvey, B. and Marston, J. (2010) *Cases and Commentary on Tort*, Oxford University Press, Oxford.
- Heins, M. (1984) 'The 'battered child' revisited', *Journal of the American Medical Association*, 251, 24, pp.3295-300.
- Hoskote, A., Richards, P., Anslow, P. and McShane, T. (2002) 'Subdural haematoma and non-accidental head injury in children', *Child's Nervous System*, 18, pp.311-17.
- Hylton, C. and Goldberg, M. (2004) 'Circumpapillary retinal ridge in the shaken-baby syndrome', *New England Journal of Medicine*, 351, 2, p.170.
- Jones, M., Martin, P., Williams, J. et al. (2015) 'Development of a computational biomechanical infant model for the investigation of infant head injury by shaking ', *Medicine Science and the Law*, 55, 4, pp.291-9.
- King, J. (2009) *Judgment*, A local authority v. S, EWHC 2115 (Fam) 8 May, available at <http://www.familylawweek.co.uk/site.aspx?i=ed53850> (accessed October 2017).
- Kempe, H. (1962) 'The battered-child syndrome', *Journal of the American Medical Association*, 18, 1, pp.11-24.
- Law Commission (2011) *Expert Evidence in Criminal Proceedings in England and Wales*, Stationery Office, London, March.
- Lazoritz, S. and Bier, A. (2012) 'Historical perspectives' in Lazoritz, S. and Palusci, V. (eds) *The Shaken Baby Syndrome: a Multidisciplinary Approach*, Routledge, Abingdon, pp.9-18.
- Linder, D. (nd) 'Testimony of Oscar Wilde on cross examination (April 3, 1895)', Famous Trials, available at <http://www.famous-trials.com/wilde/346-literarypart> (accessed October 2017).
- Mack, J., Squier, W. and Eastman, J. (2009) 'Anatomy and development of the meninges: implications for subdural collections and CSF circulation', *Pediatric Radiology*, 39, 3, pp 200-10 .
- Mackey, M. (2006) 'After the Court of Appeal: R v Harris and others [2005] EWCA crim 1980', *Archives of Disease in Childhood*, 91, 10, pp.873-4.
- Mansfield, M., Stafford Smith, C., Bohan, T. et al. (2016) 'General Medical Council behaving like a modern inquisition', *Guardian*, 21 March.
- Martinez-Lage, J., Ros de San Pedro, J., Puche, A. and Perez-Espejo, M. (2006) 'Benign' shaken baby syndrome. Case report', *Neurocirugia (Astur)*, 17, pp.348-50.
- Maude, J. (2014) 'Differential diagnosis: the key to reducing diagnosis error, measuring diagnosis and a mechanism to reduce healthcare costs', *Diagnosis*, 1, 1, pp.107-9.
- Medical Practitioners Tribunal (2016) *Determination on Facts, Dr Waney Marian Valerie Squier (1555161)* Medical Practitioners Tribunal Service, 11 March, available at <https://www.insidejusticeuk.com/pdf/mppts-determination-of-facts.pdf> (accessed April 2018).
- Ministry of Justice (2013) *The Government's Response to the Law Commission Report: 'Expert Evidence in Criminal Proceedings in England and Wales'*, London, November.
- Ministry of Justice (2017) *Practice and Direction 35 – Experts and Assessors*, London, January, available at https://www.justice.gov.uk/courts/procedure-rules/civil/rules/part35/pd_part35 (accessed October 2017).

- Minns, R., Jones, P., Tandon, A., Fleck, B., Mulvihill, A. and Minns, F. (2017) 'Raised intracranial pressure and retinal haemorrhages in childhood encephalopathies', *Developmental Medicine & Child Neurology*, 59, pp.597-604.
- Mitting, J. (2016) *Judgment*, Squier v. GMC, 3 November, EWHC 2739 (Admin) available at <https://www.judiciary.gov.uk/wp-content/uploads/2016/11/squier-v-gmc-protected-approved-judgment-20160311-2.pdf> (accessed April 2018).
- Newsweek Magazine* (1956) 'The boys jeered her', 10 September.
- Piteau, S., Ward, M., Barrowman, N. and Plint, A. (2012) 'Clinical and radiographic characteristics associated with abusive and nonabusive head trauma: a systematic review', *Pediatrics*, 130, 2, pp.315-23.
- Powers, M. (2017) 'Expert witnesses: stuck between the courts and the GMC', *British Medical Journal*, 357, j2034, pp.1-2.
- Prange, M., Coats, B., Duhaime, A., Margulies, S. (2003) 'Anthropomorphic simulations of falls, shakes, and inflicted impacts in infants', *Journal of Neurosurgery*, 99, pp.143-50.
- Ramesh, R. and Butler, P. (2010) 'Baby P files show police left him in danger, lawyers say', *Guardian*, 2 April, available at <https://www.theguardian.com/society/2010/apr/02/baby-p-police-knew-lodger> (accessed October 2017).
- Richards, P., Bertocci, G., Bonshek, R., Giangrande, P. *et al.* (2006) 'Shaken baby syndrome', *Archives of Disease in Childhood*, 91, 3, pp.205-6.
- Rowland, D. (1999) 'Negligence, professional competence and computer systems', *Journal of Information, Law and Technology*, 2, available at https://www2.warwick.ac.uk/fac/soc/law/elj/jilt/1999_2/rowland/#fnb10 (accessed October 2017).
- Scheimburg, I., Fleming, P., Reyes-Mugica, M. *et al.* (2016) 'Striking off Dr Squiers from the GMC deprives patients of her invaluable contribution to developmental neuropathology. On the occasion of her appeal', *British Medical Journal*, 352, 10 October, available at <http://www.bmj.com/content/352/bmj.i1768/rr-6> (accessed November 2017).
- Smith, C. (2014) 'Shaken baby syndrome' and forensic pathology', *Forensic Science, Medicine, and Pathology*, 10, 2, pp.256-8.
- Squier, W. (2008) 'Shaken baby syndrome: the quest for evidence', *Developmental Medicine and Child Neurology*, 50, 1, pp.10-14.
- Squier, W. (2011) 'The 'shaken baby syndrome: pathology and mechanisms', *Acta Neuropathologica*, 122, 5, pp.519-42.
- Squier, W., Mack, J. and Jansen, A. (2016) 'Infants dying suddenly and unexpectedly share demographic features with infants who die with retinal and dural bleeding: a review of neural mechanisms', *Developmental Medicine & Child Neurology*, 58, 12, pp.1223-34.
- Squier, W., Mack, J., Green, A. and Aziz, T. (2012) 'The pathophysiology of brain swelling associated with subdural hemorrhage: the role of the trigeminovascular system', *Child's Nervous System*, 28, pp.2005-15.
- Stoodley, N. (2002) 'Non-accidental head injury in children: gathering the evidence', *Lancet*, 360, pp.271-2.
- Stoodley, N. (2004) 'Neuroimaging in child abuse: reducing the risk', *Clinical Radiology*, 59, pp.965-6.
- Strause, P. (2016) 'Child abuse: we have problems', *Pediatric Radiology*, 46, 5, pp.587-90.
- SBU (2016) *Traumatic Shaking: The Role of the Triad in Medical Investigations of Suspected Traumatic Shaking – A Systematic Review*, Report 255E, Swedish Agency for Health

Technology Assessment and Assessment of Social Services, Stockholm, October, available at

http://www.sbu.se/contentassets/09cc34e7666340a59137ba55d6c55bc9/traumatic_shaking_2016.pdf (accessed April 2018).

Tuerkheimer, D. (2011) 'Science dependent prosecution and the problem of epistemic contingency: a study of shaken baby syndrome', *Alabama Law Review*, 62, 3, pp.513-69.

Vinchon, M., Defoort-Dhellemmes, S., Desurmont, M. and Dhellemmes, P. (2005) 'Accidental and nonaccidental head injuries in infants: a prospective study', *Journal of Neurosurgery*, 102, 4, pp.380-4.

Watkins, J. (2016) 'The law is not equipped to consider scientific dispute', *British Medical Journal*, 352, 31 March.

Wilde, O. (1894) 'Phrases and philosophies for the use of the young', *Chameleon*, December.



RESPONSE PAPER

Shaken baby syndrome: a fraud on the courts

Heather Kirkwood

4515 West Dravus Street, Seattle WA, United States

Contact: hkirkwood2@comcast.net

Heather Kirkwood is a Harvard-trained attorney who previously specialized in antitrust and commercial litigation, including securities fraud. In reviewing a pro bono case of child sexual assault, she was startled to find that there was no evidence base for the medical and psychological evidence used to obtain the conviction; to the contrary, the evidence confirmed innocence. Her work overturned the conviction, and the young father is now on the National Registry of Exonerations. Since then, she has explored the evidence base for other allegations and/or convictions in the area of child abuse, including shaken baby syndrome/abusive head trauma. She has lectured on this subject, including at the National Center on Shaken Baby Syndrome (2016), and her work has continued to result in the exoneration of innocent parents and caretakers, in the US and abroad.

Introduction

For decades, Waney Squier was the leading pediatric neuropathologist in the UK and possibly in the world. She was also the recipient of the prestigious 2016 Innocence Network Champion of Justice award. Yet her views on shaken baby syndrome – the very views that generated the Champion of Justice award – also brought her a six-month hearing before a panel of the General Medical Council (GMC) that removed her medical license, followed by an appeal that largely reversed the panel’s findings, but restricted her from testifying in the UK for three years. Only rarely in these proceedings, however, was the real issue addressed. The real issue was not whether Waney Squier used the right words in her testimony in six cases involving shaken baby diagnoses, but rather whether there was any evidentiary basis for the shaken baby diagnoses in these cases, or in others. The answer is straightforward: as confirmed by a comprehensive 2014-2016 review of the literature by the Swedish agency for health technology assessment, there is – and has never been – a valid research basis for shaken baby syndrome. Instead, the medical testimony that has been used – and is still being used – to destroy families and imprison parents and caretakers constitutes a fraud on the courts that has been perpetuated through intellectual inertia and intimidation. There is no better example than the trial of Waney Squier. Just as Watergate was a stain on the American presidency, the trial of Waney Squier – Waneygate – is a stain on the medical profession in the UK and elsewhere.

Waneygate: the backdrop

Technically, Waneygate started in April 2010 when the police filed claims against her with the GMC alleging she had given false and/or misleading testimony in shaken baby cases. In fact, Waneygate started much earlier. It started in the 1940s, at just about the time that Waney Squier was born. At that time, x-rays were in common use, but no medical specialty focused on children's bones. When a small group of radiologists (later to become the fathers of pediatric radiology) looked at children's bones, they saw abnormalities that were not present in adults or even most children. Although these findings had long been attributed to rickets, scurvy, infectious disease and/or congenital conditions, these pioneers suggested they were attributable to trauma and, more specifically, to abuse. Over the decades, other internal findings that had previously been attributed to natural disease processes or household accidents were also attributed to abuse.

Although these diagnoses were initially advanced as medical hypotheses, they quickly became accepted as medical certainties. This culminated in 1962 with a paper entitled 'The battered-child syndrome' (Kempe, 1962). For years, I thought this paper was about bruised and battered babies, babies whose assaulters hid the injuries or even the babies. It was not until I actually read the paper – long after I became aware of the problems with shaken baby diagnosis – that I understood that Kempe, a pediatrician, was diagnosing abuse based on *internal* medical findings in children who had no history of trauma and no external evidence of trauma. To fill the evidentiary gap, Kempe urged that physicians become skilled in the accusation and interrogation of parents and caretakers who could not explain their children's internal medical findings, most of which had previously been attributed to nutritional or congenital conditions. His proposal was widely adopted, and complaints soon skyrocketed.

There was only one problem: although Kempe described the babies as battered, in most instances there was no history of battery and no bruises to suggest physical abuse. Within a decade, John Caffey (a radiologist) addressed this problem by redefining the 'battered' babies as 'shaken' babies, with findings for the shaken baby diagnosis including subdural hemorrhage and bony abnormalities, particularly abnormalities in the growth plate previously associated with rickets and other nutritional and congenital conditions (Caffey, 1972, 1974). Despite acknowledging that the evidence base for this hypothesis was meager, he predicted that a new pediatric subspecialist would soon emerge – a traumatologist – and attain the same success as subspecialists in infectious disease, neoplasms, metabolics and genetics. It took nearly 40 years, but this too came to pass. In the

meantime, the findings used to diagnose shaking morphed into a ‘classic triad’ of subdural hemorrhage, retinal hemorrhage, and encephalopathy (brain dysfunction). None of this was based on observation: no observed shaking events led to these findings, and there were very few admissions. Instead, shaking was assumed, with no inquiry as to whether this was even possible.

By 2000-2001, an elaborate scaffolding had been built upon the assumption that in the absence of a history or external evidence of trauma, a wide range of internal findings was caused by violent shaking. Although the shaken baby hypothesis started with the proposition that shaking *could* cause these findings, it quickly shifted to the claim that *only* shaking could cause these findings, and that shaking could therefore be reliably inferred from the presence of such findings – a very different proposition. By then, shaken baby syndrome had developed its own powerful advocacy group, the National Center on Shaken Baby Syndrome (NCSBS), a private organization dedicated to promoting the shaking hypothesis. In gatherings that resembled political rallies, doctors and prosecutors who believed in the shaken baby hypothesis trained other doctors and prosecutors as well as social workers and judges. They also mixed medicine with therapy by holding grief sessions for those who had been told their children had been shaken, and they launched public ‘shaming’ attacks on anyone who questioned their beliefs. Advocates of the shaken baby hypothesis even created their own private medical society, the Ray E. Helfer Society (named after Kempe’s collaborator on books endorsing the battered child syndrome). They give annual awards to each other based on their common belief in the hypothesis.

Soon families were being separated and parents and caretakers imprisoned in unprecedented numbers based on the testimony of doctors who relied on the parent’s or caretaker’s inability to explain internal medical findings. This did not mean, however, that support for the shaken baby hypothesis was unanimous, or even widespread. From the beginning, parents protested, and so did many doctors, including leading forensic pathologists. Some questions were obvious: If a baby was violently shaken with sufficient force to cause brain damage and subdural hemorrhage, wouldn’t there be neck injury? Yet such injury was rarely present. Rational discussion was further hampered by the lack of research on key issues. Although the shaken baby hypothesis melded biomechanics (the study of force on the human body) and pediatric neuropathology (the study of the pediatric brain and central nervous system), very little work had been done on this subject by either discipline. In the absence of evidence, the juggernaut of shaken baby syndrome advanced, virtually unimpeded, through 2001, with just two red flags.

The first red flag was raised in 1987 when Ann-Christine Duhaime, a neurosurgeon, and several biomechanical engineers, conducted experiments on shaking. Although Duhaime expected the experiments to support the shaking hypothesis, the experiments found that the forces of shaking were not high enough to cause the findings that were being attributed to shaking. (Duhaime et al, 1987). Still, this did not deter the diagnosis, which had by then acquired a cult-like status. Instead, Duhaime simply renamed the hypothesis “shaking-impact syndrome”, (Duhaime et al, 1998), leading to claims that perhaps the baby was first shaken and then thrown onto a soft surface, such as a pillow or mattress, leaving no traces of either shaking or impact.

The second red flag was raised in 1997 when Louise Woodward, a young British nanny, was tried for the death of Matthew Eappen, a toddler. This time, the defense questioned the validity of the shaken baby diagnosis. Witnesses for the defense included one of Duhaime’s biomechanical co-authors, a neuroradiologist, a neurosurgeon and a neuropathologist, all associated with prestigious institutions and all with pediatric expertise. Yet the jury preferred the prosecution’s account of a toddler who had been violently shaken by a teenager, with no consideration of whether the prosecution’s claims were supported or even possible. The judge found, however, that the prosecution had not sustained its burden of showing a serious assault (indeed, it was unclear whether he thought the prosecution had shown an assault at all), and he reduced Woodward’s sentence to time served (less than a year). His decision was upheld, and the nanny returned to the UK. In a pattern that was to become familiar, seventy-three advocates of the shaken baby hypothesis promptly signed a letter of protest targeted at those who questioned the diagnosis (Chadwick *et al.*, 1998).

By 2000, the NCSBS was teaching that questions about the shaken baby hypothesis were “untrue defenses” that were being raised by “irresponsible experts.” They were also teaching that shaking was the only hypothesis that explained various internal findings in the absence of a severe motor vehicle accident. (Parrish, 2000). In 2001, the committee on child abuse and neglect of the American Academy of Pediatrics reaffirmed a presumption of abuse for any ‘unexplained’ intracranial finding, asserting that none of the triad findings could be caused by short falls. (AAP, 2001). The National Association of Medical Examiners – the professional organization for forensic pathologists – published a committee paper that attempted to provide pathological underpinnings for the shaken baby hypothesis (Case *et al.*, 2001). The pathology claims were that subdural hemorrhages were caused by ruptured bridging veins, that the brain damage in allegedly shaken

infants was caused by torn or ruptured ('shorn') axons throughout the brain, and that retinal hemorrhages were highly correlated with "rotational" injury, i.e., shaking, often described as 'vitreoretinal' traction (the back and forth movement of the vitreous against the retina). If these claims were correct, each of the triad findings would require great force, the child would not be able to engage in any normal activity between the shaking and the collapse (no 'lucid interval'), and the shaker was, by definition, the last person with the baby before collapse. Soon doctors routinely testified that these findings required a force equivalent to a major motor vehicle accident or fall from a multi-story building. (Imwinkelreid, 2010). Remarkably, despite the Duhaime experiments, no one thought to enquire whether human beings were capable of generating such force.

That was, however, soon to end. In 2001, a review of witnessed fatal short falls confirmed that short falls can indeed cause the triad; indeed, one of the falls – a toddler's tumble from a plastic gym set in the family playroom – was videotaped (Plunkett, 2001). In the same year, Jennian Geddes, a leading UK pediatric neuropathologist, published the first careful neuropathological studies on shaken baby syndrome (Geddes *et al.*, 2001a, b). Geddes and her colleagues found that the subdural hemorrhages seen in allegedly shaken infants were not like those seen in older children or adults but were instead thin, even trivial, and were also seen in infants who died from natural causes. Nor did the neuropathology show traumatically ruptured axons throughout the brain; instead, the predominant finding was hypoxia (or lack of oxygen), a nonspecific finding that is also seen in natural deaths. The following year, in the US, the National Institutes of Health held a conference acknowledging that:

The debate over 'shaken baby syndrome' continues to rage in our country. Because there is very little scientific experimental or descriptive work, the pathophysiology remains obscure, and the relationship to mechanics even cloudier. ... The evidence that does exist has not been subjected to evidence-based scrutiny in a multidisciplinary scientific forum. (Nicholson, 2003)

From there, the floodgates opened. In 2002, a prominent neurosurgeon and two leading biomechanical engineers published a paper explaining why the shaken baby hypothesis was implausible (Ommaya, Goldsmith and Thibault, 2002), and a 2003 biomechanical study confirmed that the forces of shaking were less than the forces of short falls, including one foot falls onto concrete or even carpet (Prange, Coats, Duhaime and Margulies, 2003; see also Prange, 2002). In 2006, the National Association of Medical Examiners withdrew its position paper (see Findley et

al, 2012), and even the most ardent supporters of the shaken baby hypothesis admitted that there were many causes of the internal findings that had been attributed to shaking, including birth, illness, infection, congenital conditions, and stroke (Sirotnak, 2006). In a paper entitled ‘Shaken baby syndrome: the quest for evidence’, Waney Squier reviewed the evidence on both sides of the shaken baby debate and raised implicitly the question that was on many minds: Was there any research support for shaken baby syndrome, or was this just a red herring? (Squier, 2008). In 2008, a major government-sponsored review in Ontario, Canada, acknowledged the significant evolution in pediatric forensic pathology relating to shaken baby syndrome and ordered a review of past cases (Goudge, 2008). And in 2009, Squier co-authored two major articles on the pathology of infant dura and pediatric subdural hemorrhage, essentially destroying the notion that the thin subdural hemorrhages typically seen in infants were caused by traumatically ruptured bridging veins and raising the issue of whether they reflected great trauma, or even trauma at all (Mack, Squier, and Eastman, 2009; Squier and Mack, 2009). In the same year, the American Academy of Pediatrics acknowledged the controversies, abandoned the presumption of abuse as well as the claim that short falls cannot cause the triad, and renamed shaken baby syndrome ‘abusive head trauma’ (Christian and Block, 2009).

In the meantime, Waney Squier’s testimony had helped overturn one conviction in the Court of Appeal in the UK, and several defendants had been acquitted following the testimony of Squier and others. By the spring of 2010, several more shaken baby cases were up for review before the Court of Appeal while another case was pending in the Old Bailey. With a series of acquittals and major shifts in the literature, the juggernaut suddenly seemed not so unstoppable. And then came Waneygate. Waneygate did not come about because Waney Squier was asking the wrong questions, getting the wrong answers, misrepresenting the literature, testifying outside her expertise, or even using the wrong words. Instead, she was put on trial because she was pointing out errors in the shaken baby hypothesis and providing answers that were a much better fit for the medical findings based on the anatomy and physiology of the infant brain, the caregiver history and the biomechanics of head injury. If the shaken baby hypothesis were to prevail, even under pseudonyms, Squier – and others like her – had to be stopped.

Two strategies developed. The first strategy was to create a subspecialty that would certify pediatricians to diagnose abuse and testify in court against parents and caretakers. This specialty, which is known as ‘child abuse pediatrics’, was launched and taught by leading advocates of the

shaken baby hypothesis, leading to 191 certifications of child abuse pediatricians in 2010 (PREP:CAP 2009; Giardino *et al.*, 2011). The second strategy was to launch full-fledged attacks on physicians who questioned the shaken baby diagnosis. While such attacks had always been a critical component of shaken baby advocacy, this time the primary target was Waney Squier. If Squier (and by extension her colleagues) could be eliminated, the shaken baby hypothesis might yet survive, albeit under pseudonyms.

The Cases

Waney Squier was put on trial before the GMC for her testimony in six shaken baby cases. In each case, she testified that shaking was an unlikely cause of the findings, and she offered explanations that were more consistent with the neuropathology and biomechanics of head injury. Five cases were family court cases; four of these were also heard in the criminal courts. The sixth case was heard only in the criminal courts. Although initials were used in the GMC proceedings, the criminal cases are well-known and easy to match to the cases described in the GMC proceedings.

Case 1

In 2007, an 8-month-old child vomited three times during the day and had two short falls (from a standing position). The parents attributed the vomiting to illness as the child's older siblings were also ill and vomiting. An ambulance was called, but the child died twelve hours later. A CT (computerized tomography) scan showed a subdural hemorrhage, reportedly asymmetrical. The history suggested two obvious possibilities for the death: illness and/or short falls. Of these, Waney Squier favored the latter. In 2008, a family court judge held that the death was caused by shaking by the mother. Later the same year, the criminal court dismissed the murder charges for lack of evidence, and there was a hung jury on manslaughter. In 2009, the court brought in a not guilty verdict for lack of evidence.

Case 2

In 1999, a 2-month-old baby had a subdural hemorrhage and was diagnosed with cerebral palsy (one of Waney Squier's areas of expertise). The parents had separated, but both continued to raise the child. In 2008 – nearly a decade later – social services sought to take the new baby of the father

and his second wife on the ground that the cerebral palsy of the older child was caused by shaking. Waney Squier concluded that, based on changes in the research, the radiological findings were more consistent with a rebleed into a birth-related chronic subdural hemorrhage. The family court rejected her testimony and held that the findings were caused by shaking.

Case 3

In 2007, an 8-month-old child collapsed (cardiac arrest) in the care of his daycare provider, who reported that he became unwell shortly after feeding (seemingly choking) and became unresponsive. He was resuscitated, but died almost two months later. The same family court judge as in Case 1 held that the death was caused by shaking. In 2010, the criminal court dismissed the murder charge against the daycare provider for lack of evidence and a jury was undecided on a manslaughter charge. When the prosecution said it would no longer offer any evidence against the daycare provider, the court entered a not guilty verdict.

Case 4

In 2007, a 3-month-old infant died three days after hospital admission. The mother described choking and there were indications of heart arrhythmia. In 2009, a family court judge concluded that the death was the result of shaking by the mother, sharply criticized Waney Squier and a colleague (Marta Cohen) for testifying to the contrary, and made her opinion public. Later that year, a jury found the mother not guilty of murder, but convicted her of manslaughter. The mother continued to deny shaking the child, and the judge imposed but suspended a 51-week sentence, saying that experts agreed that only minor force was required and that having heard the testimony, he was certain the mother had tried to save the child.

Case 5

In 2005, a 19-month-old toddler suffered cardiac arrest at home and died approximately 18 hours after admission to hospital. Waney Squier concluded that the child's medical findings and death were consistent with the accidents described by the family. In 2008, a jury found the stepfather not guilty. In 2010, the same family court judge as in Case 4 disagreed with Squier and the jury.

Case 6

Also in 2005, a 2-month-old baby died with pathological findings of infection in the brain and the classic triad. Squier attributed the death to infection. The father was convicted of killing the child. In 2010, the court of appeal upheld the conviction. The opinion, which harshly criticized Squier, was written by a former family court judge.

These six cases reveal a burgeoning split between the family court judges who remained committed to the shaken baby hypothesis and the criminal courts. While the criminal courts were slowly responding to the shifts in the literature, as set forth by Squier and others, several family court judges ignored or even challenged the new research. Although part of the split may have been attributable to the lower burden of proof required by the family courts, this does not explain the harshness of the family court opinions or the decision by the family court judge in Cases 4 and 5 to make a particularly harsh decision public, with no opportunity for rejoinders from Squier or Cohen. Nor does it explain the GMC's wholesale endorsement of the family court decisions, including the sometimes vituperative attacks on experts who questioned the shaken baby hypothesis.

Waneygate

When earlier attempts to discourage or discredit Waney Squier failed, Waneygate began in earnest. If the shaken baby hypothesis were to survive – even under other names – it was essential not only to silence those who questioned its existence and whose views were gaining increasing acceptance in the courts as well as in academia, but also to send a strong signal to anyone who might join them. By targeting Waney Squier, they would eliminate one of the most prestigious critics of the shaken baby hypothesis while sending a message to the world that shaken baby was not be questioned. And hence began Waneygate – a scurrilous attack on the leading pediatric neuropathologist in the UK (and possibly the world) who had not only questioned the research basis for the shaken baby hypothesis but had destroyed the last remaining element of the triad. They could not challenge her pathology, which even her opponents recognized was impeccable, so they instead challenged her character, taking her words out of context and twisting them so that even she could hardly recognize them and certainly could not explain them without the context.

The GMC complaint and interim orders panel (2010)

The first step was a complaint to the GMC in April 2010 that relied on the critical family court judgments. I first became aware of the GMC claims in July 2010 when I received a request from Waney Squier for a character reference. I knew Squier because she had testified in one of my cases (a post-conviction shaken baby case in Amarillo, Texas) and she had also been a witness in a Swedish case which I was reviewing for possible post-conviction relief. Her testimony was conservative, the Texas court found her to be knowledgeable and credible, and her views in both cases were supported by other well-credentialed witnesses. I could vouch for the accuracy of her testimony, but I knew little about her character. Had she been caught shoplifting or embezzling? She appeared to be a sensible woman who was devoted to the study of the anatomy and physiology of the infant brain, but private and public lives can be quite different.

When I called to ask why she needed a character reference, Waney Squier told me that charges had been filed against her with the GMC based on her testimony in shaken baby cases, and that there was to be an interim orders panel (IOP) hearing on whether she could keep her license. I said that I did not understand why she would want a character reference; it seemed that she needed substantive analyses. She told me that her counsel had advised that only character references could be used and that no references to the merits of her testimony would be permitted. I called her counsel directly and was given the same directive. When I said I would provide a letter with information on the merits, I was told that it would not be used. I sent it anyways. In it, I explained the shifts in the literature and the way in which Squier's research and testimony fit the literature. Before the IOP hearing, Marta Cohen – a well-regarded pediatric pathologist who was facing similar complaints – had, on advice of counsel, accepted an agreement under which she would not testify in shaken baby cases pending a full hearing. Waney Squier was being encouraged to do the same.

Waney Squier's IOP hearing was held in August 2010. Before the hearing, Squier's barrister took a different tack. Instead of accepting restrictions, she submitted letters from prominent physicians, as well as my own letter, explaining the developments in the literature and Squier's contributions to the science, and she reviewed these letters at the hearing. The IOP declined to impose restrictions on Squier, and in less than a month the restrictions on Marta Cohen were also removed.

National Center on Shaken Baby Syndrome (NCSBS) conference (September 2010)

If there were any doubts as to how shaken baby advocates would respond to the increasing criticisms of the shaken baby hypothesis, the September 2010 NCSBS conference dispelled them. The political rally atmosphere was stronger and darker. Keynote presentations by prosecutors and others featured cartoons and an audience singalong mocking the experts who questioned the shaken baby hypothesis. Recordings and audience questions were barred; questions could be written out, but the speakers would select the ones that they wished to answer. An attorney was threatened with expulsion for asking a question; as the security guards descended on him, audience members surrounded him and prevented forcible ejection. A physician who had testified on the shifts in the literature was threatened with physical attack by a parent. In the midst of all this, I saw a session with the innocuous title of ‘A national co-ordinated approach to cases of non-accidental head injury in the UK’. Since this was only a month after Waney Squier’s IOP hearing, I decided to attend. I expected it to be procedural and probably a bit dull, but thought it would provide relief from the emotion-laden sessions that pervaded the conference and might also give some insight into the manner in which SBS cases were being approached in the UK.

As it turned out, the session was anything but dull. In his talk, detective inspector Colin Welsh of New Scotland Yard used PowerPoint slides of newspaper clippings to illustrate the shaken baby cases that the police and prosecutors had recently lost. He attributed these losses to the testimony provided by Waney Squier and Marta Cohen, and he presented the plan the police and prosecution experts had developed to prevent Squier and Cohen from testifying in the future. Although the cases were not identified, the newspaper clippings were sufficient to identify two of them as Cases 1 and 5. There was no apparent interest in whether Squier and Cohen were right: instead, the goal was to ensure convictions, irrespective of guilt or innocence. Welsh went on to describe the approach, which was to approach family court judges through what he called “the back door”. When a leading US SBS advocate exulted prematurely that Squier had already lost her license based on the family court decisions, Welsh corrected her, but made clear that this was indeed the goal. I sent my notes to the UK that night in case they might assist in Marta Cohen’s new hearing. As I was leaving the conference a few days later, I heard that all restrictions on Cohen’s license had been removed.

The hiatus

There was then a five-year hiatus as the GMC tried to find experts to support its claims against Squier. This was not an easy task. By then, it was evident that the shaken baby hypothesis was in tatters, and that giving it new names did not solve the problem. Nor did the GMC claim that Squier's professional publications on this subject – which contained the same views as her testimony – were incorrect or lacking; instead, the GMC criticized her use of words in her testimony. Ultimately, the GMC turned to the same witnesses who had lost in the criminal courts in the cases under consideration, along with a new expert, also an SBS advocate, who advised the GMC that he, too, was biased. Despite the fact that there were no neutral GMC experts to be found, the GMC re-activated the case, which eventually went to full hearing in October 2015.

The testimonials

In contrast, more than a hundred witnesses offered to testify on behalf of Waney Squier, and several provided lengthy reports. The reports and testimonials came from neuropathologists, pathologists, biomechanical engineers, attorneys (including prominent UK barristers and Innocence Network attorneys) and even parents. I had already discussed the changes in the literature with Squier's insurance company, and I met with Squier's solicitor in London after the GMC proceedings were re-activated. Although the meeting had been confirmed in advance and seemingly welcomed, Squier's counsel told me at the outset that he had been instructed (presumably by the insurance company) not to speak to me. However, I was not prohibited from speaking to him, and did so for several hours, during which he appeared to agree on the witnesses who should be called to testify on Squier's behalf. In the following months, however, Squier told me her counsel did not want to question shaken baby syndrome or even to use witnesses who questioned it. Instead, her counsel wished to employ witnesses who had no expertise or knowledge on this subject. This raised a serious issue: if her counsel did not question shaken baby syndrome, the shaking hypothesis would likely be viewed as a validated medical diagnosis and Waney Squier's testimony to the contrary would almost certainly be viewed as irresponsible, no matter how careful her wording.

In February 2015, the GMC convened a second IOP proceeding addressing a 7th case in which the claim was that Squier had not sufficiently alerted the attorneys who had retained her of the GMC claims. Squier's counsel asked me and others for new reports or testimonials. My letter addressed the new claims and included an update on the changes in what was now known as the

SBS/AHT (shaken baby syndrome/abusive head trauma) hypothesis since 2010. Shortly before the hearing, Squier told me that the barrister who handled the first IOP hearing and was about to handle the second told her that my letter was “spot on”. Within a few hours, however, Squier’s solicitor asked me to remove all substantive content from my letter. When I asked who had requested this, I was told the very barrister who had told Squier my letter was “spot on”. I called the barrister to make sure this was correct. She seemed uncomfortable, but told me that that these were indeed her instructions and that this was in Squier’s best interest. I did as she asked, albeit with misgivings, since this letter no longer represented my views – all the crucial points had been left out. Later, Squier told me that her insurance company had advised that my call had upset the barrister and that if I had any further contact with counsel, her insurance company would no longer represent her, and she would have to fund her own defense.

Over the next year, Waney Squier told me repeatedly that her counsel refused to address the validity of the shaken baby hypothesis. While I was not allowed to interact with counsel, several prestigious UK lawyers who were familiar with the issues attempted to assist, without success. My instinct remained the same: if the problems with the shaken baby hypothesis were not addressed, Waney Squier would lose – it was only a question of by how much. In October 2015, there was a brief glimmer of hope. When the GMC provided an email from a prosecution expert acknowledging the controversies over the shaken baby diagnosis, Squier’s solicitor again asked for supporting letters, this time specifying that shaken baby syndrome could be addressed. As requested, I provided a letter, as did others. Several leading physicians, including a neuropathologist, a pediatric neuroradiologist, and two forensic pathologists – including one with additional training in neuropathology – also submitted reports, as did several attorneys with expertise in this area. Soon, however, it became apparent that Squier’s counsel had once again decided not to question shaken baby syndrome, or even learn the issues. Consequently, it is my understanding that most of these testimonials and reports were never used.

The hearing

The panel was provided with the critical Family Court judgments, and the hearing opened with a rousing recital of Waney Squier’s alleged mistakes. There was no response by her counsel, who took the same position taken during preparation: since the prosecution experts were not on trial, their views, even if wrong and/or disproven, were not relevant and could not be challenged. And

so it went for a painful six months in which counsel for both sides accepted an unsupported hypothesis. Instead of focusing on whether innocent parents and caretakers were being accused and/or convicted of crimes that had not occurred, the hearing focused on whether Squier used the best words in her testimony. There was to be no mercy: if she had made wording errors – even the verbal equivalent of typographical errors – she might lose her license. It did not matter that the prosecution experts admitted that their own opinions were speculative. Nor did it seem to occur to anyone that if they were removing children and sending parents or caretakers to prison based on hypotheses they knew were speculative, perhaps it was they who should have been on trial, not Waney Squier.

For her defense, Squier's counsel selected five medical witnesses – the pediatric radiologist who co-authored Squier's groundbreaking 2009 paper on subdural hemorrhage (Squier and Mack, 2009); a Swedish pathologist and epidemiologist who had concluded in a recent post-conviction case that there was no reliable evidentiary basis for the shaken baby hypothesis; an eye pathologist who favored shaken baby/abusive head trauma for most eye findings, but found the mechanisms to be uncertain; a biomechanical engineer who confirmed (by video) that Squier's testimony on biomechanics was correct; and the neuropathologist whose work had first challenged the shaken baby hypothesis (by phone). I sat in on a week of the defense testimony. The panel – which consisted of a retired policeman, a retired naval officer, and a retired psychiatrist who specialized in geriatrics – asked few questions and showed little interest in the substance. One could hardly blame them: they had been provided with opinions that harshly criticized Waney Squier without being provided with the context or the issues. From their perspective, they were simply being asked to endorse these decisions, and that is what they did. They took the same approach to Squier's witnesses: if they questioned the shaken baby hypothesis, the panel viewed their testimony as not credible. This was not, in short, a hearing, it was a lynching – not just by the police and prosecution experts, but also by the GMC and even Waney Squier's own team.

The appeal

The judgment against Waney Squier, which included a plethora of negative findings and the removal of her license, was appealed. Since the appellate court was restricted to the record, which left out the real issues, the Innocence Network (a widely-respected organization, largely affiliated with law schools, that works to exonerate the wrongfully convicted and address the causes of

wrongful conviction) voted quickly to file an amicus brief explaining the recent developments in the shaken baby arena. Amicus (“friend of the court”) briefs are filed by non-parties who can provide a valuable perspective to the court because of their interest and expertise in issues of public importance, as the Innocence Network has done in other cases involving shaken baby syndrome. However, the UK barrister who agreed to sponsor the amicus brief bowed out at the last minute, possibly because of recent UK rules involving the assessment of costs. Even without an amicus brief, the appellate court overruled most of the panel’s findings and restored Squier’s license. However, the judge upheld some findings and prohibited Squier from testifying in the U.K. for three years.

The findings

The findings that the appellate court upheld fell into two categories: (1) claims that Squier strayed outside her expertise, specifically, in pediatric medicine and biomechanics; and (2) claims that she cited research papers that did not fully support her opinion. The examples provided make clear that the panel and court of appeal misunderstood the role of a neuropathologist, the status of the shaken baby hypothesis, and the manner in which these interact.

The role of a neuropathologist

Neuropathology is the study of the brain and central nervous system, including their response to injury or disease. A pediatric neuropathologist focuses on the developing brain and its surrounding membranes, including the dura. Two parts of the shaken baby triad – brain findings and subdural hemorrhage – fall directly into this area of expertise. Other issues are shared with other specialties. For example, since the eye is an extension of the brain and has the same membranes, including the dura, ophthalmologists and neuropathologists have a shared responsibility for addressing eye findings. Similarly, while clinicians take histories and treat symptoms such as choking, vomiting or infection, the responsibility for correlating these findings with the neuropathological findings is shared by clinicians and neuropathologists.

As a practical matter, neuropathologists have two tasks. First, they have a technical role: they study the brain and central nervous system and they describe what they see, including under the microscope. This is not, however, their only task. As physicians, they must also interpret what

they see. Interpretation includes telling other physicians what the neuropathological findings mean, assessing possible causations, and providing a differential diagnosis (list of possible causes) for these findings. Neuropathologists are, in short, not just technicians; they are also diagnosticians. To perform this role, they must consider a broad range of information, including information from the caregivers and from other professionals, including clinicians, radiologists and biomechanical engineers. To fail to consider this information would be a dereliction of their responsibilities to patients, society and the courts.

Outside her expertise

The panel and court of appeal did not criticize Waney Squier's neuropathological descriptions and findings. Instead, they said that it was beyond her expertise as a neuropathologist to consider the information provided by parents, clinicians or biomechanical engineers. Nor was she to be allowed to correlate her neuropathological findings – which would be incomprehensible to most physicians – with any other findings. It did not matter if she reported the other findings or information correctly; she was not to consider them at all. Instead, she was to restrict herself to technical descriptions of the neuropathology and leave its interpretation to others. More to the point, she was to endorse the shaken baby hypothesis (or at least refrain from questioning it) even when it did not fit with the anatomy and physiology of the infant brain and dura (her area of expertise), the biomechanics, or the caretaker history. In short, she may have been the leading world expert on the infant brain and dura, but she was not to apply her knowledge to the shaken baby hypothesis.

The limitations on neuropathology were well illustrated in the Court of Appeal's suggestion that it was outside Squier's expertise to suggest that a chronic subdural membrane (a neuropathological finding) may leak from the increased intracranial pressure caused by choking. In such a case, one can only wonder within whose expertise it might fall. Neuroradiologists can only suspect the presence of these membranes on scan, and neurosurgeons rarely see them and when they do, it is only grossly and in passing. Neuropathologists are the only physicians who examine these membranes closely and under the microscope, and it is their job to understand their function. If neuropathologists cannot address the physiology of chronic subdural membranes, then no one can.

Use of the literature

The panel and Court of Appeal took the same approach to Waney Squier's use of the literature. Once Squier – and others – concluded there was no reliable evidence base for the shaken baby hypothesis and that the available evidence undermined or even demolished its key elements, they had an obligation to correct the record, including by re-examining the literature. In two of the six cases under consideration, the caretaker described choking, which has also been described in other cases and case reports. Squier further identified two papers written by physicians who attributed the deaths to shaking, but stated that the caretakers described choking. If shaking is not supported by evidence, one must consider choking as a possible alternative. This is not cherry-picking: it is simply pointing out that the witness accounts support choking. The claim that this might mislead the courts is itself misleading: the papers identified by the panel and appellate court are short and clearly written (under four pages total), they include the diagnosis of shaken baby syndrome in their titles, and they were provided to the prosecution experts, discussed in expert conferences and used in cross-examination. While the authors rejected the witness accounts in favor of shaking - in one case, the authors claimed that the findings were “*pathognomonic*” of shaken baby syndrome (Hylton and Goldberg, 2004); in the other, the authors characterized the Heimlich maneuver as “benign” shaken baby syndrome (Martínez-Lage, Ros de San Pedro, Puche and Pérez-Espejo, 2006) - Squier thought that choking was more likely. There was no lack of clarity in her presentations; as the family court decisions stated, Squier was very clear in her view that her opinions were based on her belief that the shaking hypothesis is unsupported by the research as well as her own understanding of the infant brain. The same applies to all of the literature that Squier was accused of cherry picking. Since most of these papers were written by those who believed in the shaken baby hypothesis, their conclusions inevitably supported shaking as the cause of injury. Squier did not suggest that their conclusions supported her testimony; she simply pointed out that these papers also contained data that supported an alternative diagnosis. There was no need to point out that the authors reached different conclusions since this was well known to all sides and obvious from the face of the papers.

There is, moreover, no indication that the family courts, panel or court of appeal did not understand that Waney Squier disagreed with the authors' conclusions. On the contrary, as the family court judge who published her opinion stated:

Dr. Cohen and Dr. Squier each believe that in the absence of additional external injuries, such as grip marks or fractures, there is no reliable evidence of shaken baby syndrome. Dr. Squier does not accept the Triad to be a strong indicator of shaken baby syndrome. These

views are, undoubtedly controversial. They go against the mainstream of current thinking and the analysis of the court of appeal in *R v. Harris*. (King, 2009, paras.198-9)

The family court judge preferred the testimony of the prosecution expert, who assured the court that his views were “in line with mainstream opinion” (King, 2009, para.199). The family court appeared to view this as a devastating indictment of Squier’s testimony, as did the GMC, and even the Court of Appeal appeared to endorse the shaking hypothesis, stating that the two choking papers “described classic brain injuries in babies following upon vigorous or forceful shaking.” (Mitting, 2016, para.96)

However, Waney Squier was not alone in her views that shaking is an unsupported and implausible explanation for these findings. By the time the Court of Appeal issued its opinion, twenty years of biomechanical experiments had consistently found shaking to be at best an implausible cause of the medical findings, the National Association of Medical Examiners had withdrawn its paper on this subject a decade earlier, and the American Academy of Pediatrics had been forced to withdraw the presumption of abuse, to recognize alternative causes (including short falls and natural disease processes), and to come up with a new name three years after that. Ironically, within a week of the appeal decision, a comprehensive two-year Swedish literature review concluded not only that there is little or no reliable evidence in support of the shaking hypothesis, but that it is ethically problematic for physicians to assert that shaking has occurred based on the evidence that is available (SBU, 2016; see Lynøe, Elinder, Hallberg *et al.*, 2017). In short, Waney Squier had been right all along.

The message

The message of Waneygate was sent – and heard – around the world. The message to physicians was clear: if you challenge – or even question – the shaken baby hypothesis, your career will be in jeopardy. Waney Squier was not the first physician to be subject to retaliation and intimidation by shaken baby advocates, nor was she the last; she was simply the most visible. In March 2011, just under a year after the police filed their complaint with the GMC and just months after the NCSBS conference, another NCSBS speaker filed a complaint against Ronald Uscinski with their professional association. Uscinski, a neurosurgeon, was one of the first to point out the problems with the SBS hypothesis, and he was ultimately censured by the association for being an

‘advocate’. And what was he advocating? He was advocating exactly what he had written in his publications, including in the *British Medical Journal*: there was no basis for the shaken baby hypothesis, or for the testimony that was being given by its supporters in their efforts to imprison parents and caretakers. Although all substantive claims against him were dismissed, the censure made clear that any other neurosurgeon who questioned shaken baby syndrome would likely meet the same fate. This was brought home to me in 2017 when I spoke with a neurosurgeon who was treating a child whose father had been accused of abuse. He made clear that he had never seen or suspected abuse, and that he had never made a report or record of any such suspicions. Yet he did not want to get involved. “What more do you want of me?”, he asked. Was I asking him to give up his career? This is what we both knew would happen if he followed the example set by Uscinski and Squier and testified that, in his opinion, the child suffered from a natural disease process (childhood stroke), as set forth in the medical records, *not* abuse, as claimed by a child abuse pediatrician.

I know of at least four other prestigious physicians who have testified for parents and caretakers accused of shaking and who have been faced with internal investigations based on allegations from proponents of the shaken baby hypothesis. Typically, their institutions place restrictions on their practice but ultimately support them, months or (in one case) years later. Two other experts faced criminal charges for what were at most trivial misstatements; one was vindicated, the other agreed not to testify for just under a year. Irrespective of the outcome, the process is devastating. Even had Waney Squier been entirely victorious at the close of the hearing or on appeal, she would have endured a six-year cloud on her reputation and a six-month trial. This occurred even though her insurance company provided her with counsel; most affected physicians have to bear their own attorney fees. While these factors alone would be sufficient to deter doctors from questioning the shaken baby hypothesis, the mantra used throughout the hearing - it doesn’t matter if she’s right or wrong, it’s just about how she says it - serves as a further deterrent. Being right is no defense. Supporters of the shaken baby hypothesis will go through every word that you have used, in every trial. If you have not used the ‘right words’, you may lose your reputation or even your license. Not surprisingly, following these proceedings, leading UK experts made clear that they would no longer review cases or testify for the defense in shaken baby cases. They were soon followed by US experts, who found the UK courts hostile to any consideration of the changes in the shaken baby literature or to any expert who raised these issues. It is ironic: the leading

research on shaken baby syndrome was carried out in the UK or published in UK journals, yet the UK has become a backwater in the very areas in which it had previously led.

I hear many variations on the same story. I see outrageous complaints filed with hospitals and medical schools by doctors who support the shaken baby hypothesis against those who question it. In 2016, I saw a call to arms by a leading pediatric radiology journal editor, encouraging attacks on those who question shaken baby syndrome (Strouse, 2016). And I meet with doctors who cannot look up when they speak with me. They tell me what they see, but also tell me that if I disclose what they have told me, they will deny they said it, even when there are witnesses. As the evidence that shaken baby is a flawed hypothesis floods in, I hope that doctors will someday feel free to speak up and say what we all know, that the shaken baby hypothesis is flawed, possibly irreparably. In the meantime, we will continue to see families destroyed and innocent parents and caretakers sentenced to prison – or even execution – based on a hypothesis whose premises are indefensible.

Conclusion

While doctors have the right to believe in shaken baby syndrome, they do not have the right to provide or encourage misleading testimony or to intimidate witnesses in order to maintain a flawed hypothesis. The Swedish report did not say anything new; it simply confirmed what supporters of the SBS hypothesis have long acknowledged - that the studies supporting the shaken baby hypothesis are circular (and thus of no evidentiary value) and that the only supporting evidence consists of confessions, which are of only limited value. Given what is now known, one conclusion is obvious: the testimony that is routinely given in the courts constitutes a fraud on the courts and on families. It is fraudulent for physicians to testify to shaken baby syndrome (regardless of the name under which it travels) without disclosing, clearly and unequivocally, that it is at best speculative. Indeed, since as one legal expert has pointed out, shaken baby syndrome is unreliable for legal purposes no matter what it is called (Papetti 2018), they should not be testifying about it at all, let alone advocating that families be destroyed and parents and caretakers imprisoned based on it. Similarly, advocates of the shaken baby hypothesis should not be setting up certification programs for those who agree with their views with the goal of preparing them to testify in court, nor should they be intimidating and persecuting witnesses who point out that the evidence base for

the shaken baby hypothesis is weak or nonexistent. Like Watergate, Waneygate shows what those in positions of authority will do to sustain their ideology. But there is one crucial difference: while Watergate brought down a presidency, Waneygate perpetuated a fraud on the courts and on families. Unlike burglaries, frauds can take some time to unravel. In the meantime, I choose to view Waneygate as just one more step in the unravelling of a fraud on the courts that has ruined – and continues to ruin – the lives of so many children and their parents.

References

- Caffey, J. (1972) 'On the theory and practice of shaking infants', *American Journal of Diseases of Children*, 124, pp.161-9.
- Caffey, J. (1974) 'The whiplash shaken infant syndrome: manual shaking by the extremities with whiplash-induced intracranial and intraocular bleedings, linked with residual permanent brain damage and mental retardation', *Pediatrics*, 54, pp.396-403.
- Case, M., Graham, M., Handy, T., Jentzen, J. and Monteleone, J. (2001) 'Position paper on fatal abusive head injuries in infants and young children', *American Journal of Forensic Medicine and Pathology*, 22, 2, pp.112-22.
- Chadwick, D., Kirschner, R., Reece, R., Ricci, L. *et al.* (1998) 'Shaken baby syndrome – a forensic pediatric response', *Pediatrics*, 101, pp.321-3.
- Christian, C. and Block, R. (2009) 'Abusive head trauma in infants and children', *Pediatrics*, 123, pp.1409-11.
- Duhaime, A-C., Gennarelli, T., Thibault, Bruce, L. *et al* (1987), 'The shaken baby syndrome: A clinical, pathological, and biomechanical study', *Journal of Neurosurgery*, 66 pp. 409-415.
- Duhaime, A-C., Christian, C., Rorke, L., and Zimmerman, R. (1998), 'Nonaccidental Head Injury in Infants – the “Shaken-Baby” Syndrome', *The New England Journal of Medicine* 338 pp. 1822-1829.
- Findley, K., Barnes, P., Moran, D., Squier W., 'Shaken Baby Syndrome, Abusive Head Trauma, and Actual Innocence: Getting It Right', *Houston Journal of Health Law and Policy*, pp. 209-310.
- Geddes, J., Vowles, G., Hackshaw, A., Nickols, C., Scott, I. and Whitwell, H. (2001a) 'Neuropathology of inflicted head injury in children. I. Patterns of brain damage', *Brain*, 124, 7, pp.1290-8.
- Geddes, J., Vowles, G., Hackshaw, A., Nickols, C., Scott, I. and Whitwell, H. (2001b) 'Neuropathology of inflicted head injury in children. II. Microscopic brain injury in infants', *Brain*, 124, 7, pp.1299-306.
- Giardino A., Hanson, N., Seaver Hill, K., Leventhal, J. (2011) 'Child abuse pediatrics: new specialty, renewed mission', *Pediatrics*, 128, pp.156-9.
- Goudge, S. (2008) *Inquiry into Pediatric Forensic Pathology in Ontario*, Ontario Ministry of the Attorney General, Toronto, September.
- Hylton, C and Goldberg, M. (2004) 'Circumpapillary retinal ridge in the shaken-baby syndrome. Images in clinical medicine, *New England Journal of Medicine*, 351, 2, p.170.

- Imwinkelried E (2010), SBS: A Genuine Battle of the Scientific (and Non-Scientific) Experts, *Criminal Law Bulletin* 46, p. 1-54.
- Kairys et al, Committee on Child Abuse and Neglect, American Academy of Pediatrics (2001), *Pediatrics*, 108, pp. 206-210.
- Kempe, H. (1962) 'The battered-child syndrome', *Journal of the American Medical Association*, 181, pp.17-24.
- King, J. (2009) *Judgment*, A local authority v. S, EWHC 2115 (Fam) 8 May.
- Lynøe, N., Elinder, G., Hallberg, B., Rosén, M., Sundgren, P. and Eriksson, A. (2017) 'Insufficient evidence for 'shaken baby syndrome' - a systematic review', *Acta Paediatrica*, 106, 7, pp.1021-7.
- Mack, J., Squier, W. and Eastman, J. (2009) Anatomy and development of the meninges: implications for subdural collections and CSF circulation. *Pediatric Radiology*, 39, 3, pp.200-10.
- Martínez-Lage, J., Ros de San Pedro, J., Puche, A. and Pérez-Espejo, M. (2006) 'Benign' shaken baby syndrome. Case report', *Neurocirugia*, 17, pp.348-50.
- Mitting, J. (2016) *Approved Judgment*, Squier v. GMC, EWHC 2739 (Admin) 3 November.
- Nicholson, C. (2003) 'Preface' in Reece, R. and Nicholson, C. (eds) *Inflicted Childhood Neurotrauma*, American Academy of Pediatrics, Bethesda MA.
- Ommaya, A., Goldsmith, W. and Thibault, L. (2002) 'Biomechanics and neuropathology of adult and paediatric head injury', *British Journal of Neurosurgery*, 16, 3, pp.220-42.
- Papetti, R. (2018) *The Forensic Unreliability of the Shaken Baby Syndrome*, Academic Forensic Pathology International, La Jolla CA.
- Parrish, R. (2000) 'Executive summary', Third National Conference on Shaken Baby Syndrome, Salt Lake City UT, September.
- Plunkett, J. (2001) 'Fatal Pediatric Head Injuries Caused by Short-Distance Falls', *American Journal of Forensic Medicine and Pathology*, 22, 1, pp.1-12.
- Prange, M. (2002) *Biomechanics of Traumatic Brain Injury in the Infant*, dissertation, University of Pennsylvania, Philadelphia PA.
- Prange, M., Coats, B., Duhaime, A-C and Margulies, S. (2003) 'Anthropomorphic simulations of falls, shakes, and inflicted impacts in infants', *Journal of Neurosurgery*, 99, pp.143-50.
- PREP:CAP, American Academy of Pediatrics (2009), An Intensive Review and Update of Child Abuse Pediatrics.
- Ray E. Helfer Society (<http://www.helfersociety.org>) (accessed April 2018).
- SBU (2016) *Traumatic Shaking: The Role of the Triad in Medical Investigations of Suspected Traumatic Shaking – A Systematic Review*, Report 255E, Swedish Agency for Health Technology Assessment and Assessment of Social Services, Stockholm, October, available at http://www.sbu.se/contentassets/09cc34e7666340a59137ba55d6c55bc9/traumatic_shaking_2016.pdf (English translation 2017; accessed April 2018).
- Sirotnak, A. (2006) 'Medical disorders that mimic abusive head trauma' in Frasier, G. et al. (eds) *Abusive Head Trauma in Infants and Children*, Medical Publishing, St. Louis MO, pp.199-206.
- Squier, W. (2008) 'Shaken baby syndrome: the quest for evidence', *Developmental Medicine and Child Neurology*, 50, 1, pp.10-14.
- Squier, W. and Mack, J. (2009) 'The neuropathology of infant subdural haemorrhage', *Forensic Science International*, 187, pp.6-13.

Strouse, P. (2016) 'Child abuse: we have problems', editorial, *Pediatric Radiology*, 46, 5, pp. 587-90.



RESPONSE PAPER

Shaken baby: an evolving diagnosis deformed by the pressures of the courtroom

Susan Luttner

Palo Alto CA, United States

Contact: sue.luttner@gmail.com

Sue Luttner is a technical writer in the Santa Clara Valley, currently writing internal engineering documentation on contract at Google. She started researching shaken baby syndrome in 1998, after the niece of a friend was convicted of shaking a baby in her care. She has followed the debate to medical and legal libraries, to conferences and training sessions, to hospitals and courtrooms, and to the homes of people whose lives have been torn apart one way or another by a misguided diagnosis of infant shaking. She maintains a blog on shaken baby syndrome, and she is a founding board member of Protecting Innocent Families, a non-profit corporation dedicated to raising awareness of unproven medical theories in the courtroom.

Introduction

On an otherwise lovely afternoon in the spring of 1996, sitting on a bench under the redwood trees in the city park with a friend while our children played, I heard a piece of news that made me blench. My friend's adult niece, Stephanie, had been accused of shaking a baby into permanent brain damage. Stephanie said the 5-month-old she was watching had choked on a bottle and quit breathing in her arms. At the hospital, though, doctors said bleeding and swelling in the child's brain and eyes proved the little girl had been violently shaken - so violently, in fact, that the effects would have been immediately obvious.

My friend was confident an investigation would exonerate her niece. The baby had been dropped off that morning with 'a touch of the flu', and vomiting is a well-known sign of head injury. Doctors found no external signs of battering - no bruising, abrasions, or grip marks - but they did find healing rib fractures estimated to be maybe 10 days old the afternoon she collapsed at Stephanie's. They also found blood in the girl's brain of several different ages, the oldest

estimated at a week, and she had an undatable skull fracture with no bruising of the scalp above it - all possibly implying she had suffered a blow to the head a week or 10 days earlier.

A year later, though, after one hung jury and a second trial, Stephanie was convicted of child abuse. A few weeks after that, the US media burst into saturation coverage of the ‘Boston nanny’ (19-year-old British au pair Louise Woodward, accused of shaking an 8-month-old baby to death). Like Stephanie, Woodward was ultimately convicted on the basis of medical testimony that her charge had been violently shaken minutes before the emergency call to 911. Like Stephanie, Woodward enjoyed the support of friends and family, who described her as even-tempered and good with children. Like the infant in Stephanie’s case, the infant in Woodward’s case had an undatable skull fracture with no overlying bruises.

Because the boy in her care had died, Louise Woodward was convicted of second-degree murder. After the verdict, though, Judge Hiller Zobel reduced the charges to manslaughter and set the sentence to time served. Louise Woodward returned to England. Indignant over the outcome, 72 child abuse physicians signed a letter to the journal *Pediatrics*, protesting about the press coverage that had treated the Woodward defense as credible. The physicians endorsed what had become received wisdom in child abuse circles about shaken baby injuries:

Infants simply do not suffer massive head injury, show no significant symptoms for days, then suddenly collapse and die. Whatever injuries Matthew Eappen may or may not have suffered at some earlier date, when he presented to the hospital *in extremis* he was suffering from proximately inflicted head injuries that were incompatible with any period of normal behavior subsequent to the injury. Such an injury would and did produce rapidly progressive, if not immediate, loss of consciousness.

The shaken baby syndrome (with or without evidence of impact) is now a well-characterized clinical and pathological entity with diagnostic features in severe cases virtually unique to this type of injury - swelling of the brain (cerebral edema) secondary to severe brain injury, bleeding within the head (subdural hemorrhage), and bleeding in the interior linings of the eyes (retinal hemorrhages). Let those who would challenge the specificity of these diagnostic features first do so in the peer-reviewed literature, before speculating on other causes in court. (Chadwick, Kirschner, Reece *et al.*, 1998, p.321)

As a writer with a personal insight on a national story, I felt compelled to learn more. I started at the Second National Conference on Shaken Baby Syndrome, organized by a coalition of three child-abuse prevention organizations in Utah (this was before the incorporation a few years later of the National Center on Shaken Baby Syndrome, which now organizes the conferences). At my first conference, prosecutor Rob Parrish declared, “No other condition fully mimics all the features

of shaking-impact syndrome” (Parrish, 1998). Parrish articulated these features in the executive summary of the third conference, distributed by the organizers:

Often referred to as the ‘Triad’, the consensus continues to be that a collection of (1) damage to the brain, evidenced by severe brain swelling and/or diffuse traumatic axonal injury; (2) bleeding under the membranes which cover the brain, usually subdural and/or subarachnoid bleeding; and, (3) bleeding in the layers of the retina, often accompanied by other ocular damage, when seen in young children or infants, is virtually diagnostic of severe, whiplash shaking of the head. (Parrish, 2001, p.1)

This advice seemed to be commonly accepted for many years after I started my research. In 2004, neuropathologist Brian Harding, pediatric pathologist Anthony Risdon, and pathologist Henry F. Kraus, all working at children’s hospitals, wrote an opinion piece in the *British Medical Journal* that clearly articulated both the Triad and its presumed clinical value:

In shaken baby syndrome, it is the combined triad of subdural and retinal haemorrhage with brain damage, as well as the characteristics of each of these components that allow a reconstruction of the mechanism of injury, and assessment of the degree of force employed. (Harding, Risdon and Krous, 2004, p.720)

Timing the injuries

My initial interest, though, was not in the signs and symptoms of infant shaking, but in the timing of the injuries. Both Stephanie and Louise Woodward had been convicted because babies in their care had collapsed with brain injuries, even though doctors for centuries have recognized the ‘lucid interval’, a time period after a head injury when a patient might seem to be perfectly normal, only to collapse hours or days later, when intracranial bleeding or swelling reaches a critical point. But at the shaken baby conferences, experts taught that shaken baby syndrome was different, that the effects of a serious shaking manifest themselves immediately - as the 72 physicians had written in their letter to *Pediatrics* (Chadwick, Kirschner, Reece *et al.*, 1998). In the opening segment of the opening panel at my first shaken baby conference, child abuse pediatrician Kent Hymel explained that shaking damages the neuronal axons running from the brain - damage known as ‘diffuse axonal injury’ (DAI) which causes “immediate loss of consciousness and prolonged coma” (Hymel, Chadwick., Christian *et al.*, 1998).

Still, even my first conference raised a big question about timing. In one full-conference session, a young military wife told a hushed audience how she had been sent home three times

from the base hospital, told she was an anxious, first-time mom whose baby just had the flu - until he quit breathing in the waiting room on her fourth visit. She believed, and her doctors believed, that her husband had shaken the boy a day and a half before he collapsed in the hospital emergency room, during which time three teams of medical professionals had examined him and found only a child with flu (Ackworth, 1998).

In the case of my friend's niece, the baby was fussy and vomiting the morning before her collapse. If the child had in fact been shaken before being dropped off, how could Stephanie have been expected to recognize the difference between a baby with the flu and a baby with a head injury? How could the doctors who testified at Stephanie's trial be so sure about the timing? So, I took the conference bibliography to the medical library, where I was shocked to learn that the official statement from the American Academy of Pediatrics (AAP) seemed to contradict the opinions of the doctors in Stephanie's case:

Shaken baby syndrome is characterized as much by what is obscure or subtle as by what is immediately clinically identifiable. A shaken infant may suffer only mild ocular or cerebral trauma. The infant may have a history of poor feeding, vomiting, lethargy, and/or irritability occurring intermittently for days or weeks prior to the time of initial health care contact. The subtle symptoms are often minimized by physicians or attributed to mild viral illnesses, feeding dysfunction, or infant colic. (Committee on Child Abuse and Neglect, 1993, p.872)

And across the Atlantic, the *British Medical Journal* carried this report:

After a variable time, the infant will develop signs of cerebral irritation, cerebral oedema, or intracranial haemorrhage. Acute deterioration, convulsions, or respiratory or circulatory arrest may follow. (Carty and Radcliffe, 1995, p.344)

Intrigued by this tantalizing news about timing, I kept looking, hoping to find the research behind the opinions that had prevailed at trial.

In an early review of the literature, Nashelsky and Dix find only three published cases of pure shaking with no signs of impact. They summarize:

In two cases, there was onset of symptoms immediately after shaking. In one case, there was a delay of 4 days between shaking and onset of seizures although the child had several episodes of vomiting during the days after shaking. One wonders whether the infant was reshaken shortly before onset of seizure activity. (Nashelsky and Dix, 1995, p.157)

The opinion of the authors aside, this seems to be a report of a lucid interval following a shaking injury. I had also come across another published case report with delayed symptoms, not

mentioned in the Nashelsky paper but included without comment in a series of four cases seen at one New York hospital (Frank, Zimmerman and Leeds, 1985).

More timing research

In 1997, a team at a children's hospital had tried to extrapolate timing of infant head injury from accident reports. It identified 95 witnessed, fatal accidental head injuries to children younger than 16 years - only 4 of them under the age of 2, and almost all of them from motor vehicle accidents (Willman *et al.*, 1997). The researchers looked only at cases where an emergency response team had been sent to the scene. They tracked each child's level of consciousness, starting with the assessments by the emergency medical technicians in the field. The only children who seemed to deteriorate after medical contact suffered from growing epidural hematomas; that is, bleeding between the dura and the skull, further from the brain than the blood in both Stephanie's case and the Woodward case. Willman's team concluded:

Unless an epidural hematoma is present, children who die of blunt head injuries probably do not experience lucid intervals. In cases of fatal HI [head injury] where the history claims that the child looked well following the injury and only later began to act abnormal, the story must be questioned and nonaccidental trauma must be suspected. (Willman *et al.*, 1997, pp.938-9)

The biggest problem with this study, from my perspective, is that the researchers did not start the clock until a medical professional was on the scene. If a child fell or choked at home, seemed fine at first, and then started to deteriorate, the case would not have been included in the study because the parents' report had not been verified by a medical professional. This criterion also explained why the cases in the study were almost all automobile accidents serious enough to trigger an ambulance call.

In 1998, M.G.F. Gilliland pulled together the data on timing from the medical records of 76 fatal pediatric head injury cases collected from her own and her colleagues' experiences as forensic pathologists. A full quarter of Gilliland's cases featured a time lag between the trauma and an obvious deterioration in consciousness, with a much broader definition of 'brief' than Willman's. Gilliland wrote:

Our data indicate that the interval is brief (less than 24 hours), in almost 3/4 of cases of head injury death, especially in shaking injuries. However, in more than 1/4 of the cases, the interval from injury to the onset of severe symptoms is longer. In all cases in which the

children were seen by an independent observer after injury, they were described as not normal. (Gilliland, 1998, p.724)

Given that the child in Stephanie's case had been dropped off that morning with 'a touch of the flu' and had clear evidence of a prior brain injury, none of this struck me as convincing scientific evidence to support the key medical opinion pressed by the prosecution at Stephanie's trial that the child's collapse had occurred just minutes after a violent assault. I thought I saw a gap between the testimony at Stephanie's trial and the published literature, especially the advice offered by the AAP position statement that the symptoms commonly emerged over time (Committee on Child Abuse and Neglect, 1993).

The first revision of the AAP statement

In 2001, then, the AAP narrowed that gap by updating its position statement, introducing the concept of immediate symptoms but with an odd and murky twist. The key passage opened as in 1993, allowing for weeks of poor feeding and so on, but then stated that the symptoms are "immediately identifiable as problematic," but only by parents, not necessarily by physicians:

A victim of sublethal shaking may have a history of poor feeding, vomiting, lethargy, and/or irritability occurring for days or weeks. These clinical signs of shaken baby syndrome are immediately identifiable as problematic, even to parents who are not medically knowledgeable (Duhaime *et al.*, 1998). However, depending on the severity of clinical signs, this may or may not result in caretakers seeking medical attention. These nonspecific signs are often minimized by physicians or attributed to viral illness, feeding dysfunction, or colic. (Committee on Child Abuse and Neglect, 2001, p.207)

Duhaime *et al.* (1998) is a survey article written by a team of prominent experts in the area. Noting that the reported history is unreliable in shaking impact cases, the authors write, "... information about the timing of the injury must be extrapolated from data on accidental trauma." (p.1825). Their conclusion is that "an alert, well-appearing child has not already sustained a devastating acute injury that will become clinically obvious hours to days later" (Duhaime *et al.*, 1998, p.1825). In Stephanie's case, of course, the child was not described as alert or well-appearing. She was described as a baby with the flu. She also had clear evidence of a previous, serious brain injury, at least a week old the day she collapsed in Stephanie's kitchen. But the babysitter was convicted, based on medical opinion that the effects of an infant shaking would be immediately obvious.

The 2001 update to the AAP statement was both a small change and a big change. With the new wording, a defense attorney could no longer point to the AAP's own position statement to refute expert testimony that the effects of a shaking would be immediately obvious. The value of immediate symptoms in the courtroom is clear: if you believe a child shows the effects of a violent shaking within minutes of the assault, you can prove your case against the caretaker who was there when the child collapsed. If you accept delayed symptoms, you might never be able to identify the perpetrator.

The child abuse doctors, the child abuse investigators, the child abuse prosecutors, and the social workers are all on the same team, literally. They come together on the child protection teams that meet, typically at the hospital, to discuss their abuse cases and figure out the best way to proceed. Given the tendencies of human nature and the lack of actual data to support faith in immediate symptoms, I'm guessing that the unanimous opinion among child abuse experts that the symptoms of a violent shaking are immediate has grown imperceptibly from a laudable human trait, the urge to help. Belief in immediate symptoms probably sprang naturally from the optimism and good intentions within a group of people looking for answers, with no one in the room to question their opinions.

The effect of this development is insidious: as long as investigations are driven by the opinions of the child abuse experts, there is little chance of acquiring any knowledge that challenges those opinions. My own offering by way of evidence is that early in his investigation, the detective in Stephanie's case interviewed Dr. Dominic Sanfilippo, the doctor who had reported the abuse. According to the police report, Sanfilippo "offered his professional opinion... that if the care provider was alleging a choking, then that was the time the injuries were inflicted".⁵⁰ Neither the investigators nor the doctors ever considered any other possibility, even when the medical findings confirmed that the child had a brain injury at least a week old on the day she collapsed at Stephanie's.

Another disturbing case

Meanwhile, I had started following up shaking reports in the popular press, and had collected a number of controversial cases, most of them grandmothers and babysitters passing through the

⁵⁰ For details, see <https://onsbs.com/cases/stephanies-story-my-first-case/>.

news and into prison while their friends and families insisted they would never have hurt a child. Then, in 2001, in my own county, a suburban wife and mother was charged with murder following the death of her best friend's baby and what sounded to me like an improbable shaking diagnosis.

The babysitter, a short and slight 32-year-old immigrant from Beijing, had called the 911 emergency number for help with a choking infant minutes before the mother was due to pick up the child. During resuscitation, paramedics pulled a rubber band from the girl's throat. At the preliminary hearing, supporters of the accused babysitter packed the room. "[The babysitter] is a kind and gentle person," one friend of both the defendant and the infant's families told me. "She would not hurt [the baby]. She would not hurt anyone." The baby had been a robust 10-month-old, who showed no grip marks, no fractures, no neck or spinal cord damage, and only two faint bruises, one on her cheek and one on her elbow. The cause of death was runaway brain swelling.

At the preliminary hearing, the county medical examiner, Gregory Schmunk, testified that the bleeding and swelling inside the child's head proved she had been shaken, and that doctors now knew "with absolute certainty" that after a fatal shaking "there would be a serious and abrupt change in the baby's consciousness." The proceedings dragged on for more than a year, while the babysitter, a lifelong vegetarian who never became reconciled to the food at the county jail, grew thinner at each court appearance. On the eve of trial, faced with a mandatory sentence of 25 years to life if convicted, the babysitter pled no contest to manslaughter and received a sentence of 6 years, ensuring she would be back home for at least part of her own daughter's childhood. From my time in the medical library, I knew that this outcome would be counted in the literature as a confession.

A controversial diagnosis

By the time I encountered the rubber band case, I had spent enough time in the medical library to realize that timing of the symptoms is only one controversial aspect of shaken baby syndrome. There is, in fact, a fundamental debate about the diagnosis itself. In the mid-1980s, a team working with neurosurgery graduate student Ann-Christine Duhaime examined clinical records, revisited autopsy samples, and conducted biomechanical experiments in the laboratory, shaking an infant dummy fitted with accelerometers. In 1987, they reported their conclusion that shaking by a normal adult does not generate the forces thought necessary to trigger concussion, subdural

bleeding, or damage to infant brain cells from shearing or stretching (Duhaime *et al.*, 1987). Noting that angular accelerations spiked when volunteers were told to throw the mannequin down after shaking, the authors wrote:

Although shaking may, in fact, be a part of the process, it is more likely that such infants suffer blunt impact. The most common scenario may be a child who is shaken, then thrown into or against a crib or other surface, striking the back of the head and thus undergoing a large, brief deceleration. (Duhaime *et al.*, 1987, p.414)

Several other biomechanical researchers have since revisited the Duhaime study, using more sophisticated equipment; most have essentially replicated her results (e.g., Prange *et al.*, 2003; Cory, 2004; Lloyd *et al.*, 2011). More recently, a team in Japan achieved injury thresholds high enough to cause concussion in primates, but not high enough to cause axonal injury (Jenny, 2017).

Fallout from Woodward

After the Woodward case brought biomechanics testimony into the shaking debate, three pioneers of auto-safety research - Ayoub Ommaya (a neurosurgeon), Werner Goldsmith and Lawrence Thibault (both bioengineers) - got together for one final, late-life collaboration, producing a paper that rejected shaking theory (Ommaya, Goldsmith and Thibault, 2002). In 2005, Faris Bandak, a crash-injury expert and once a student of Ommaya, published his own analysis, concluding that an infant's neck would break from a shaking assault before the angular accelerations would be great enough to trigger subdural bleeding (Bandak, 2005). Critics of Bandak's work said he must have miscalculated (Margulies, Prange, Myers *et al.*, 2006; Rangarajan, 2006), but Bandak disputed their analysis ([Bandak, 2006](#)), and another commentator observed that even if Bandak had miscalculated, his point remained valid (Molina, 2009).

In 1999, forensic pathologist John Plunkett responded to the physicians who had protested the Woodward defense (Chadwick, Kirschner and Reece, 1998) with a frank critique that questioned everything about shaken baby theory, from the literature behind the diagnosis to the presumed timing of the injuries (Plunkett, 1999). In 2001, Plunkett also published a series of 18 case reports of children who had died from head injuries suffered in falls of 3 meters or less from playground equipment, drawing on data from the US Consumer Product Safety Commission (Plunkett, 2001). The paper was his answer to the common opinion among child abuse experts that children are

unlikely to receive serious injuries in short falls (with the corollary that if parents report a short fall to explain serious injuries, they are lying to cover up abuse).

In Britain, Jennian Geddes reported that she was not seeing the axonal injury that her colleagues had told her would be present in the brains of infants diagnosed as shaken (Geddes, Vowles, Beer *et al.*, 1997). Together, Geddes and Plunkett published a commentary in the *British Medical Journal* with the title ‘The evidence base for shaken baby syndrome: we need to question the diagnostic criteria’ (Geddes and Plunkett, 2004).

In Australia, Mark Donohoe was studying the foundational shaken baby literature, concluding that it did not meet the standards of evidence-based medicine ([Donohoe, 2003](#)). He argued that most of the early papers were based on speculation, case reports, and prevailing opinion, and sometimes circular reasoning. By sorting cases into abuse and non-abuse based on prevailing theories about what findings are associated with abuse, researchers guaranteed their studies would confirm their original opinions.

Meanwhile, Patrick Barnes, a pediatric neuroradiologist, was also revisiting the old literature and adding to the new. Barnes had testified for the prosecution in the Woodward case, repeating on the stand what he had learned from his teachers and colleagues about shaken baby syndrome. After an intense cross-examination, Barnes says, he decided he should educate himself more thoroughly about the research behind shaking theory. Realising that his mentors had been wrong (Barnes, 2009), Barnes started testifying for the defense in shaken baby cases, and began publishing papers about the medical conditions that can produce the same brain findings (Barnes, Galaznik, Gardner and Shuman, 2010; Barnes, 2011).

In England, a small team of researchers started exploring oxygen deprivation as a trigger for subdural hematoma in the very young brain. “Thousands of infants regurgitate and choke every day but they do not develop the Triad,” wrote Waney Squier at Oxford in 2008, “Is there any justification for thinking that just sometimes, in a few cases, they might?” (Squier, 2008, p.13). The two cases I knew best - Stephanie’s and my local babysitter’s - both featured reported chokings. When the adrenaline jolt faded after I read Squier’s musings, I sat down to compose a note I never imagined I would write, a fan letter to a pediatric neuropathologist. Waney Squier got back to me immediately, not just agreeing to an interview, but expressing her willingness “to talk to anyone and everyone about this topic until we get some sense and evidence into these cases.”

A power shift in the courtroom

Alerted to the controversy through a case championed by shaking skeptic John Plunkett, the Wisconsin Innocence Project in 2008 won a motion to vacate the conviction of child care provider Audrey Edmunds. Its appeal argued that medical thinking had changed since Edmunds' trial in 1996, that doctors no longer believed either that the Triad proved abuse or that the symptoms were necessarily immediate. The decision caught the attention of Deborah Tuerkheimer, a former child abuse prosecutor, who studied the medical sources cited in the Edmunds appeal and concluded, as I had, that shaken baby syndrome was not a reliable diagnosis. In 2009, she argued in print that all shaken baby convictions should be reviewed (Tuerkheimer, 2009).

I thought change might be on the horizon. And it was, but not the change I had expected. Instead of addressing the issues raised by their critics, the child abuse experts attacked the messengers. In a keynote address at the Eleventh International Conference on Shaken Baby Syndrome/Abusive Head Trauma, Brian Holmgren, once a Nashville prosecutor, displayed a series of quotes drawn from the testimony of defense experts, including John Plunkett and Patrick Barnes, while an image of Pinocchio loomed on a screen behind the stage, his nose growing longer with each new quote (Holmgren, 2010). Holmgren's talk ended with an audience singalong to guitar music by pediatrician John Stirling. The lyrics lampooned defense experts, accusing them of testifying only for the money. The tune was 'If I only had a brain' from *The Wizard of Oz*, and the tag line was, "If I only get ten grand."

Singalong at the Eleventh International Conference on Shaken Baby Syndrome/Abusive Head Trauma, Atlanta GA, 2010

I will say there is no basis for the claims in shaking cases,
My opinion's in demand.
Though my theories are outrageous, I'll work hard to earn my wages
If I only get ten grand.

I could be an honest person, say abuse, of this I'm certain
Like Oz across the land
But my wallet says it's needin' so I'll say it's all rebleedin'
If I only get ten grand.

Oh, I will tell you why the State's proof is not there,
Make my claims for causes that are very rare
No proof for them, why should I care?

I don't care what other docs say, I will claim they're short falls always,
Professing on the stand.
Bleeding bad within the brain or say I'll not abuse again
If I only get ten grand.

Other things cause bleeds in eyes, confessions are all lies,
I'm like a one man band,
Anecdotes do not make science, research has no reliance
If I only get ten grand.

Oh I will tell you why the State's proof is not there
Make my claims for causes that are very rare
No proof for them why should I care

I'm attacked by many critics, but defense guys like to get us
Cause I support their plan.
They'll decry me as a chorus, I don't care my skin's not porous
Cause I always get ten grand.
I want to get ten grand.
I really need ten grand.

Another keynote speaker, Ross Cheit, devoted the final segment of his talk to Tuerkheimer's paper. He reported, incorrectly, that Tuerkheimer had helped with the Edmunds appeal. "What kind of scholarship is this?" he asked, "She would violate her duty to Audrey Edmunds if she told you anything to support conviction." And: "The current assault on AHT [abusive head trauma] is not another innocence project ... This is defense-based advocacy masquerading as an innocence project." (Cheit, 2010). At the 2012 conference, in a keynote presentation titled 'A wolf in sheep's clothing: denialism in child abuse pediatrics,' Christopher Greeley compared critics of shaken baby theory to holocaust deniers and lambasted the work of several SBS critics, including Geddes and Tuerkheimer, focusing particularly on Donohoe's evidence-based medicine paper (see Greeley, 2011, 2012).

Retreat from the Triad

But more surprising than the rising acrimony from the community of child abuse experts was an unexpected change in the official position on the Triad. After the Edmunds decision, child abuse physicians started arguing that no one had ever claimed there was a ‘Triad’ that defined shaken baby syndrome. For instance, in a keynote talk at the 2010 shaken baby conference in Atlanta, Robert Block, then the incoming president of the AAP, declared, “Only people who are NOT active physicians working with children, naïve journalists, and professors with a biased agenda would propose that only three signs and symptoms support a diagnosis” (Block, 2010).

At a training program in 2011, Carole Jenny, a child abuse pediatrician, displayed a slide that read, “No trained pediatrician thinks that subdural hemorrhage, retinal hemorrhage and encephalopathy equals abuse. The ‘Triad’ is a myth!” (Jenny, 2011). In 2014, Christopher Greeley published an editorial critical of defense experts. He dismissed alternative diagnoses as “fringe theories” and accused individuals of misrepresentation in their papers - including this sentence:

The complex features of AHT are often disparagingly distilling [sic] simply to ‘The Triad’; a term devoid of any real clinical meaning and not used at all in practice. (Greeley, 2014, p.253)

A 2015 resource guide assembled by AAP child abuse experts dismissed the Triad as a “‘straw man’ created for legal arguments” (American Academy of Pediatrics, 2015). I remain puzzled as to why the larger medical community tolerates this double think. I tried to bring up the discrepancy with experts during breaks between sessions at the 2010 conference - and was criticized for buttonholing the speakers.

The second revision to the AAP position statement

The AAP updated its position statement on shaking again in 2009, this time making two fundamental changes:

- offering no statements about either the timing of the injuries or the findings that point to the diagnosis, and
- recommending that physicians drop the term ‘shaken baby syndrome’ in favor of ‘abusive head trauma’ or AHT.

The statement offered this explanation for the terminology change:

Legal challenges to the term ‘shaken baby syndrome’ can distract from the more important questions of accountability of the perpetrator and/or the safety of the victim. The goal of this policy statement is not to detract from shaking as a mechanism of AHT but to broaden the

terminology to account for the multitude of primary and secondary injuries that result from AHT. (Christian and Block, 2009, p.1410)

Meanwhile, a series of successful appeals seemed to establish, at least in the courtroom, that the findings previously cited as proof of infant shaking can also result from a range of non-abusive causes, so far including sickle cell disease (Melonie Ware), stroke (Julie Baumer), seizure disorder (Drayton Witt), sepsis infection (Adrian Thomas), urinary tract infection with hypoxia (Brandy Briggs), sudden infant death syndrome (Joel Lehmer and Teresa Engbert-Lehmer), and accidental injury (Ken Marsh, John Peel, Warren Hales, and Michael Hansen) (*National Registry of Exonerations*, 2014). And the medical literature now contains a growing body of case reports and opinions about other conditions and mechanisms that can possibly produce the same symptoms, including von Willebrand disease (Stray-Pedersen, Omland, Nedregaard *et al.*, 2011); delta storage pool disease (De Leeuw, Beuls, Jorens *et al.*, 2013); a minor fall in a child with larger-than-normal intracranial spaces, a reasonably common condition of infancy known as ‘benign enlargement of the subarachnoid space’ (Piatt, 1999; Pittman, 2003); infantile scurvy (Clemetson 2004); choking (Orient, 2005); paroxysmal coughing (Talbert, 2005); cyclic vomiting (Talbert, 2009); dysphagic choking (Barnes 2010); infections, coagulopathies, genetic and developmental defects, toxins, birth injury, dysphagic choking, and more (Barnes, 2011); hypoxia followed by resuscitation and ventilation (Squier, 2011); pyloric stenosis leading to venous hypertension (Talbert, 2012); and hypoxia/ischaemia (Scheimberg, Cohen, Zapata Vazquez, *et al.*, 2013).

I would also add Menkes disease to the list, after researching the case of Tammy Fourman in Ohio, who lost four children while accused of shaking one of her sons. Two of her children died of Menkes (which is always fatal), and her older daughter and one son were removed by the state and adopted by other families. These adoptions are permanent. “If someone had just listened to us in the first place, it would have saved everybody a lot of trouble,” Tammy told me, “But they just kept insisting we’d been beating on Daniel the whole time he was with us” (see Luttner, 2011). Both before and after I met Tammy, I heard conference speakers dismiss the notion that a physician could misdiagnose Menkes as abuse.

Defending a theory under assault

In November 2011, the US Supreme Court upheld the 1997 sentence of Shirley Ree Smith, a grandmother convicted of shaking her grandson to death while the child's mother slept in the next room. Although the prosecution's case was confirmed by the decision, Justice Ruth Bader Ginsberg wrote a strong dissenting opinion that pointed out logical flaws in the case and cited Donohoe, Bandak, and other critics of shaken baby theory. In deference to a wave of support for Smith, the governor of California later commuted her sentence.

At the shaken baby conference following the Shirley Ree Smith decision, Randall Alexander (a child abuse pediatrician) and Brian Holmgren (a prosecutor) gave a talk blasting the Ginsberg dissent (Alexander and Holmgren, 2012), and in 2013, Holmgren and Joëlle Moreno published a scathing law journal paper entitled 'Dissent into confusion: the supreme court, denialism, and the false 'scientific' controversy over shaken baby syndrome', in which they not only deny there is any real controversy about shaking theory, but also give vent to the anger that still seethes within the community of child abuse experts against those who testified for the defense in the Woodward case. In the introduction to their analysis of the Smith case, Moreno and Holmgren refer to the Woodward trial:

The hotly contested trial also brought national attention to the use of highly paid defense medical witnesses to challenge the accuracy of a child abuse diagnosis and to advance outlier and highly controversial 'alternative theories' of causation ... Woodward marks the origin of the false AHT/SBS controversy - at least in part because the defendant, who was convicted of second-degree murder by a jury, was later freed by the judge. This fact alone could explain the resulting public uncertainty regarding the weight of the prosecution's medical evidence. Irresponsible journalists, however, including Mike Wallace of *60 Minutes*, exacerbated the confusion. (Moreno, and Holmgren, 2013, p.168)

Moreno and Holmgren also disparage their academic critics as collaborators in the deception:

The academics cite the same handful of defense medical witnesses, the media cites both, the defense medical witnesses benefit from the publicity and are hired in more cases, and the cycle begins anew (Moreno and Holmgren, 2013, pp.177-8).

This attitude helps explain why a law-enforcement agency filed a complaint with the General Medical Council against Waney Squier. By questioning a potent and dominant theory, she was causing the authorities to lose cases, triggering media coverage and eroding public faith in the diagnosis. The actions against her were part of a wide-ranging effort to silence what was becoming a very real debate.

When the Kansas International Film Festival announced that its 2014 program would feature the premiere of *The Syndrome*, a documentary by Susan and Meryl Goldsmith questioning shaken baby theory, festival organizers received two letters, one from the National Center on Shaken Baby Syndrome (NCSBS) and one from a panel of child abuse physicians. The letter from Ryan Steinbeigle, executive director at the NCSBS, called the film's promotional materials "appalling, inaccurate, and potentially dangerous" and worried that viewers might come away with the impression that shaking a baby is not harmful, so that "numerous infants could be put in significant danger" (Steinbeigle, 2014).

The panel of child abuse physicians misrepresented the message of their critics, who do not claim that shaking a baby is safe, only that the Triad is not proof of abusive shaking. The physicians' letter said:

The prerelease materials ... clearly state that the film provides a national platform for the tiny handful of well-known child abuse defense witnesses to publicize their fringe message - *that shaking an infant cannot cause death or traumatic brain injury*. [italics in original] (Block *et al.*, 2014)

The physicians also called *The Syndrome* "a gross and deliberate mischaracterization of vital public health and child safety issues" and threatened to bring a lawsuit:

This is a public health matter and as organizers of this film festival, we hope you share this concern. Under the circumstances, we also hope that you will reconsider featuring this film as part of your upcoming festival. In the event that you decide to continue with premiering this film, we may opt to pursue additional legal action. (Block *et al.*, 2014)

The physicians had threatened litigation earlier, complaining that a news clip in the trailer presented the words of a child abuse pediatrician out of context. The filmmakers denied misrepresenting the speaker, but edited that sequence out of the trailer to avoid legal challenges. The show went on when the Goldsmith cousins signed a statement releasing the festival from responsibility for any legal repercussions, which did not ensue.⁵¹

At the fourteenth international SBS Conference, in a talk titled 'Exonerating the guilty: child abuse and the corruption of the false conviction movement', Ross Cheit characterized *The Syndrome* as "a love letter" to three defense experts. He asserted that the film's trailer showed "incredible arrogance and remarkable ignorance" by suggesting that child abuse physicians have

⁵¹ Author's interview with Meryl Goldsmith, 2014. See also <http://www.resetfilms.com/>, (accessed February 2018).

a professional or financial incentive to defend their theories. “Child abuse is not where the money is,” he sneered, “Child abuse defense is where the money is.” He also attacked Tuerkheimer’s work, the *National Registry of Exonerations*, and Innocence Project appeals of shaken baby convictions, which he called “an Orwellian corruption of the concept of innocence.” (Cheit, 2014)

NCSBS conferences are targeted not only at professionals in the area - physicians, attorneys, investigators, and social workers - but also the families of children diagnosed as shaken. The programs usually include at least one family panel, where grief fills the room, grief that has been magnified and hardened into anger by the families’ belief that their children and grandchildren had been brutally maimed and murdered - because that is what doctors have told them. Their anger is understandable, but it chills me, as does the memory of an army of social workers and investigators trained to scorn anyone who questions the prevailing model of shaken baby syndrome.

In 2016, Peter Strouse (a pediatric radiologist) published an editorial warning about a growing tide of child abuse denialism:

The denialists create the appearance of scientific and medical controversy when, in almost all cases, there is none. Rather than providing clarification, the denialists’ tactics are to confuse judges and jurors, to bias the news media and to mislead the public. (Strouse, 2016, p.587)

Strouse lauded the General Medical Council for its actions against Squier and praised the American Association of Neurological Surgeons for censuring a member who had spoken out against shaking theory and testified for the defense. He encouraged “institutions that harbor denialists” to “carefully consider their employment” (Strouse, 2016, p. 588).

In short, the child abuse experts and the court system are not listening to the large and growing body of evidence against shaken baby theory. Instead of learning from past mistakes, they deny them. Instead of acknowledging that shaken baby theory entered the courtroom before it was proven, they have redefined the syndrome, with an explicit eye to courtroom outcome. Instead of conceding that the Triad can have non-abusive causes and reconsidering past convictions, they attack the physicians who point to these causes and they rail against appeals of those convictions. And as long as the child abuse physicians, the child abuse prosecutors, and the police and social service investigators listen only to each other, nothing will change.

References

- Ackworth, K., De La Rosa, T., Eappen, D. *et al.* (1998) 'SBS families: how the system effects us [sic], how we effect change', *Second National Conference on Shaken Baby Syndrome*, Salt Lake City UT, 14 September.
- Alexander, R. and Holmgren, B. (2012) 'SBS and the supreme court', *Twelfth International Conference on Shaken Baby Syndrome/Abusive Head Trauma*, National Center on Shaken Baby Syndrome, Cambridge/Boston MA, 1 October.
- American Academy of Pediatrics (2015) *Understanding Abusive Head Trauma in Infants and Children: Answers From America's Pediatricians*, available at http://www.ncsl.org/Portals/1/Documents/fsl/Understanding_AHT_Infants_Children_AAP_FINAL_6-15.pdf (accessed October 2018).
- Bandak, F. (2005) 'Shaken baby syndrome: a biomechanics analysis of injury mechanisms', *Forensic Science International*, 151, 1, pp.71-9.
- Bandak, F. (2006) 'Response to the letter to the editor,' *Forensic Science International*, 164, pp.282-3.
- Barnes, P. (2009) 'Blood, brain, and bones', *Controversies in the Era of Evidence-based Medicine* [lecture series], University of Toronto Centre for Forensic Science and Medicine, 25 September.
- Barnes, P. (2011) 'Imaging of nonaccidental injury and the mimics: issues and controversies in the era of evidence-based medicine', *Radiologic Clinics of North America*, 49, 1, pp.205-29.
- Barnes, P., Galaznik, J., Gardner, H. and Shuman, M. (2010) 'Infant acute life-threatening event - dysphagic choking versus nonaccidental injury', *Seminars in Pediatric Neurology*, 17, 1, pp.7-11.
- Block, R. (2010) 'SBS/AHT 2010: what we know, what we must learn, what we must do to move forward', *Eleventh International Conference on Shaken Baby Syndrome/Abusive Head Trauma*, Buckhead/Atlanta GA, 12 September.
- Block, R. *et al.* (2014) letter to the Kansas International Film Festival Organizers, 6 October, available at <https://onsbs.files.wordpress.com/2014/10/peds-letter-ncsbs-re-syndrome.pdf> (accessed February 2018).
- Carty, H. and Ratcliffe, J. (1995) 'The shaken infant syndrome. Parents and other carers need to know of its dangers', *British Medical Journal*, 310, 6976, pp.344-5.
- Chadwick, D., Kirschner, R., Reece, R. *et al.* (1998) 'Shaken baby syndrome - a forensic pediatric response,' *Pediatrics*, 101, 2, pp.321-3.
- Cheit, R. (2010) 'The strange politics of child abuse', *Eleventh International Conference on Shaken Baby Syndrome/Abusive Head Trauma*, National Center on Shaken Baby Syndrome, Buckhead/Atlanta GA, 13 September.
- Cheit, R. (2014) 'Exonerating' the guilty: child abuse and the corruption of the wrongful conviction movement', *Sixteenth International Conference on Shaken Baby Syndrome/Abusive Head Trauma*, National Center on Shaken Baby Syndrome, Denver CO, 21 September.
- Christian, C. and Block, R. (2009) 'Abusive head trauma in infants and children', *Pediatrics*, 123, 5, pp.1409-11.
- Clemetson, C. (2006) 'Caffey revisited: a commentary on the origin of 'shaken baby syndrome'', *Journal of American Physicians and Surgeons*, 11, 1, pp.20-1.
- Committee on Child Abuse and Neglect, American Academy of Pediatrics (1993) 'Shaken baby syndrome: inflicted cerebral trauma', *Pediatrics*, 92, 6, pp.872-5.

- Committee on Child Abuse and Neglect, American Academy of Pediatrics (2001) 'Shaken baby syndrome: rotational cranial injuries - technical report', *Pediatrics*, 108, 1, pp.206-10.
- Cory, C., Jones, M. (2003) 'Can shaking alone cause fatal brain injury? A biomechanical assessment of the Duhaime shaken baby syndrome model' *Medicine, Science, and the Law*, 43, 4, pp.317-33.
- De Leeuw, M., Beuls, E., Jorens, P. *et al.* (2013) 'Delta-storage pool disease as a mimic of abusive head trauma in a 7-month-old baby: a case report,' *Journal of Forensic & Legal Medicine*, 20, 5, pp.520-1.
- Donohoe, M. (2003) 'Evidence-based medicine and shaken baby syndrome; part I: literature review' *American Journal of Forensic Medicine and Pathology*, 24, pp.239-42.
- Duhaime, A-C., Christian, C., Rorke, L. *et al.* (1998) 'Nonaccidental head injury in infants - the 'shaken baby syndrome'', *New England Journal of Medicine*, 338, pp.1822-9.
- Duhaime, A-C., Gennarelli, T., Thibault, L. *et al.* (1987) 'The shaken baby syndrome: a clinical, pathological, and biomechanics study', *Journal of Neurosurgery*, 66, 3, pp.409-15.
- Frank, Y., Zimmerman, R. and Leeds, N. (1985) 'Neurological manifestations in abused children who have been shaken,' *Developmental Medicine & Child Neurology*, 27, 3, pp.312-16.
- Geddes, J. and Plunkett, J. (2004) 'The evidence base for shaken baby syndrome: we need to question the diagnostic criteria,' *British Medical Journal*, 328, pp.719–20.
- Geddes, J., Vowles, G., Beer, T. *et al.* (1997) 'The diagnosis of diffuse axonal injury: implications for forensic practice', *Neuropathology & Applied Neurobiology*, 23, pp.339-47.
- Gilliland, M. (1998) 'Interval duration between injury and severe symptoms in nonaccidental head trauma in infants and young children', *Journal of Forensic Science*, 43, 3, pp.723-5.
- Greeley, C. (2011) 'Deconstructing Donohoe', *Third International Conference on Pediatric Abusive Head Trauma*, San Francisco CA, 7-8 July.
- Greeley, C. (2012) 'A wolf in sheep's clothing: denialism in child abuse pediatrics', *Twelfth International Conference on Shaken Baby Syndrome/Abusive Head Trauma*, National Center on Shaken Baby Syndrome, September-October, Boston MA.
- Greeley, C. (2014) 'Shaken baby syndrome' and forensic pathology', *Forensic Science, Medicine, and Pathology*, 10, 2, pp.253-5.
- Harding, B., Risdon, R. and Krous, H. (2004) 'Shaken baby syndrome: pathological diagnosis rests on the combined Triad, not on individual injuries,' *British Medical Journal*, 328, 7442, pp.720-1.
- Holmgren, B. (2010) 'To tell the truth – examining defense witness testimony in abusive head trauma cases', *Eleventh International Conference on Shaken Baby Syndrome/Abusive Head Trauma*, National Center on Shaken Baby Syndrome, Atlanta GA, 13 September.
- Hymel, K., Chadwick D., Christian C. *et al.* (1998) 'Shaken baby syndrome: fact, fiction, and controversy,' *Second National Conference on Shaken Baby Syndrome*, Salt Lake City UT, 13 September.
- Jenny, C. (2011) 'The mechanics: distinguishing AHT/SBS from accidents and other medical conditions,' slide 33, *New York City Abusive Head Trauma/Shaken Baby Syndrome Training Conference*, New York, 23 September.
- Jenny, C. (2017) 'Biomechanical response of the infant head to shaking: an experimental investigation', *Journal of Neurotrauma*, 34, pp.1579-88.
- Lloyd, J., Willey, E., Galaznik, J., Lee, W., Luttner, S. (2011) 'Biomechanical analysis of head kinematics during infant shaking versus pediatric activities of daily living.' *Journal of Forensic Biomechanics*, 2, pp.1-9 available at

- <https://pdfs.semanticscholar.org/c86c/f4b3edededa46ff7b50dc01117c8fd2c22be.pdf> (accessed January 2019).
- Luttner, S. (2011) 'Prologue' in *On Shaken Baby*, available at <https://onsbs.com/prologue/> (accessed February 2018).
- Margulies, S., Prange, M., Myers B. *et al.* (2006) 'Shaken baby syndrome: a flawed biomechanical analysis', *Forensic Science International*, 164, 2, pp.278-9.
- Molina, D. (2009) 'Neck injuries and shaken baby syndrome,' *American Journal of Forensic Medicine & Pathology*, 30, 1, pp.89-90.
- Moreno, J. and Holmgren, B. (2013) 'Dissent into confusion: the supreme court, denialism, and the false 'scientific' controversy over shaken baby syndrome', *Utah Law Review*, 1, pp.153-217.
- Nashelsky, M. and Dix, J. (1995) 'The time interval between lethal infant shaking and onset of symptoms: a review of the shaken baby syndrome literature', *American Journal of Forensic Medicine & Pathology*, 16, 2, pp.154-7.
- National Registry of Exonerations (2014) University of Michigan Law School and Center on Wrongful Convictions at Northwestern University School of Law, available at <http://www.law.umich.edu/special/exoneration/Pages/about.aspx#> (accessed February 2018).
- Ommaya, A., Goldsmith, W. and Thibault, L. (2002) 'Biomechanics and neuropathology of adult and paediatric head injury,' *British Journal of Neurosurgery*, 16, 3, pp.220-42.
- Orient, J. (2005) 'Reflections on 'shaken baby syndrome': a case report', *Journal of American Physicians & Surgeons*, 10, 2, pp.45-50.
- Parrish, R. (1998) 'What every investigator needs to know about shaken baby syndrome,' *Second National Conference on Shaken Baby Syndrome*, Salt Lake City UT, 14 September.
- Parrish, R. (2001) *Third National Conference on Shaken Baby Syndrome, Executive Summary*, National Center on Shaken Baby Syndrome, Ogden UT, September 2000, available at <https://www.dontshake.org/media/k2/attachments/2000-SaltLakeCityProgram.pdf> (accessed February 2018).
- Piatt, J. (1999) 'A pitfall in the diagnosis of child abuse: external hydrocephalus, subdural hematoma, and retinal hemorrhages', *Neurosurgery Focus*, 7, 4, pp.e1-e7.
- Pittman, T. (2003) 'Significance of a subdural hematoma in a child with external hydrocephalus,' *Pediatric Neurosurgery*, 39, 2, pp.57-9.
- Plunkett, J. (1999) 'Shaken baby syndrome and the death of Matthew Eappen: a forensic pathologist's response,' *American Journal of Forensic Medicine & Pathology*, 20, 1, pp.17-21.
- Plunkett, J. (2001) 'Fatal pediatric head injuries caused by short-distance falls,' *American Journal of Forensic Medicine & Pathology*, 22, 1, pp.1-12.
- Prange, M., Coats, B., Duhaime, A. and Margulies, S. (2003) 'Anthropomorphic simulations of falls, shakes, and inflicted impacts in infants,' *Journal of Neurosurgery*, 99, pp.143-50.
- Rangarajan, N. (2006) 'Shaken baby syndrome: a flawed biomechanical analysis', *Forensic Science International*, 164, pp.280-1.
- Scheimberg, I., Cohen, M., Zapata Vazquez, R. *et al.* (2012) 'Nontraumatic intradural and subdural hemorrhage and hypoxic ischemic encephalopathy in fetuses, infants, and children up to three years of age: analysis of two audits of 636 cases from two referral centers in the United Kingdom,' *Pediatric & Developmental Pathology*, 16, 3, pp.149-59.
- Squier, W. (2008) 'Shaken baby syndrome: the quest for evidence,' *Developmental Evidence and Child Neurology*, 50, pp.10-14.

- Squier, W. (2011) 'The 'shaken baby' syndrome: pathology and mechanisms,' *Acta Neuropathologica*, 122, 5, pp.519-42.
- Steinbeigle, R. (2014) letter to the Kansas International Film Festival Board, 6 October, available at <https://onsbs.files.wordpress.com/2014/10/ncsbs-letter-re-syndrome.pdf> (accessed February 2018).
- Stray-Pedersen, A., Omland, S., Nedregaard, B. *et al.* (2011) 'An infant with subdural hematoma and retinal hemorrhages: does von Willebrand disease explain the findings?,' *Forensic Science, Medicine, & Pathology*, 7, 1, pp.37-41.
- Strouse, P. (2016) 'Child abuse: we have problems', *Pediatric Radiology*, 46, 5, pp.587-90.
- Talbert, D. (2005) 'Paroxysmal cough injury, vascular rupture, and 'shaken baby syndrome'', *Medical Hypotheses*, 64, 1, pp.8-13.
- Talbert, D. (2009) 'Cyclic vomiting syndrome: contribution to dysphagic infant death,' *Medical Hypotheses*, 73, 4, pp.473-8.
- Talbert, D. (2012) 'Is 'shaken baby syndrome' the malignant peak of a 'benign hydrocephalus of infancy' iceberg?', *Journal of Trauma & Treatment*, 1, 8, pp.1-6, available at <http://www.omicsgroup.org/journals/2167-1222/2167-1222-1-149.digital/2167-1222-1-149.html>.
- Tuerkheimer, D. (2009) 'The next innocence project: shaken baby syndrome and the criminal courts,' *Washington University Law Review*, 87, 1, pp.1-58, available at <http://ssrn.com/abstract=1354659>.
- Willman, K., Bank, D., Senac, M. and Chadwick, D. (1997) 'Restricting the time of injury in fatal inflicted head injuries,' *Child Abuse & Neglect*, 21, 10, pp.929-40.



RESPONSE PAPER

Waney Squier's ordeal and the crisis of the shaken baby paradigm

Niels Lynøe

Centre for Healthcare Ethics, Karolinska Institutet, Stockholm, Sweden

Contact: Niels.Lynoe@ki.se

Niels Lynøe is a general practitioner and senior professor of medical ethics. He has conducted many empirical and philosophical studies within the area of clinical ethics as well as medical research ethics. During spring 2014 and fall 2016, he participated in a Swedish systematic literature review of shaken baby syndrome.

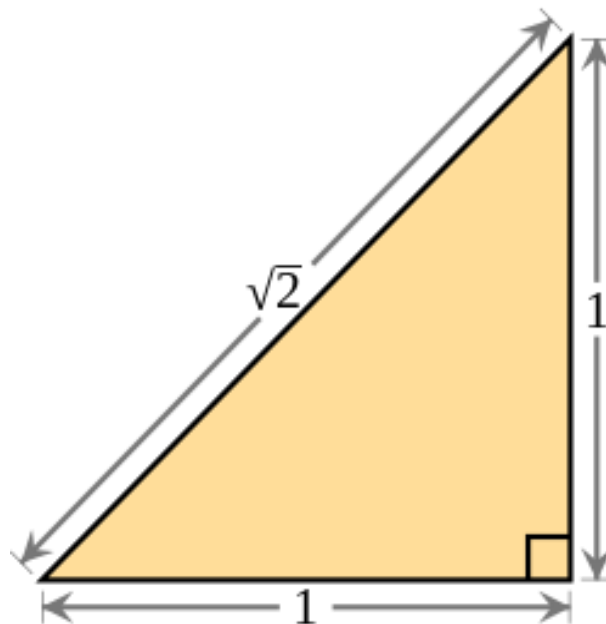
Introduction

There is a murder story, from 400 BC, about the deaths of two members of the Pythagorean society. The circumstances are unclear, but it is assumed that they were actually killed. Why? They had betrayed the basic ideas of the Pythagorean worldview (Farrington, 1949). According to this scientific world order, everything that matters could or should be described and transformed into mathematical numbers and symbols. A point was referred to as 1, a line as 2, an area as 3 and a body as 4. The sum of $1+2+3+4$ is 10 and ten was considered a holy number. The circle was thought to be perfect and hence divine (Witt-Hansen, 1961). Pythagorean mathematics was also thought to be perfect and divine, and accordingly definitive. However, the Pythagorean numerology did not include what we currently refer to as 'irrational' numbers, such as the square root of 2. These numbers were actually given a name by the Pythagoreans, who regarded them as

beyond all reason and thus irrational. Members of the Pythagorean scientific society were not supposed to discuss this issue. The ‘crime’ committed by the two members of the society who died mysteriously was discussing the irrational numbers and talking about them with people outside the society (Farrington, 1949). They had been considering that in a rectilinear triangle the hypotenuse cannot be expressed in integers if the other sides are expressed in integers (Johansson and Lynøe, 2008). They had been dealing with a scientific anomaly (see Figure 1).

The story may not be true, but it does represent the most extreme means of silencing and punishing people who question basic assumptions within a scientific society. Currently, members of a scientific society who discover inconsistencies or observe scientific anomalies are shunned and marginalized. They might encounter problems in renewing their positions, in receiving financial support or in having their papers accepted for publication in scientific journals. After reading Waney Squier’s proposition paper, a *via dolorosa* through scientific purgatory, the Pythagorean mystery murder story springs to mind. Even though Waney Squier did not receive a death sentence, what happened was close to a character assassination. Her opponents certainly thought they had silenced her. They definitely succeeded in sending a signal to all other concerned scientists - and potential expert witnesses: if they want to avoid being subject to a similar ordeal, they should abstain from giving testimony which does not support mainstream ideas.

Figure 1. A Pythagorean problem



In what follows, I provide another example of how a scientific paradigm with associated clinical implications might be defended when its basic assumptions are questioned. I also discuss possible explanations as to why those who support the shaken baby paradigm reacted as they did. I will examine what they did themselves and what they did with the assistance of people outside the scientific community. I will present the hypothesis that the traditional shaken baby paradigm suffers from three types of crisis: 1) a crisis of basic assumptions, 2) a crisis of responsibility, and 3) a senility crisis.

The Semmelweis case

The next association which sprang to mind when reading of Waney Squier's ordeal was the case of Ignaz Semmelweis. In 1849, he presented the results of hand-washing procedures by obstetricians prior to examining women in labor: the mortality rate from childbed fever decreased from approximately 11.4% in 1846 to 1.3% in 1848 (Johansson and Lynøe, 2008). Here I focus on the local reaction among his colleagues at Allgemeines Krankenhaus in Vienna in 1849, and not the international response when he presented a more comprehensive study on childbed fever in 1861. The international response was merely a classical reaction within the whole scientific community, somewhat similar to the Pythagorean case. The conclusion was that Semmelweis' reasoning was nothing but metaphysical speculation (Johansson and Lynøe, 2008).

Apart from finding the results incomprehensible, Semmelweis's colleagues at Allgemeines Krankenhaus might have reacted to the fact that the results were based on hand-washing by the physicians, implying that their non-washing was responsible for the greater mortality rate. Doctors generally believe that their interventions are of benefit to mankind. However, according to Semmelweis, they had actually harmed rather than helped their patients. If the clinicians in question accepted Semmelweis' results, they had to acknowledge that they had, although unintentionally, caused harm, and the death of their patients. This is very difficult to accept, both psychologically and sociologically. It might well take a generation for scientists and clinicians to digest such a revelation.

Instead, the obstetricians thought that variations in the death rate from childbed fever – it increased and decreased – were attributable to natural causes. As childbirth at that time was potentially life-threatening, it could be argued that the obstetricians should not be blamed or held responsible. Childbed fever and mortality were considered to be natural hazards associated with

giving birth (Johansson and Lynøe, 2008). In order to protect themselves from Semmelweis' accusation that they were harming their patients, his colleagues found it convenient to refer to the current scientific assumption about micro-organisms. Before Pasteur and Koch's scientific revolution in the 1870s, micro-organisms were regarded as products of the disease process - not causative agents. Accordingly, Semmelweis' results were considered scientifically incomprehensible. When his employment was not renewed in 1849, Semmelweis left Vienna.

Comparing the Pythagorean and Semmelweis cases

There are some interesting similarities and differences between the Pythagorean and Semmelweis cases. The similarity lies in the presentation of scientific anomalies which question the basic assumptions of a paradigm. Although the basic assumption of the Pythagorean paradigm involved a whole cosmology, no third person was concerned or came to harm; it was primarily an academic issue. In the Semmelweis case, however, the consequences were not solely academic. Had Semmelweis' results been accepted promptly, it would have been obvious that thousands of patients had been exposed to risk. Although the physicians' aims were to benefit their patients, they might have been held responsible and blamed for malpractice. It appears that to be shunned by the scientific community, it is enough to present inconvenient results, a controversial hypothesis which directly or indirectly questions the current paradigm. However, if questioning the paradigm also raises the prospect that clinical adherents to the paradigm might, directly or indirectly, be accused of malpractice, the reaction might be expected to be even more extreme (Lynøe, Juth and Eriksson, 2018).

Understanding reaction to the shaken baby paradigm

Similarly, the shaken baby paradigm is not confined to rational academic discussion of different theories to decide which is the most evidence-based. In other words, it is not a conflict of competing theories. The shaken baby case also implies catastrophic consequences for the infant in question, its parents and carers (Saunders *et al.*, 2017). Because the shaken baby case also has clinical consequences, it is more closely comparable with the Semmelweis case than the Pythagorean. If those who support the mainstream shaken baby paradigm were to accept the observations and theories presented by Waney Squier, they would also have to acknowledge that they might unintentionally have brought about catastrophic consequences. It is not only the

suspected child abuser who tears families apart (Strouse, 2016): child protection teams might also do so (Lynøe *et al.*, 2018). Concerned pediatricians might have harmed rather than helped the infants whose best interests they are supposed to protect. If a pediatrician's courtroom testimony leads to removal of an infant from a secure family setting, splitting up the family and imprisoning an innocent parent, these are catastrophic consequences (Saunders *et al.*, 2017; Lynøe *et al.*, 2018). In analogy with the Semmelweis case, it is almost psychologically and sociologically impossible for clinicians to accept that they have participated in such wrongdoing and malpractice. Referring to scientific reasoning might be a convenient way of protecting and defending oneself.

Waney Squier's experiences over the last ten years suggest a paradigm in crisis (Lynøe, Juth and Eriksson, 2018). Adherents to such a paradigm will try to defend and protect it from outside critics, and particularly from former followers of the paradigm. But the paradigm is less threatened by rational academic criticism than by the legal and societal consequences of accepting it. This was probably the core issue when the Squier case was brought to trial.

Referring to a paradigm in crisis is justified because the reaction to Waney Squier was not a normal reaction. Adherents of a paradigm might normally be prepared to test new hypotheses and tolerate rational criticism without overreaction. In the Squier case, the overreaction took the form of prosecution and conviction of Squier for malpractice, with the assistance of a police officer. Another sign of overreaction to critical voices is reference to critics as 'denialists' (Strouse, 2016), as if criticism is akin to Holocaust denial. As I understand the issue, neither Waney Squier nor those of us who conducted the Swedish systematic literature review deny that child abuse occurs - including violent shaking of a baby (Lynøe, Elinder, Hallberg *et al.* 2017). Shaking a baby, with or without impact (also referred to as 'abusive head trauma') might well be child abuse. But calling those who question the validity of the theories and the empirical studies denialists is merely a desperate defensive action by those defending a problematic paradigm rather than part of any rational academic discussion.

New theories encapsulating the old theory

What Waney Squier questions is the assumption that *all* cases presenting with *isolated* subdural hematoma are caused by violent shaking (Squier, 2011). There might be natural causes. With respect to subdural hemorrhage (SDH), the bridging vein theory based on high energy violence might be correct in some cases. But in infants up to six months old, other theories (eg, the capillary

theory as presented by Squier and others) might be more reasonable (Geddes and Whitwell, 2004; Squier, 2011). Several observations support this. For example, subdural hematoma is observed in many newborn infants following normal vaginal delivery. There is also a gradient between the frequency of subdural hematoma and different delivery modes: assisted vaginal delivery results in subdural hematoma in 56% of cases, compared with 1.7% in scheduled Caesareans; normal vaginal deliveries with and without labour-stimulating drugs result in 41% SDH, and emergency Caesareans in 29% (Lynøe and Eriksson, 2017).

Another observation reported by Waney Squier is that the shape of the film-thin bilateral subdural hematoma in newborn infants is similar to those identified in suspected shaken baby cases without impact (Squier, 2011). If the hemorrhages were actually the result of a damaged bridging vein in all cases, large localized unilateral hemorrhages might be expected (Squier, 2011). The shaken baby paradigm does not seem to consider the fact, also highlighted by Squier, that there might be a significant difference between a subdural hematoma in an adult brain and that in the brain of a month-old baby. These relatively controversial findings indicate that the last word about the bridging vein theory has yet to be said.

It has been proposed that the retinal hemorrhages represent a specific, localized effect of shaking a baby – the ‘shaken eye’ theory, described as specific damage in the form of tearing of the vitreous retina (Squier, 2011). In that sense, it might be described as completely separate from the subdural hematoma. This theory has, however, also been contradicted by different observations. Retinal hemorrhages - often bilateral in newborn infants - rarely occur in the absence of a subdural hematoma (Thackeray, Scribano and Lindberg, 2010; Li, Mitchell, Fromkin and Berger, 2011). Furthermore, recent research indicates that retinal hemorrhages might actually be an effect of high intracranial pressure (Minns, Jones, Tandon and Fleck, *et al.*, 2017) and the high intracranial pressure might, in turn, be caused by the process following, for instance, a subdural hematoma (Squier, 2017). This might, as Squier (2011) suggests, support the capillary theory, regardless of whether the capillaries in question are intra-dural or vessels in the membranes around a hygroma or a chronic subdural hematoma. Finally, with respect to the third distinguishing feature of the so-called ‘Triad’, violent shaking is also supposed to have a direct impact on the brain, causing axonal brain damage (Squier, 2011). This direct axonal brain damage (tearing of nerve fibers) requires, in turn, that the encephalopathy symptoms occur promptly. Accordingly, this excludes the possibility of an interval between shaking and symptoms - a so-called ‘lucid interval’

(De Leeuw, Beuts, Jorens *et al.*, 2013). This theory also influences the criteria applied for evaluating the trustworthiness of a parent's story, indicating that the parent who brings the infant to the hospital is probably the actual perpetrator.

The three features of shaken baby syndrome (the Triad) - subdural hematoma, retinal hemorrhages and encephalopathy - are accordingly understood as three separate and independent effects of violent shaking. Thus, if an infant presents with two of the above three components of the Triad and no signs of impact on the skull, the diagnostic accuracy is considered to be high. If retinal hemorrhages are also identified, then the diagnosis - traumatic shaking - is considered to be corroborated (Laurent-Vennier, Nathanson, Quiriau, Briand-Huchet *et al.*, 2011). If the shaken baby paradigm had been less entrenched, the observations presented by Waney Squier would probably have been assessed. Accordingly, the paradigm might have developed in a more dynamic way. To date, some adherents of the paradigm have done almost nothing apart from defending it by developing protection strategies and accusing critical scientists of denialism (Strouse, 2016). But why? Maintaining that all infants with the Triad but without signs of impact have been violently shaken is one thing, but it is quite another to maintain that the paradigm is robust and evidence-based, and to deny that there are contradictions, paradoxical phenomena and scientific anomalies (Lynøe, Juth and Eriksson, 2018).

Circular reasoning

When parents are unable to offer a medically acceptable explanation for an infant's injuries (the isolated Triad), they are considered to be hiding information in order to protect themselves. If the parents maintain that the infant's symptoms progressed from merely subtle to manifest symptoms of encephalopathy, it is assumed they are not telling the truth. Sometimes they admit they did shake the baby, but in an attempt to resuscitate the infant. Child protection teams diagnose such cases as shaken baby syndrome. Since researchers assessing the Triad test are using child protection teams' diagnostic decision-making as the gold standard, such cases are classified by the researchers as *true positive*.

This classification strategy might, however, result in circular reasoning (Lynøe, Elinder, Hallberg, Rosén *et al.*, 2017). My understanding is that there are at least two types of circular reasoning. In the first type, the circularity concerns the researchers' use of child protection teams as a reference test or gold standard when calculating the positive predictive value of the isolated

Triad test for determining that an infant has been shaken violently. But since the presence of the isolated Triad are used by child protection teams when they determine that the infant has been shaken violently, the Triad test is based on circular reasoning. If the diagnostic test is based on criteria and these are included in the gold standard test, we will end up with solely true positive cases and true negative cases. False positive and false negative cases will not occur. However, in practice, researchers are often conducting case control studies and here the shaken baby cases are also determined - directly or indirectly - by child protection teams. As controls the researchers often use the judgments of child protection teams when determining whether an infant has been hurt in an accident. Infants who have external impact to the head might also be determined as accidental cases, depending on what kind of story the parents tell. If the parents are saying that the infant fell from a height of more than a meter, the case might be determined as accidental. If the fall is described as less than a meter, the team will determine that the infant has also been violently shaken (Lynøe, Juth and Eriksson, 2018). In Triad cases with no impact, the team will determine that the infant has been violently shaken independently of what the parents might say. In some studies, witnessed accidents might also be applied as controls (Vinchon, de Foort-Dhellemmens, Desurmont and Delestret, 2010); in such studies, the control group is independent of the judgments of child protection teams.

In Table 1, the gold standard test is a combination of child protection teams' clinical evaluation of shaken baby cases regarding positive outcomes and accidents are used regarding negative outcomes. As just said, the Triad criteria of the diagnostic test (the Triad test) are also included in the gold standard test. If Waney Squier is right when she questions the selected mechanism theories, then there are false positives to the Triad test, but the way the researchers who defend the shaken baby paradigm examine this possibility makes them unable to discover these false positives even if they exist.

Table 1.

The gold standard test is			
		Positive	Negative
The Triad test is	Positive	<i>True positive</i>	<i>False positive</i>
	Negative		

Negative *False negative* *True negative*

If the researchers had used the child protection teams' determination of not only the shaken baby cases but also the cases the team determined to be non-shaken baby cases, the number of false positive cases would probably have been zero - at least if we are dealing with shaken baby cases without impact. Since the numbers of false positive and false negative cases are always part of the denominator of the accuracy measure, the diagnostic accuracy will always be 1 or 100%. Also, the positive predictive value becomes 1 or 100% since it is calculated as the proportions of true positive divided by the true positive + false positive (Lynøe, Rosén and Eriksson, 2017). Using accidents as non-shaken baby cases might complicate the picture because even children exposed to traffic accidents might display the Triad or some of its components. Furthermore, compared with those classified as shaken baby cases, the accident group is, on average, much older and this group will always have external impact to the head. In those classified as shaken baby cases with the isolated Triad, we will, by definition, find no impact to the baby's head.

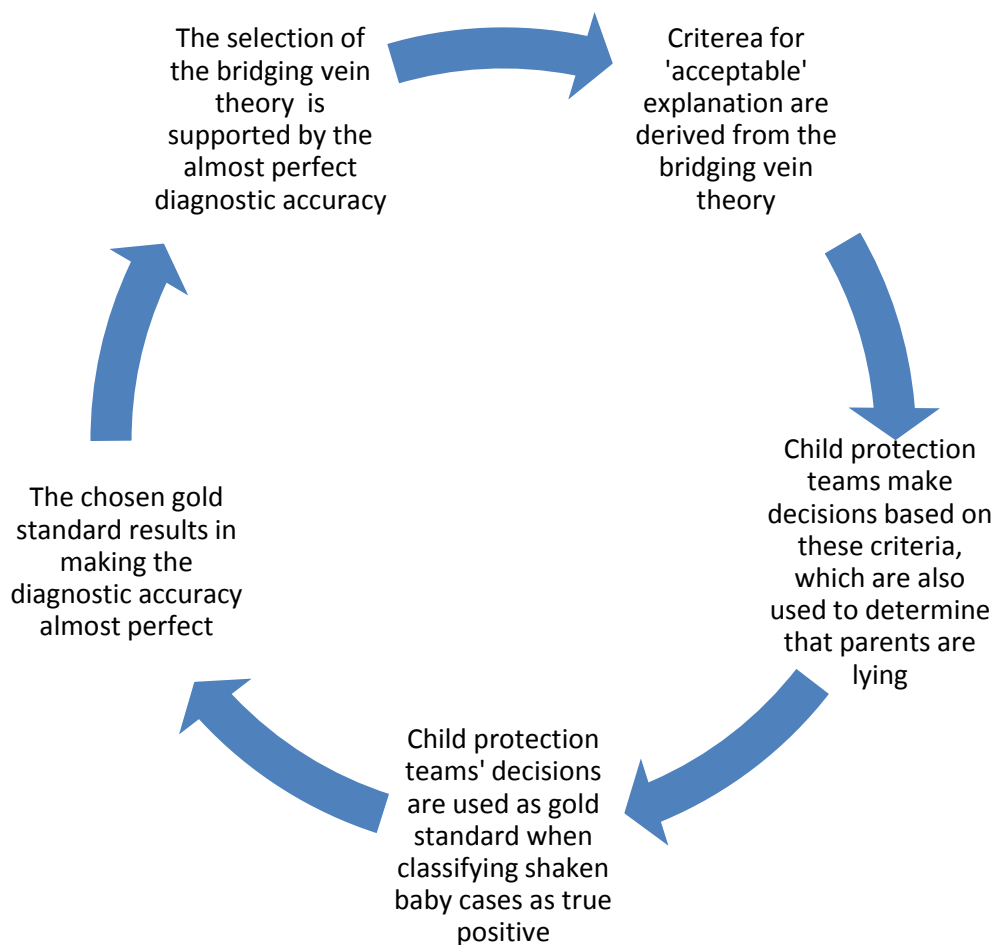
In one study where accidents were actually used as non-shaken baby cases, the researchers replaced the encephalopathy component of the Triad with lack of impact (Vinchon, de Foort-Dhellemmens, Desurmont and Delestret, 2010; Lynøe, Rosén and Eriksson, 2017). Since accidents always include impact to the child's head, the consequences of the new Triad were that all *false positive* cases of the revised Triad test disappeared. It seems as if the number of *false positive* cases tends, in one way or another, to vanish.

Although the danger of circular reasoning is well known within clinical epidemiology, the judgments of child protection teams and similar groups have been applied as the gold standard even when researchers test the Triad or its components as instruments for predicting shaken baby syndrome (Lynøe, Elinder, Hallberg, Rosén *et al.*, 2017). When child protection teams are judging whether the isolated Triad in an infant has been caused by violent shaking, the team includes the Triad as part of the judgment. The diagnostic test is part of the gold standard. In order to avoid circular reasoning in determining the positive predictive value, the gold standard must be independent of, and able to be separated from, the diagnostic test. Cases in which someone has confessed to shaking an infant or where a person has been convicted of shaking the baby might be independent judgments. Such independent judgments might avoid the risk of this type of circular reasoning (Lynøe, Elinder, Hallberg, Rosén *et al.*, 2017).

But - and this is a big but - we need to have detailed information about how a confession was obtained and under what circumstances the conviction was made. The reason for these reservations is that there is quite a high risk of police-induced confessions and false confessions based on plea bargains (Kassin, Drizin, Grisso, Gudjonsson *et al.*, 2010; Gertner, 2015). If both true and false confessions are classified as true positive cases, the number of true cases will be overestimated (Lynøe and Eriksson, 2018a). Both the plea bargain confessions and the police-induced confessions are often the result of an expert witness associated with a child protection team who applies the above mentioned criteria for estimating the trustworthiness of the parents (Lynøe, Juth and Eriksson, 2018; Lynøe and Eriksson, 2018a).

The other type of circular reasoning is initiated when selecting the mechanism theory. The mechanism theory is based on the assumption that shaking a baby violently brings about the damage in the brain, the disrupted bridging veins and the retinal bleedings. From this mechanism theory, criteria are derived for what are considered acceptable medical explanations. If there is no impact to the infant's head, reliance on the derived criteria results in the conclusion that the infant has been violently shaken. And this conclusion is independent of what the parents might say. The teams' decisions are eventually used by researchers for classifying shaken baby cases in case control studies. The researchers also use accidents as controls in case control studies, as well as when calculating the diagnostic accuracy of the Triad for predicting violent shaking. Finally, the calculated high diagnostic accuracy can be used as support for selecting the mechanism theory (see Figure 1 below).

Figure 1. Circular reasoning



According to the selected mechanism theory, the origin of the subdural hematoma is rupture of bridging vein(s), the retinal hemorrhages are caused by vitreous retina tearing and the encephalopathy is the result of direct damage to the brain. The consequences of the bleedings and the immediate symptoms are regarded as pathognomonic for violent shaking. The three findings are also considered to develop separately and independently of each other. This in turn has impact on classification of true positive shaken baby cases. The selection of what is seemingly considered as a control group influences the number of false positive cases – which might become zero (Vinchon, de Foort-Dhellemmens, Desurmont and Delestret, 2010). Together with the chosen gold standard, this influences the calculation of the diagnostic accuracy, which in such cases might be perfect.

A perfect score for diagnostic accuracy corroborates the choice of mechanism theory as correct - a theory from which the criteria are derived and so on, and so on. As can be seen, the reasoning is circular, apparently making the argumentation stronger and stronger. The iteration of

the circular reasoning makes the argumentation for a perfect diagnostic test for predicting violent shaking a self-fulfilling prophesy. What is supposed to be examined is already taken for granted as the truth. Circular reasoning is, at best, poor scientific thinking; at worst, it is scientific misconduct (Lynøe, Elinder, Hallberg, Rosén *et al.*, 2017).

The observations by Waney Squier and others that contradict and undermine the mechanism theory selected by the shaken baby paradigm seem not to bother its supporters. A particularly important issue, which should have been addressed, is that the Triad may have only one main cause - the subdural hematoma, which might, in turn, trigger both the retinal hemorrhages and the encephalopathy. I comment on this issue in the concluding remarks. Next, though, I discuss possible reasons why the supporters of the present paradigm overlook a number of issues, and spend so much time defending and protecting the paradigm from paradoxical phenomena and competing theories. First, I argue that the shaken baby paradigm is in crisis. I specify three types of crisis: a fundamental crisis of the basic assumptions of the paradigm, a crisis of responsibility, and finally a crisis of senility (Andur Pedersen, 1976).

The fundamental crisis

The basic assumptions of a scientific paradigm guide all attempts to make observations, interpret them and make them meaningful (Johansson and Lynøe, 2008). We might use the metaphor ‘wearing scientific glasses’ to understand how we observe and focus on scientific aspects and understand them within a paradigm. Without scientific glasses, we would often be unable to observe anything meaningful. However, once adopted, scientific glasses become very difficult to remove.

Problems might arise when we observe phenomena which are not comprehensible in terms of the basic assumptions. Such phenomena might be classified as scientific anomalies (Johansson and Lynøe, 2008). There are several options for dealing with anomalies. They might be ignored: within the paradigm you act as if the anomalies did not exist and do not concern the paradigm. As a protagonist of the paradigm, you might also react offensively and describe those who have observed the anomalies as bad scientists or denialists (Strouse, 2016). Pythagoras’ reaction when he became aware that two members of his group had talked with others about irrational numbers might serve as an example. Apart from the Semmelweis case, another medical example appeared in the 1950s when the Greek physician, John Lykoudis, observed that an antibiotic was actually

effective in the treatment of peptic ulcer (Rigas, Feretis and Dapavassilliou, 1999). Since the *helicobacter pylori* theory was yet to be devised, Lykoudis' treatment was considered quackery and his discovery was ignored.

When Waney Squier presented her observations and her competing theories, she was initially ignored. But when she began to act as an expert witness for the defense, she learnt everything about the offensive strategies of supporters of the shaken baby paradigm. These strategies continue to protect the present paradigm. As stated above, the overreaction - the use of a police officer as a surrogate protection agent, for example - might indicate that the paradigm is in serious crisis. Signs of a paradigm in fundamental crisis are:

1. the development of competing theories, theories that might provide better explanations than those associated with the established paradigm's basic assumptions, and that threaten to undermine established theory;
2. scientific anomalies become more and more problematic, not only quantitatively but also qualitatively;
3. defensive auxiliary hypotheses are proposed in order to obscure the inadequacy of basic assumptions (Lynøe, Juth and Eriksson, 2018).

The responsibility crisis

A responsibility crisis occurs when the scientific paradigm has significant societal consequences (Andur Pedersen, 1976). During the 1940s, the field of quantum physics included many scientists who found themselves facing a responsibility crisis. Going from theory and thought experiments of the quantum phenomenon to the Manhattan project was a big leap. The Manhattan project was also motivated by fear that scientists working for the Nazi regime were far ahead of allied scientists and were close to developing an atomic bomb. When it became clear that this was far from the case, several of the participating scientists suggested that the Manhattan project should be discontinued. But it endured and when the atomic bombs were dropped on Hiroshima and Nagasaki, many prominent scientists felt responsible and left the program. Robert Oppenheimer continued, but when he opposed the development of the hydrogen bomb, he was removed and replaced (Bird and Sherwin, 2006). Albert Einstein, Robert Oppenheimer and other physicists found themselves in a crisis of responsibility.

Similarly, when, in 2012, Guthkelch re-evaluated his 1971 hypothesis that shaking an infant might result in a subdural hematoma, he also began to feel responsible for having contributed to sending innocent parents to prison (Guthkelch, 2012). Waney Squier describes in this debate how she was initially part of the shaken baby paradigm. However, when she became aware of Jennian Geddes' observations (Geddes and Whitwell, 2004), she began to question the paradigm. Geddes found no tearing of nerve fibers in the brain, but observed signs of hypoxia and brain-swelling. Oxygen failure, high pressure in the brain and eventually brain swelling might provide different manifestations. In this debate, Squier describes other, more subtle symptoms which may occur, such as grumpiness, irritability and vomiting, suggesting that there might be a lucid interval between the initial subtle symptoms and more manifest symptoms, such as seizures and lethal brain swelling. These observations challenge the basic assumption that brain damage (encephalopathy) will cause the rapid onset of manifest symptoms.

Like others involved in the shaken baby issue, Waney Squier seems to have suffered from a responsibility crisis. Like Guthkelch, she became aware of the legal and societal ramifications of doubts being raised about the diagnostic accuracy of the Triad as confirmation that an infant has been the victim of violent shaking. For Patrick Barnes, a pediatric neuroradiologist, it was evidence-based medicine that brought the realization that, for over twenty years, he might have acted against one of the Ten Commandments and the constitution of the United States (Barnes, 2017). What Patrick Barnes describes is nothing short of a responsibility crisis.

The senility crisis

Symptoms of a senility crisis are stagnation or degeneration of creativity and new ideas (Andur Pedersen, 1976). New hypotheses are not developed and tested. A sign of a senility crisis is that the paradigm is not focusing on issues which might be relevant, but do not accord with basic assumptions. For instance, even though the capillary theory is somewhat different from the bridging vein theory, it is remarkable that it is not scrutinized. Examination might show the bridging vein theory to be correct, but perhaps with limited validity.

Much effort within the shaken baby paradigm is spent on protecting and defending the paradigm itself. This tends to result in a narrowing of perspective and what is referred to as 'petty' (*petitesse*) research. Petty research might focus on parents' descriptions of events and their

trustworthiness (say, examining the lucid intervals between symptoms and the times at which parents bring the child to hospital). Compared with accidentally injured infants, those with suspected shaken baby syndrome have a longer lucid interval (De Leeuw, Beuts, Jorens *et al.*, 2013). Another example is the development of a diagnostic test for whether the parents are giving a truthful description of events before the infant developed symptoms (Hettler and Greenes, 2003). Examination of the capillary theory might broaden what are currently regarded as acceptable medical explanations. At the moment, a parent is considered to be lying if the parent admits that the baby was actually shaken, but only in an attempt at resuscitation after the baby lost consciousness.

If researchers and clinicians who support the shaken baby paradigm abstain from testing interesting new theories because they are afraid that a potential perpetrator might go free, there is a high risk that the paradigm will become dogmatized, ideological, infertile and degenerate. Within the shaken baby paradigm, there seem to be several signs of all three crises: a fundamental crisis, a responsibility crisis and a senility crisis. The senility crisis presents the greatest threat to the continued existence of the paradigm.

Concluding remarks

Although Waney Squier is a strong person who has survived this purgatory, it is shameful that a scientific community could behave in this manner in the twenty-first century - and be assisted by a police agent. We live in an open society and rational arguments should count for something, even when they are inconvenient. Instead of fighting and using words like 'denialist' to describe those who criticize the current paradigm, we should be cooperating in tackling the problem of child abuse. This includes shaken baby syndrome and the very young babies who suffer from subdural hematoma without impact. We need to study, for example, whether some infants with isolated subdural hematoma actually exhibit the sequela of a normal vaginal delivery. It is not primarily to restore Waney Squier's reputation that such studies are needed. I am sure she would agree that they should be conducted primarily for the sake of the infants and their parents, as well for the progress of scientific knowledge.

Whether the classical Triad is actually a relevant diagnostic test for violent shaking must be addressed. As the subdural hematoma seems to be the core issue and retinal hemorrhages and

encephalopathy secondary phenomena, another combination of signs suggests itself. Bilateral thin films of subdural hematoma among infants 0-4 months old might be combined with magnetic resonance examinations of the cervical spine ligament (Choudhary, Ishak, Zacharia and Dias, 2014). These two observations are independent of each other and the absence of cervical spine ligament ruptures might indicate causes other than violent shaking (Bandak, 2005). After exclusion of, for example, assisted or other kinds of complicated delivery, ruptures of the cervical spine ligaments might be an indication of violent shaking. In other words, researchers on the periphery of the mainstream paradigm might develop a sub-paradigm in a more dynamic way (by magnetic resonance examination of the ligaments of the cervical spine).

This way, there is cause for optimism. However, if the mainstream shaken baby paradigm persists, there is a high risk of a senility crisis, whereby creativity, new ideas and hypotheses are seen only to threaten the paradigm. Under these circumstances, the mainstream shaken baby paradigm might not only produce defensive and infertile auxiliary hypotheses, but eventually become impotent and dogmatic. It might be of some comfort to Wane Squier to know that, in the context of the philosophy of science, she is in the company of such prominent scientists as Ignaz Semmelweis. In twenty years' time, pediatricians who currently feel as Semmelweis' colleagues did in 1849 will probably have retired or changed their minds. The next generation might develop the paradigm in a more dynamic and productive direction. Consensus currently overrules evidence. It should be the other way around, of course. It will surely be so in the future (Lynøe and Eriksson, 2018b).

Acknowledgment

I am grateful to Ingvar Johansson, a philosopher, for helping me make the text of this paper clearer and more intelligible.

References

- Andur Pedersen, S. (1976) *Kriser I Videnskaberne (Crisis in the Sciences)* København Universitet, København.
- Bandak, F. (2005) 'Shaken baby syndrome: a biomechanics analysis of injury mechanisms', *Forensic Science International*, 151, pp.71-9.
- Barnes, P. (2017) 'Child abuse - nonaccidental injury (NAI) and abusive head trauma (AHT) - medical imaging: issues and controversies in the era of evidence-based medicine', *University of Michigan Journal of Law Reform*, 50, 3, pp.679-92.

- Bird, K. and Sherwin, M. (2006) *American Prometheus: The Triumph and Tragedy of J. Robert Oppenheimer*, Vintage Books, New York.
- Choudhary, A., Ishak, R., Zacharia, T. and Dias, M. (2014) 'Imaging of spinal injury in abusive head trauma: a retrospective study', *Pediatric Radiology*, 44, pp.130-40.
- De Leeuw, M., Beuts, E., Jorens, P. *et al.* (2013) 'History of an abusive head trauma including a lucid interval and retinal hemorrhage is most likely false', *American Journal of Forensic Medicine and Pathology*, 34, pp.271-6.
- Farrington, B. (1949) *Greek Science. Its Meaning for Us*, Penguin, London.
- Geddes, J. and Whitwell, H. (2004) 'Inflicted head injury in infants', *Forensic Science International*, 146, pp.83-8.
- Gertner, N. (2015) "'Why the innocent plead guilty': an exchange", *New York Review of Books*, 8 January, p.23.
- Guthkelch, A. (2012) 'Problems of infant retino-dural hemorrhage with minimal external injury', *Houston Journal of Health Law and Policy*, pp.201-8.
- Hettler, J. and Greenes, D. (2003) 'Can the initial history predict whether a child with a head injury has been abused?', *Pediatrics*, 111, 3, pp.602-7.
- Johansson, I. and Lynøe, N. (2008) *Medicine & Philosophy – A Twenty-First Century Introduction*, Ontos Verlag, Frankfurt.
- Kassin, S., Drizin, S., Grisso, T., Gudjonsson, G. *et al.* (2010) 'Police-induced confessions: risk factors and recommendations. *Law and Human Behavior*, 34, pp.3-38.
- Laurent-Vennier, A., Nathanson, M., Quiriau, F., Briand-Huchet, E. *et al.* (2011) 'A public hearing 'Shaken baby syndrome: Guidelines on establishing a robust diagnosis and the procedures to be adopted by healthcare and social services staff'. Guidelines issued by the Hearing Commission', *Annals of Physical and Rehabilitation Medicine* 54, pp.600-25.
- Li, S., Mitchell, E., Fromkin, J. and Berger, R. (2011) 'Retinal hemorrhages in low-risk children evaluated for physical abuse', *Archives of Pediatrics and Adolescent Medicine*, 165, pp.913-7.
- Lynøe, N., Elinder, G., Hallberg, B., Rosén, M., Sundgren, P. and Eriksson, A. (2017) 'Insufficient evidence for 'shaken baby syndrome' - a systematic review', *Acta Paediatrica*, 106, 7, pp.1021-7.
- Lynøe, N., Elinder, G., Hallberg, B., Rosén, M. *et al.* (2017) 'Is accepting circular reasoning in baby studies bad science or misconduct?', *Acta Paediatrica*, 106, 9, pp.1445-6.
- Lynøe, N. and Eriksson, A. (2017) 'May the fear of being falsely accused of having shaken a baby increase parents' demands for scheduled Caesareans?', *Acta Paediatrica*, 106, 7, p.1052.
- Lynøe, N. and Eriksson, A. (2018) 'A diagnostic test can prove anything if you use incorrect assumptions and circular reasoning', *Acta Paediatrica*, 107, 12, pp.2051-3.
- Lynøe, N. and Eriksson, A. (2018b) 'Consensus should be adapted to the evidence and not vice-versa', *Acta Paediatrica*, 107, 8, p.1476.
- Lynøe, N., Juth, N. and Eriksson A. (2018) 'From child protection to paradigm protection - the genesis, development and defence of a scientific paradigm', *Journal of Medicine & Philosophy*, 3 September, doi: 10.1093/jmp/jhy015.
- Lynøe, N., Rosén, M. and Eriksson, A. (2017) 'Questions about isolated traumatic shaking and confessions', *Child's Nervous System*, 33, 5, pp.731-2.

- Lynøe, N., Rosén, M., Elinder, G., Hallberg, B. *et al.* (2018) 'Pouring out the dirty bathwater without throwing away either the baby or its parents: commentary to Saunders *et al.*', *Pediatric Radiology*, 48, 2, pp.284–6.
- Minns, R., Jones, P., Tandon, A., Fleck, B. *et al.* (2017) 'Raised intracranial pressure and retinal haemorrhages in childhood encephalopathies', *Developmental Medicine and Child Neurology*, 59, pp.597–604.
- Rigas, B., Feretis, C. and Dapavassiliou, E. (1999) 'John Lykoudis: an unappreciated discoverer of the cause and treatment of peptic ulcer disease', *Lancet*, 354, pp.1634-5.
- Saunders, D., Raissaki, M., Servaes, S., Adamsbaum, C., *et al.* (2017) 'Throwing the baby out with the bath water - response to the Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU) report on traumatic shaking', *Pediatric Radiology*, 47, 11, pp.1386-9.
- Squier, W. (2011) 'The 'shaken baby' syndrome: pathology and mechanisms', *Acta Neuropathologica*, 122, pp.519-42.
- Squier W. (2017) 'Retinal haemorrhage: a red flag for raised intracranial pressure', *Developmental Medicine and Child Neurology*, 59, 6, p.565.
- Strouse, P. (2016) 'Child abuse: we have problems', *Pediatric Radiology*, 46, pp.587-90.
- Thackeray, J., Scribano, P. and Lindberg, D. (2010) 'Yield of retinal examination in suspected physical abuse with normal neuroimaging', *Pediatrics*, 125, pp.1066-71.
- Vinchon, M., de Foort-Dhellemmens, S., Desurmont, M. and Delestret, I. (2010) 'Confessed abuse versus witnessed accidents in infants: comparison of clinical, radiological, and ophthalmological data in corroborated cases', *Child's Nervous System*, 26, pp.637-45.
- Witt-Hansen, J. (1961) *Strejftog i Moderne Filosofi I*, Folkeuniversitets Bibliotek, Copenhagen.



RESPONSE PAPER

Another perspective - simply my brief thoughts

Dave Marshall

Dave Marshall Consultancy, 11-12 St. James's Square, London, England

Contact: DJM@davemarshallconsultancy.co.uk

In 2010, Dave Marshall retired from the Metropolitan Police in London. For the last nine of his thirty years' service, he was as a detective chief inspector in charge of a major investigation team within the child abuse investigation command (SCD5), responsible for investigating complex child abuse (including non-recent/historic abuse), suspicious child deaths and suspected child homicides. In this role, he was directly responsible for, or oversaw, investigation of over fifty such deaths. As a member of the ACPO (Association of Chief Police Officers) homicide working group sub-group on investigating child death, he helped design and deliver a course for police officers on investigating sudden childhood death.

Other papers in this debate mention the paper given by Detective Inspector Colin Welsh (retired) at the National Center on Shaken Baby Syndrome (NCSBS) conference, held in Atlanta in September 2010. Welsh was one of five detective inspectors on Special Crime Directorate 5(6) Major Investigation Team, of which Marshall was head and DCI. Marshall's name appears on DI Welsh's presentation because he might have travelled to Atlanta with him to give a joint presentation, but Marshall retired in August that year and did not attend the conference or write the presentation.

Introduction

This paper consists of some brief personal thoughts and observations from my own experience, many of which I have previously outlined in my book (Marshall, 2012). Rather than answers, these are views developed over many years of investigating child deaths and involvement with those impacted by them. I will group my thoughts into themes which I hope will contribute to the debate. The paper will stress the importance of looking at abusive head trauma (AHT), non-accidental head injury (NAHI) and rotational acceleration deceleration impact (RADI) with a wide-angle lens and in a general context, as well as with a microscope focused on a specific area. This will reduce the risk of not being able to see the wood for the trees. My motivation for agreeing to contribute to this debate is that I think it essential that we get it right.

Words written in stone - setting the scene

'Defend the children of the poor and punish the wrongdoer' is inscribed above the old doorway of the central criminal court (the Old Bailey) in London. I have always wondered just why the court's architects chose these particular words to focus the thoughts of those entering the court in the shadow of the lady balancing the scales of justice. Personally, I like the emphasis on defending children (particularly those with no voice and most vulnerable) and on punishing only the wrongdoer - with the crucial inference that justice will also be served when those who have done no wrong are exonerated.

The words come from Psalm 72, verse 4 in the Old Testament, where they are linked to King Solomon, renowned for his wisdom in the dispensation of justice. Whatever your faith, this ancient text provides useful insight into caring for the oppressed, the poor, the vulnerable and the marginalised in society. This may also be the earliest description of a child death review meeting, the importance of coming to the right decision evident from King Solomon himself chairing the meeting.

In 1 Kings, chapter 3, verses 16-28, dating from around 930 BC, King Solomon deals with a child death. Briefly, two women living in the same house each had a new born baby. There was no one else living in the house. During the night, one of the children suffocated because the mother had lain on it in her sleep. Realising what had happened, the mother switched her dead baby for

the living one. By the morning light, the mother of the living child realised the two children had been swapped and complained to the king. One mother was dishonest and heartless while the living child's mother was honest and compassionate. So, when Solomon ordered that the living child be cut in two and half given to each mother, she protested: "O my lord, give her the living child, and in no wise slay it."⁵² Solomon then ordered that the living child be returned to its true mother.

The story demonstrates that suffocation by overlaying was recognised as a mechanism of child death long ago. But it also shows the importance of thinking outside the box. A fresh approach (not that I am advocating threatening to harm children with a sword) helped resolve the situation, establish the truth and achieve justice for both the living child and its mother. But what about the deceased child, disowned by its mother? Of this there is no mention. This has parallels today; often there is more emphasis on living children than on those who have died. For instance, I have noticed that the sentences of those convicted of raping a child often exceed the sentences of those convicted of killing a child.

A different Triad

There have been many public inquiries into child deaths since the inquiry into the death of Dennis O'Neil in 1945 (see Hopkins, 2007). One inquiry, that into the death of Maria Colwell in 1973, was notable in highlighting three key areas where failings lay. Sadly, these same failings have been evident in more recent cases (eg, Victoria Climbié in 2000, Baby 'P' in 2007, and Daniel Pelka in 2012). These failings also appear in numerous serious case reviews where children have died or suffered significant harm (see Department of Education, 2015). The three recurring areas are:

- Lack of communication - people not sharing information, not working together
- Inadequate training - people not knowing what to do, how to work together, not understanding the issues, or being aware of relevant legislation, guidance and research.
- Insufficient focus on the child and how children are perceived - the voice of the child going unheard with greater attention being paid to the adults involved.

Working Together to Safeguard Children (Department of Education, 2015) is regularly updated and edited (a new version is expected in 2018) with information from the latest inquiries and serious case reviews into child deaths. Key statements are linked to the three themes outlined

⁵² *Bible* (King James version), 1 Kings, chapter 3, verse 26.

above. It is statutory guidance, but I wonder how many are aware of this guidance and its relevance. Some key statements from the 2015 edition are particularly important for setting the scene.

11. Children are best protected when professionals are clear about what is required of them individually, and how they need to work together

13. Ultimately, effective safeguarding of children can only be achieved by putting children at the centre of the system, and by every individual and agency playing their full part, working together to meet the needs of our most vulnerable children.

16. No single professional can have a full picture of a child's needs and circumstances and, if children and families are to receive the right help at the right time, everyone who comes into contact with them has a role to play in identifying concerns, sharing information and taking prompt action.

17. In order that organisations and practitioners collaborate effectively, it is vital that every individual working with children and families is aware of the role that they have to play and the role of other professionals. In addition, effective safeguarding requires clear local arrangements for collaboration between professionals and agencies.

20. Effective safeguarding systems are child-centred. Failings in safeguarding systems are too often the result of losing sight of the needs and views of the children within them, or placing the interests of adults ahead of the needs of children. (Department of Education, 2015, pp.7-9)

Although *Working Together* is primarily focused on living children, its emphasis on the child is no different for deceased children (who invariably no longer have a voice). *Working Together* sets out a statutory process that should occur when any child under 18 dies suddenly and unexpectedly. The mindset it outlines is appropriate for all professionals involved. In his review of the death of Baby P, Lord Laming (2009) made comparison with his findings from the earlier Victoria Climbié inquiry. He stated that policies, procedures and structures are important “but more so the robust and consistent implementation of these policies and procedures which keeps children and young people safe” (p.2). This emphasis on training surely includes awareness, resourcing and application of legislation, guidance, processes and research.

Working Together makes clear (see paragraph 16 above) that “no single professional can have a full picture of a child's needs and circumstances.” The principle also applies to medical

evidence. There should be no Lone Ranger or Quincy ME equivalents as no one person has sufficient knowledge or experience to comprehend all the circumstances. Also, it would be grossly unfair to place such a responsibility on a single individual, and equally unwise for any individual to accept it. Likewise, as I will establish, no one discipline will have all the answers; for example, science may make valuable contributions, but will not provide the answer to everything.

Putting the pieces together

The task of assembling a new jigsaw puzzle is much easier with a picture of the completed puzzle than without. In the absence of a picture, a preliminary examination of some of the pieces might assist, but could be misleading, perhaps leading to the conclusion that some pieces were missing or that pieces from another puzzle had somehow found their way into the puzzle's box. The analogy of a jigsaw puzzle is extremely pertinent to investigating possible child abuse. Those in possession of some jigsaw puzzle pieces will form ideas of the possible picture which may differ from the ideas of those in possession of other pieces, even though they are all the pieces of the same puzzle.

In isolation, jigsaw pieces can be misleading, becoming meaningful only when they fit into other pieces. Clearly, the more pieces, the more complete the picture and the greater the likelihood of constructing a true picture. Everyone contributing pieces and working together to fit them into their correct places helps build the true picture, whereas people withholding pieces or disposing of them because they do not think they are part of the puzzle can be detrimental, creating a misleading picture. Some pieces which appear insignificant on their own can prove key, making sense of all the others. Trying to reshape pieces to make them fit is also counterproductive as it leads to a distorted and blemished picture. Persisting in this practice can be damaging, greatly reducing the opportunity ever to construct the true picture. This may prove very different from the picture envisaged at the outset. But be careful; only with sensitive identification and sharing of all the pieces will the objective of building the true picture be achieved.

However, other factors can hinder the process - people not cooperating in sharing pieces, some pieces missing as parties have not looked in the right places for them, and legal processes and constraints. For example, incomplete disclosure in criminal prosecutions may mean that crucial pieces are hidden and sometimes never disclosed. Not everyone enjoys jigsaw puzzles as establishing the true picture can have consequences (being found guilty, for example, or being shown to have made a mistake). Miscarriages of justice - innocent people being wrongly accused

or guilty people walking free - are the reality of life, often made the more likely by our adversarial judicial process where only one side is actually obliged to provide the pieces and the other can contribute if it chooses.

Jurors have the task of making judgements from an incomplete picture where sometimes the law itself restricts the number of jigsaw pieces that can be revealed (for example, information about bad character or that is considered too prejudicial). An inquisitorial system might produce a much clearer and more complete picture. The boast that we have the best legal system in the world is questionable; it certainly does not produce the most complete picture for a jury tasked with determining guilt. Invariably, the others in the judicial process will have information the jury does not have.

There are usually 12 jurors, but only a single judge: 12 determining fact and the other the law. However, the interpretation and application of the law in relation to understanding medical evidence and associated issues can limit the facts disclosed. Nearly all cases will be tried with only part of the picture. In some trials, there is agreement between the prosecution and defence as to which pieces will be excluded from the jury's picture. When the jury system was first introduced, jurors would have known the defendant and would have had many pieces of information not available to modern juries. Balances and safeguards are important, but I would argue that, for true justice, the more pieces available the better. Is justice achieved for either victim or accused if the jury has an incomplete picture? I am aware of the legal constraints and reasons for withholding certain pieces of information, but perhaps the time has come to trust jurors with more pieces.

Importantly, and perhaps obviously, medical experts provide only some of the pieces. These may be very important pieces, but not so important that they can be considered in isolation. To have any true value, they must be seen in the wider context. There should be no hierarchy in the various roles involved; everyone - victim, family, witnesses, police, medical and other professionals, barristers and judge - has a valuable part to play in providing and helping assemble the jigsaw puzzle pieces. This analogy of puzzle building will run throughout this response.

The Southall/ Meadows effect

The media coverage of Roy Meadows and David Southall being struck off by the General Medical Council (GMC) has had, and still has, a negative impact on the willingness of experts to give

evidence in child abuse cases (see Dalrymple, 2008). Although both men successfully appealed the GMC charges in the appeal court, the legacy continues with many concerned that a similar fate may befall them. 'Tactical' complaints to the GMC in relation to expert witnesses must be robustly resisted. However, genuine complaints should be investigated by those with a detailed medical knowledge of the issues.

I know from conversations with them that paediatricians feel that the police rely too heavily on their initial interpretation of medical findings (whether the injury is caused by abuse) and base their actions solely on this, which may involve arresting the parents. This may inhibit paediatricians from fully expressing their views for fear of possible repercussions. In my view, paediatricians should not be put under this pressure. Instead, they should be asked for their concerns and these should be considered alongside all the other areas of investigation, the other jigsaw pieces.

Key documents

There are key documents and key guidance relating to the issues under debate. I will signpost their content rather than cover it in detail.

- Crown Prosecution Service (CPS) website⁵³ – an informative, useful and (in relation to this debate) an essential read. This covers all the main areas and for ease of reference I have included the list of contents below.⁵⁴ The guidance really needs to be read in its

⁵³ <https://www.cps.gov.uk/legal-guidance/non-accidental-head-injury-cases-nahi-formerly-referred-shaken-baby-syndrome-sbs> (accessed February 2018).

⁵⁴

- Charging*
- Background*
- What are the Features of Non Accidental Head Injury (NAHI)?*
 - *The Challenges to NAHI*
 - *Royal College of Pathologists (RCP)*
 - *Conclusion: The Triad of Injuries and The Unified Hypothesis*
- The Role of Experts*
- Case Management and the Criminal Procedure Rules 2005 - 2010 [now 2015]*
 - *Pre-trial Case Management*
 - *Expert Evidence: Admissibility*
 - *Parallel proceedings: Family and Criminal*

Reference Material

- *Annex A: Case law*
- *Annex B: Bio Mechanics in Non Accidental Head Injuries (NAHI)*
- *Annex C: Royal College of Pathologists, Meeting 10 December 2009*

entirety. Key court cases in the appeal and family court are summarised and the position statement of the Royal College of Pathologists is also included. These will aid an understanding of different points of view and their history and so avoid missing some important jigsaw puzzle pieces.

Other key publications advocating the sharing and disclosing of information (jigsaw pieces) and working together to do so include:

- Royal College of Pathologists (2016) - *Sudden Unexpected Death in Infancy and Childhood - Multi-agency Guidelines for Care and Investigation*. This is a report of a working group, chaired by Helena Kennedy, convened by the Royal College of Pathologists and endorsed by the Royal College of Paediatrics and Child Health. The working group also included the chief coroner, the Lullaby Trust and the police.
- Ministry of Justice (2015) - *Criminal Procedure Rules October 2015 - Part 19 Expert Evidence*. This explains the expert's duty to the court and other issues impacting on expert evidence, including an extremely useful 'Pre-hearing discussion of expert evidence', which allows prosecution and defence experts to have a confidential meeting to produce a statement outlining their agreements and disagreements so that the judge can decide on the most appropriate experts to give evidence.
- Department for Education (2015) *Working Together to Safeguard Children* (particularly chapters 4 and 5)

Media reporting

I am often disappointed with media coverage of child abuse cases. Journalists appear to rely on key sources, who put forward their own views. They do not appear to have undertaken sufficient personal research to realise there are alternative views. An awareness and understanding of the areas covered in the Crown Prosecution Service (CPS) guidance would be an excellent starting point. Oversimplification of complex issues does not help discussion and honest debate.

-
- *Annex D: Redrafted and moved to Annex A, 24 March 2011*
 - *Annex E: Short distance falls*
 - *Annex F: Subdural haemorrhage in the neonatal period*
 - *Annex G: Glossary of Terms and Abbreviations*

Police training - Triad plus⁵⁵

Police training in child abuse covers the following key areas. Again, this is only a brief overview of the investigative mindset and priorities.

Four questions in the search for the truth as to what has occurred:

1. Why did this child die? Suffer these injuries?
2. What is/are the cause(s) and circumstances
3. Are any criminal offences disclosed? (The answer to this question may be none)
4. If so - who was/were responsible?

A balanced approach - 5 key principles:

1. Balanced approach between sensitivity and the investigative mindset
2. A multi-agency response, working together, pooling knowledge and expertise
3. Sharing of information, importance of communication - sharing pieces
4. Appropriate response to the circumstances
5. Preservation of evidence (collecting pieces can exonerate as well as implicate people)

The statutory process that should occur in any sudden and unexpected death, including where criminal offences may have been committed, is outlined in chapter 5 of Department for Education (2015). The aims of the police are confirmed in Ministry of Justice (2015):

- a) Establish, as far as is possible, the cause or causes of the infant's death
- b) Identify any potential contributory or modifiable factors
- c) Provide ongoing support to the family
- d) Ensure all statutory obligations are met
- e) Learn lessons in order to reduce the risks of future infant deaths.

Key points covered in police investigative training and relevant to cases where there are indications of the Triad

⁵⁵ “Although the CPS consider that non-accidental head injury can still be diagnosed by the classic Triad, as part of their charging considerations and the application of the Full Code Test, they now require the Triad plus some form of additional supporting evidence” (Morris and McAddy, nd).

1. Is there a plausible explanation? In line with CPS guidance, accepting that there may be a plausible explanation, either medical or accidental.
2. The Triad plus. Are there any additional features or factors in addition to the Triad? Again, the CPS guidance lists examples of features medical/non-medical which may be relevant.
3. Confessions are evidence. Invariably video-recorded in the presence of a solicitor and subject to the legal constraints of the Police and Criminal Evidence Act 1984. I am personally aware of several cases where defendants explained why they acted as they did. They often demonstrated what they did, including violent shaking. These are legitimate and evidential jigsaw pieces, not to be discarded because they throw doubt on other explanations.
4. Not all investigations result in prosecutions. Even in the presence of the Triad and other factors, a thorough, objective examination of the circumstances may reveal a plausible explanation. For instance, I was involved in the case of a young baby who died from severe head injuries, including all three features of the Triad. The person who had been with the child at the time was arrested. Police enquiries revealed that the suspect was suffering from myoclonic epilepsy (previously undiagnosed), involuntary muscle spasms which must have occurred while the person was holding the child. Contrary to the views of some, the police do not set out to prove someone is guilty: they endeavour to establish what actually happened. But the police have to operate within legal constraints and often with limited access to jigsaw pieces.
5. Not everyone tells the truth and some liars can be very convincing. I have to admit there have been occasions when I doubted someone and then discovered they were telling the truth. I have also believed very convincing accounts and found them to be untrue only when trying to corroborate them. Jigsaw pieces need to be taken at face value, but examined very carefully to ensure they are what they appear to be.
6. Practitioners and managers need to be curious, to be sceptical, to think critically and systematically, but to act compassionately. This is the mindset advocated by Marion Brandon at the conclusion of a bi-annual review of serious case reviews and is an excellent approach to adopt. (Brandon, Bailey and Belderson, 2010, p.56).

The consequences of getting this wrong: the death of Ellie Butler

A relatively recent example illustrates the importance of reaching the right decision in child abuse cases. In this instance, a child died at the hands of an abusive father (Gray and Shaw, 2017). In February 2007, Jennie Gray took her daughter Ellie (7 weeks) to a doctor with burns to her head and hand. Jennie said the baby had rolled into a radiator. Days later, on 15 February 2007, Ben Butler (Ellie's father) rushed Ellie to hospital after she became pale and floppy while in his care. Medical experts diagnosed that she had the Triad of injuries that suggested she had been shaken. Butler protested his innocence. He was charged with grievous bodily harm, convicted at Croydon Crown Court, and jailed for 18 months. Ellie was placed with her maternal grandmother and grandfather, Linda and Neal Gray, under a special guardianship order.

In 2009, the Crown Prosecution Service put together three cases involving shaken baby syndrome that were pending appeal. One of these was the case of Ben Butler (the other two being the cases of Henderson and Oyediran). On 17 June 2010, a panel of court of appeal judges quashed Butler's conviction. Differing medical evidence cast doubt on the strength of the case, and the appeal court ruled there was no rational basis on which a jury could reject the possibility of an unknown cause of Ellie's injuries.⁵⁶ Ben Butler and Jennie Gray then embarked on a high-profile publicity campaign to get Ellie back. In 2012, at hearings in the family division of the high court, Sutton Council testified to Butler's violent convictions and evidence of domestic abuse against Gray. Even so, Justice Hogg ruled that Ellie should be reunited with her parents. After a short period, Ellie was returned to Ben Butler and Jennie Gray.

In October 2013, Ellie, now aged six, died after being found with severe head injuries at her home in Sutton, south London. It was discovered that she had a number of previous injuries, including broken bones. Butler rang Gray on that morning, persuading her to come back from work. Ellie, however, was already dead. The couple claimed she had died as a result of a heavy fall, saying she was copying a Peppa Pig video of jumping on the bed. At the end of the trial, Ben Butler was convicted of murder and imprisoned for a minimum of 23 years. Jennie Gray was convicted of perverting the course of justice and child cruelty.

A concluding thought

⁵⁶ This appeal court case is highlighted in Ministry of Justice (2015). It is an example of the issues and complexities encountered in these cases.

How then, are we to ‘Defend the children of the poor and punish the wrongdoer’? Perhaps we need to be more effective at putting together jigsaw puzzles.

References

- Brandon, M., Bailey, S. and Belderson, P. (2010) *Building on the Learning from Serious Case Reviews: A 2 Year Analysis of Child Protection Database Notifications 2007-2009*, research report DFE-RR040, Department for Education, London.
- Dalrymple, T. (2008) ‘In defence of David Southall’, *Spectator*, 8 September, available at <https://www.spectator.co.uk/2008/09/in-defence-of-david-southall/> (accessed March 2018).
- Department for Education (2015) *Working Together to Safeguard Children*, HM Government, London, March.
- Gray, N. and Shaw, K. (2017) ‘Operation Jaspers Green. The murder of Ellie Butler (family perspective)’, *Journal of Investigation Child Death*, 3, pp.30-7.
- Hopkins, G. (2007) ‘What have we learned? Child death scandals since 1944’, *Child Safeguarding, Children*, 10 January available at <http://www.communitycare.co.uk/2007/01/10/what-have-we-learned-child-death-scandals-since-1944/> (accessed March 2018).
- Laming, Lord (2009) *The Protection of Children in England: A Progress Report*, HM Stationery Office, London, March.
- Marshall, D. (2012) *Effective Investigation of Child Homicide and Suspicious Deaths*, Oxford University Press, Oxford.
- Ministry of Justice (2015) *Rules and Practice Directions, Criminal Procedure Rules October 2015 - Part 19 Expert Evidence*, London, available at <https://www.justice.gov.uk/courts/procedure-rules/criminal/rulesmenu-2015> (accessed February 2018).
- Morris, J. and McAddy, F. (nd) ‘Shaken baby syndrome – the development of expert evidence’, available at <http://churchcourtchambers.co.uk/shaken-baby-syndrome-the-development-of-expert-evidence-an-article-by-jo-morris-and-fiona-mcaddy/> (accessed February 2018).
- Royal College of Pathologists (2016) *Sudden Unexpected Death in Infancy and Childhood. Multi-agency Guidelines for Care and Investigation*, London, November.



RESPONSE PAPER

Has Squier been treated fairly?

Brian Martin

University of Wollongong, New South Wales, Australia

Contact: bmartin@uow.edu.au

Born in the United States, I emigrated to Australia in 1969 to avoid conscription. My formal training is in physics, with a BA from Rice University and a PhD from Sydney University. I then worked for a decade at the Australian National University as an applied mathematician. Only in the late 1970s, while working in Canberra, did I become involved in environmental and peace activism. Since 1986, I have worked as a social scientist at the University of Wollongong. Now an emeritus professor at the University of Wollongong. I have written 17 books and hundreds of articles on nonviolence, dissent, scientific controversies, whistleblowing, democracy, information issues, and education.

Introduction

Waney Squier had a highly successful career as a medical specialist and researcher, is the author of numerous scientific publications, and was one of the most experienced figures in her field. But then her professional behaviour was questioned and she had to spend years defending a charge brought by the General Medical Council. The hearings damaged her reputation and her livelihood was threatened. She has been through a terrible ordeal.

The question I want to address here is whether Squier has been fairly treated. I address this indirectly by looking at the methods used against her, adopting two approaches. The first is to compare Squier's experiences with the patterns common in cases of suppression of dissent in science. The second is to look for techniques commonly used to reduce outrage from injustice. Ultimately, it would require a much more in-depth investigation, perhaps equivalent in scale to the GMC hearings, to pass a more definitive judgement about fairness. My examination is more limited and hence my assessments are potentially open to challenge. Nevertheless, available evidence strongly suggests that Squier was unfairly treated.

Indicators of suppression

There are many cases in which scientists, doctors and other professionals have expressed views critical of orthodoxy and have suffered adverse actions as a result, a process I call 'suppression of dissent'. Given that Squier's saga is tied up with questions of expertise and credibility, it is only appropriate that I begin by saying something about my own work on this topic.

In the early 1980s, I first wrote about cases in which environmental researchers or teachers came under attack (Martin, 1981). Later, I studied suppression of dissent in several fields, including debates over nuclear power, pesticides, fluoridation and vaccination (Martin, 1999, 2015; see also Moran, 1998; Delborne, 2016). There are two essential features in cases of suppression of dissent. The first is a challenge to vested interests, which could be scientific orthodoxy or a powerful group. The second is adverse actions against the challenger (Martin *et al.*, 1986). Adverse actions include reprimands, censorship, denial of jobs and research grants, and dismissal, among others. Adverse actions, which in this framework can be called 'reprisals', usually target the challenger's vulnerabilities.

At this basic level, Squier's experience fits the pattern of other suppression cases. She was a conspicuous and influential challenger to a long-standing orthodox position about shaken baby syndrome (SBS), and she suffered serious adverse actions. But there is an important question to address: how can it be determined whether the adverse actions are justified? Only if they are unjustified is it appropriate to refer to them as reprisals.

In some cases, there is evidence of hostile intent by those taking the actions. Even without evidence of intent, there are a number of indicators that can be used to judge whether adverse

actions are likely to be reprisals: the double standard test, timing, the location of power, recipients of complaints, and openness to discussion (Martin, 2013, pp.39-41). The double standard test involves comparing the treatment of one person with that of another; namely, comparing the treatment of the target of adverse action with the treatment of others with similar performance, skills, credentials and other relevant characteristics. Applied to Squier, it involves comparing the way she was treated with the ways her peers have been treated. In her proposition paper, Squier compares her treatment by the GMC with the treatment of Richard Bonshek. He, like her, made comments about biomechanics, outside the area of his expertise. Squier was criticised, but Bonshek was not. She writes, “[Colin] Smith, the neuropathologist, similarly cited biomechanical literature to support his view, but criticised me for doing so”. As she notes, Bonshek and Smith supported the mainstream view, but she did not. This is a clear case of double standards. Squier provides examples of a different sort of double standard: when she testified for the prosecution in SBS cases, or provided expert evidence for medical negligence and other sorts of cases, her contributions were praised. Only when she testified for the defence in SBS cases was she subject to formal complaint.

The GMC, like some other official channels, is complaint-based, making it susceptible to being used as a tool in vendettas. The GMC normally does not extend its findings beyond the individuals brought before it. Imagine that the GMC, ruling that one or two practitioners operated outside their area of expertise, applied sanctions to every practitioner who did the same. This would have widespread ramifications. By restricting its sanctions to those against whom complaints are made, the GMC can suppress dissent without suppressing orthodoxy.

In my experience, the double standard test is the most reliable indicator of suppression. Other indicators are useful supplements. Consider the indicator of timing. In many cases, adverse actions begin immediately after a scientist speaks out. There was no such public trigger event in Squier’s case. However, she notes that efforts to discredit her were timed to coincide with an upcoming case in which she was to give evidence.

A third indicator is the location of power. Suppression of dissent is normally the work of a powerful individual or group - an employer, a government, an industry, a boss - acting against an individual who lacks similar backing. Because power is required to suppress dissent, the location of power is revealing. In Squier’s case, her opponents had far more power. As she describes it, at one point she was opposed by “a team whose members included the police, the Crown Prosecution

Service, lead and junior prosecution counsel, and medical prosecution experts in pathology, paediatrics and ophthalmology”. When powerful groups are involved, there can be a pattern of suppression, with many individuals in a field targeted in similar ways (Martin, 1999). Squier refers to colleagues who, like her, sometimes testified for the defence in SBS cases and who were also targeted for attack. She tells of being approached by colleagues who were sympathetic, but fearful of assisting parents because of the risk to their careers.

A fourth indicator can be expressed as a question: To whom are complaints made? In an intellectual dispute, the expected process is open and respectful dialogue. If someone’s views are seen as wrong or offensive, the way to address them is by contacting the person to raise concerns or perhaps by writing a rebuttal in a scholarly publication. In suppression cases, though, this sort of open and direct engagement with ideas and their proponents is often lacking. Instead, complaints are made to a target’s employer, professional association, publisher or regulatory agency, but not directly to the target. This is exactly what happened in Squier’s case: complaints were made to the GMC, not directly to her.

A fifth indicator involves willingness to discuss the issues. In an open intellectual engagement, disputing parties will talk with each other in personal conversations, email exchanges, public debates and online forums. This is the sort of give and take that characterises the search for common ground or a clarification of differences and assumptions. In suppression cases, on the other hand, it is more common for attackers to avoid such open discussion. This seems to apply to Squier’s critics.

Putting these indicators together, a typical case of suppression of dissent involves a scientist who speaks out on an issue in a way that threatens some group with vested interests (indicator: power). Immediately after speaking out, adverse actions are taken (indicator: timing), specifically complaints to the scientist’s employer (indicator: location of complaints) without first directly engaging with or even informing the scientist (indicator: openness to discussion). The allegations against the scientist involve a number of seeming shortcomings. However, no complaints are made about other scientists whose performance is no better and who have the same shortcomings (indicator: double standards).

In Squier’s case, evidence relevant to these indicators suggests that it is plausible that her treatment involved suppression of dissent. This does not prove that she was suppressed, but puts the onus of proof on those who would say she has been treated fairly. To be subject to reprisals for

dissenting from orthodoxy is to be treated unfairly. I now turn to a different way of judging whether treatment is fair.

Outrage management techniques

When people believe something is unfair, such as censorship, beating of peaceful protesters, or massacres, they may become upset or outraged. To prevent or reduce this reaction, powerful perpetrators have several options. Five techniques commonly used by such perpetrators to reduce public outrage are covering up the action, devaluing the target, reinterpreting what happened, using official channels to give a misleading appearance of fairness, and intimidating people (so they are afraid to express their concern). These same five techniques of reducing public outrage are found in numerous areas, ranging from whistleblowing to torture (Martin, 2007).

In workplaces, a worker being fired is sometimes seen as unjust, hence the term ‘unfair dismissal’. In such cases, the technique of cover-up might involve not telling co-workers that the worker has been dismissed. Rumours might be spread that the worker is incompetent, alcoholic or mentally ill; this is the technique of devaluation. Management might give an explanation for the dismissal; for example, a financial squeeze or job restructure; this is the technique of reinterpretation. If the worker takes the matter to court, alleging unfair dismissal, many people may believe that any injustice will be addressed. However, most courts are slow, focus on technicalities and rely on experts, allowing outrage to die down. The worker might win a small settlement, but seldom are managers held to account: the injustice is not addressed in any substantive way. The result is that when perpetrators are powerful, official channels often give only an illusion of justice. Finally, employees are often afraid to raise concerns about dismissals, their own or those of co-workers, fearing for their own jobs or getting unfavourable references. This reflects the technique of intimidation.

If the way Squier has been treated can be perceived as unfair, then it is plausible that those involved in her treatment might have used some of the five methods that reduce outrage. This does not require conscious intent on their part to anticipate others’ outrage and attempt to inhibit it. In most cases, it is reasonable to assume that those taking actions believe what they are doing is justified. In this framework, it is also possible to work backwards: if there is evidence of techniques for reducing outrage, this is indication that perpetrators are concerned, consciously or otherwise,

that actions taken will be seen as unjust. This is the approach I use here. Drawing on Squier's account, I looked for evidence of each of the five usual methods for reducing public outrage about injustice.

In terms of outrage management, cover-up refers to hiding, disguising or not revealing information that might raise concerns about actions taken. When complaints were made to the GMC, the complainers did not notify her first. (This harks back to the suppression indicator of recipients of complaints.) Colin Welsh gave a talk at a conference about his team's approach to SBS cases. Squier, requesting Welsh's slides from the police and through a Freedom of Information request, could obtain only a heavily redacted copy.

Devaluation is a powerful technique of outrage management: the lower a person's status, the less the concern about what is done to the person. For example, the murder of an esteemed humanitarian generates much greater public anger than the murder of a paedophile. Judge King's "harsh comments" about Squier's evidence might be considered devaluation or could be considered fair because they were about her evidence rather than her. A more obvious example of devaluation was Welsh's effort to find anything about defence witnesses that could be questioned. More generally, the GMC undertaking a fitness-to-practice hearing is likely to damage a professional's reputation even if there are no adverse findings. This is because some people believe that if a complaint has been made and an investigation undertaken, there is probably something wrong. The complaints to the GMC, and the GMC taking them seriously, were powerful devaluation techniques.

The tactic of reinterpretation involves explaining events in ways that do not involve an injustice, or suggest a less serious injustice. This tactic can involve lying about events, minimising the consequences of actions, blaming others, and framing actions in favourable ways. One example of reinterpretation is to say, as Colin Smith did in his report, that Squier was not measuring up to the standard expected of an expert. The issue was reframed as being about her expertise, not about preventing her from being a defence witness. The presence of double standards, described earlier, also involves the reinterpretation technique of reframing.

Official channels include, among others, grievance procedures, ombudsmen, anti-corruption commissions, police and courts. When a powerful group is responsible for an injustice, official channels may serve primarily to dampen public outrage, and provide only an illusion of justice. The GMC is an example of an official channel: it is supposed to deal with serious

transgressions by health workers. However, in Squier's case it was actually the tool of attack. Squier reveals her initial belief in the benevolence of official channels when she says that, following adverse comments by judges, the only way to clear her reputation was to resort to the GMC.

The tactic of intimidation operates to discourage action that might be triggered by feelings of outrage. Intimidation tactics can be directed against the target and anyone who might be involved. In Squier's case, the GMC hearings operated as a powerful form of intimidation. Doctors who sympathise with Squier's views might well be reluctant to speak out on her behalf lest they also be targeted by complaints to the GMC (Powers, 2017). As noted earlier in relation to the location of power, Squier tells of being approached by colleagues who share her concerns about SBS diagnoses, but who are reluctant to express their views publicly for fear of the effects on their careers.

In summary, five types of tactics are commonly used by powerful perpetrators to reduce public outrage over injustice: cover-up, devaluation, reinterpretation, official channels and intimidation. In Squier's case, there is evidence that all five of these tactics have been used, making it plausible that what her antagonists have done to her might readily be seen, by others, as unjust. On the other hand, if most people were to see the actions against Squier as right and proper, there would be no need to redact documents, make adverse comments about her and so forth.

Discussion

I have used two frameworks for assessing whether adverse actions should be considered unfair: the methods commonly used against dissidents, and the methods commonly used by powerful perpetrators to reduce public outrage over injustice. Application of each framework to Squier's case leads to the same conclusion: the evidence is compatible with her having been treated unfairly.

There are two important qualifications to this conclusion. The first qualification is that definitive evidence of suppression of dissent is seldom available. Perpetrators are usually sincere in their actions, feeling them to be justified. Open admissions of the aim of suppressing dissent are rare. So, the most that can be said is that the indicators suggest suppression. That is why I say the evidence is compatible with, rather than proves, that Squier was treated unfairly.

The second qualification is that I have relied primarily on Squier's account. This might on the surface seem to compromise my analysis, given that alternative accounts are possible and Squier's may be self-serving. However, my aim has not been to judge whether Squier's views about SBS are correct, but whether she has been treated fairly. Many of her claims are unlikely to be contested; for example, that documents were redacted, that her testimony for the defence was questioned, but not her testimony for the prosecution, and that complaints were made to the GMC. Nevertheless, it is possible that my conclusions could be challenged by the introduction of additional evidence. For example, my assessment that Squier was subject to a double standard could be challenged by providing evidence that the GMC has acted on complaints about doctors who testified for the prosecution in SBS cases.

Suppression has serious impacts on targets and sends a warning to others. Countering suppression requires people to speak up. Many supporters have spoken out on Squier's behalf (Mansfield *et al.*, 2016), challenging the GMC. To the extent that the attacks on Squier generate greater sympathy for her and draw attention to shortcomings in SBS claims, the attacks may backfire.

For those who wish to oppose injustice, the outrage management model provides guidance. Challenging the attackers is a matter of looking at each technique that reduces outrage and countering it. This leads to five methods for increasing outrage over injustice: exposing the action, validating the target, interpreting the events as an injustice, avoiding or discrediting official channels and mobilising support instead, and resisting intimidation. In her account of her treatment, Squier uses several methods of increasing outrage. Rather than acquiescing and disappearing from public view, she has written a comprehensive account of the actions taken against her, thus exposing them to wider view. In doing this, she is resisting intimidation, providing a model for others who might follow.

Acknowledgements

I thank Zhuqin Feng, Alfie Herrero de Haro and Anne Melano for valuable comments on drafts.

References

Delborne, J. (2016) 'Suppression and dissent in science' in Bretag, T. (ed.) *Handbook of Academic Integrity*, Springer, Singapore, pp.943-56.

- Mansfield, M. *et al.* (2016) 'General Medical Council behaving like a modern inquisition', *Guardian*, 22 March.
- Martin, B. (1981) 'The scientific straightjacket: the power structure of science and the suppression of environmental scholarship', *Ecologist*, 11, 1, pp.33-43.
- Martin, B. (1999) 'Suppression of dissent in science', *Research in Social Problems and Public Policy*, 7, pp.105-35.
- Martin, B. (2007) *Justice Ignited: The Dynamics of Backfire*, Rowman & Littlefield, Lanham MD.
- Martin, B. (2013) *Whistleblowing: A Practical Guide*, Irene Publishing, Sparsnäs, Sweden.
- Martin, B. (2015) 'On the suppression of vaccination dissent', *Science and Engineering Ethics*, 21, 1, pp.143-57.
- Martin, B., Baker, C., Manwell, C. and Pugh, C. (eds) (1986) *Intellectual Suppression: Australian Case Histories, Analysis and Responses*, Angus & Robertson, Sydney.
- Moran, G. (1998) *Silencing Scientists and Scholars in other Fields: Power, Paradigm Controls, Peer Review, and Scholarly Communication*, Ablex, Greenwich CT.
- Powers, M. (2017) 'Expert witnesses: stuck between the courts and the GMC', *British Medical Journal*, 357, p.j2034.



RESPONSE PAPER

Commentary on the paper by Waney Squier: ‘Shaken baby syndrome: causes and consequences of conformity’

Michael J Powers

Clinical Negligence Group, Taunton, Devon, England

Contact: powersqc@icloud.com

Michael Powers is both a doctor and a lawyer. He is a Queen’s Counsel and leader of the clinical negligence group. Michael Powers specialises in cases of medical negligence where scientific principles are involved. He is also fellow and lead examiner of the Faculty of Forensic and Legal Medicine of the Royal College of Physicians, and a helicopter pilot.

Introduction

Waney Squier's proposition paper points to the need for challenges to be made to scientific dogma, notwithstanding the personal professional costs of doing so. In the field of shaken baby syndrome (SBS), the importance of challenging an unproven hypothesis goes beyond academic interest. The determination of our liberty and whether our children should be taken away from us depends upon the reliability of medical expert opinion. Emotion fosters prejudice, destroys objectivity and

undermines the scientific approach, leading to unsafe decisions. The General Medical Council's principal purpose is to protect the public from bad doctors. It should not take sides where medical and scientific opinion is polarised. It is for the courts alone to control the admissibility and evidential weight to be placed upon expert evidence.

Shaken baby syndrome: the hypothesis

SBS is a hypothesis to explain a concurrence of bilateral thin layer subdural haematomata (SDH), retinal haemorrhages (RH) and encephalopathy: the 'Triad'. In effect, SBS is a diagnosis of a criminal offence. When this Triad is seen, the immediate carers of the infant fall under suspicion that the condition has been caused by their abuse. Most doctors prepared to give evidence on SBS believe in the hypothesis, even though there is little or no scientific support for this belief (Swedish Agency for Health Technology Assessment and Assessment of Social Services, 2016). It is the scientist's duty to attempt to prove hypotheses wrong, however popular they may be, but danger awaits any medically registered doctor who ventures to challenge majority opinion when it comes to SBS. No civilisation is served by depriving people of their liberty or their children, save on the most compelling evidence. Unchallenged acceptance of the unproven hypothesis that the cause of the Triad is violent shaking risks grave injustices.

Circularity

Circularity is an ever present danger in reaching a conclusion of SBS. For example, although there are many causes of retinal haemorrhage (RH), it is generally accepted that, in an infant, it may point to abuse. Where abuse is suspected, RH is likely to be specifically sought and, if present, seen as confirmatory evidence - notwithstanding that the incidence of RH in infants where abuse is not suspected is unknown. RH may be as common in infants presenting with unrelated conditions as in those with conditions which might be caused by abuse.

The relationship between the three components of the Triad is unknown. The presence of one is not sufficient for SBS. Neither is the addition of a second component. It is only when all three are present that the syndrome comes into existence. It is the Triad - not its component parts, or their extent or severity - which is the basis of the hypothesis. Without indulging in further

circularity, it cannot be argued that the components strengthen each other and thereby increase the credibility of the SBS hypothesis.

In November 2011, Squier published a paper in *Acta Neuropathologica* on the pathology and mechanisms of SBS: it is an impressive academic paper with an extensive bibliography exploring the pathological mechanisms of each of the components of the Triad. She also looks critically at other evidence often relied upon in support of SBS, such as axonal injury, brainstem and cervical cord damage, and spinal nerve root pathology. No one could say that she is ill-informed or that serious scientific questions about the Triad are not answered by the hypothesis. Her analysis merits attention and demands answers from the SBS proponents on both fronts: in the learned scientific literature and in the forensic environment where life-changing decisions are made.

Nothing should stand in the way of the rigorous cross-examination of the SBS hypothesis. It is only by this means that the quality and strength of evidence attributing the Triad to violent shaking can be effectively tested. There should be no tolerance of dismissive answers (such as "Because I say") to the question "Why?". It is not sufficient for any expert, however distinguished, to justify an opinion on the basis of it being in the light of his/her 'experience'. Experts on both sides of the debate should be expected to justify their opinions, and must actually do so. That a hypothesis has popular scientific support does not strengthen its explanatory value; neither does a witness gain more credibility by stating that his/her opinion is supported by that of others.

Reasoned argument, supported by scientific literature published in peer reviewed journals, is required. The foundation of an expert's opinion for or against SBS as *the* explanation for the Triad is then properly challengeable in cross-examination. If it weathers this critical analysis, its probative cogency increases. If it does not, the opinion is rendered of little or no significance. For example, consider the widespread belief of SBS proponents that the thin layer SDHs are caused by rupture of the bridging veins (BV) during (alleged) violent shaking. The BV are few in number (8-11 each side) and, in a 6-month infant, carry hundreds of millilitres of blood per minute. Squier says the rupture of even a single bridging vein would cause a massive space-occupying clot, not a thin layer SDH, and the bleeding would be partly subarachnoid. Any proponent of the ruptured BV hypothesis has to be able to advance a plausible answer to Squier's challenge.

Experts challenging conventions

Freedom of scientific expression is a major factor in the rate of increase of knowledge. Fear of regulatory censure for expressing unconventional views inhibits argument, research and the development of new ideas. I am not advocating a forensic free for all; there is no place now for a challenge to Copernican heliocentrism or to William Harvey's theory of the circulation of the blood. An advocate may advance an argument which has a very small chance of success, but may not waste the court's time on the argument which is completely without foundation. The proponents of SBS have choked debate and frightened off experts who dare to challenge the dogma from giving evidence in court.

In his paper on Francis Bacon's comments on the power of negative observations, Iain Donaldson (2016, p.459) cites a passage in translation which recognises the difficulty of challenging established belief:

The human understanding draws everything else to be in harmony with, and to support, those things which once pleased it, either because they are [generally] received and believed, or because they delight it. And, though it must be admitted that the force and the number of instances that occur to the contrary is greater [*sic*], it [the understanding] either does not heed them or it disdains them: or, if it does take notice of them, it distances itself from them and dismisses them - and that not without great and pernicious prejudice - so that the authority of those previous beliefs remains inviolate.

Those who have accepted that the Triad is caused by violence have professional reputations to defend. Some also have a steady flow of expert work from the Crown Prosecution Service and local authorities to maintain. If SBS is a false cause of the Triad or there are other non-abusive explanations, the safety of many convictions and the appropriateness of orders that children be taken into care would be called into question. Given the consequences, there is an understandable reluctance to disturb the *status quo*.

Defending a minority opinion

The Medical Practitioner Tribunal Service (MPTS) is supposed to provide independence in medical regulation by determining between the GMC and registered medical practitioners charges of professional incompetence brought by the GMC. It is funded by the GMC and occupies space in the GMC offices. Notwithstanding that its panels now comprise a majority of lay members, the

MPTS remains too closely associated with the prosecuting regulator for it to be independent of this influence.

Lay majority tribunals bring neither medical nor legal experience to the exercise of their judgments. In many cases, the issues are not medically complex and there are few legal points on which it is not sufficient for the tribunal to be guided by a legal adviser to the MPTS. Whether sexual activity took place with a patient or whether the registered practitioner has fiddled the books does not require specialist expertise to resolve the factual conflict. It is otherwise where, as in the Squier case, the charges relate to failure of an expert to stay within the confines of his/her expertise when giving evidence to a court and challenging orthodox medical opinion. Judge Mitting was critical of the MPTS in the Squier case for not having appointed a legal chair with judicial experience "both for reasons of case management and of understanding the context in which expert evidence is given in such ... a complex case requiring an understanding of the context in which expert evidence is given in a court" (Mitting, 2016, para.138).

Whether evidence is properly categorised as expert in the forensic environment is a matter for the court in which the evidence is adduced. It is not for a panel of the MPTS to determine who can and who cannot give expert evidence. How could any practitioner proposing to give expert evidence in court be sure that s/he will not be struck off by a tribunal that takes a different view from the court? If a court, which has control over the expert evidence it admits, is prepared to accept evidence as expert, how can a tribunal subsequently say that the evidence is not expert? This is not a matter with which the GMC should be involved.

It was repeatedly said in the course of the tribunal hearing of the charges against Squier that the panel's task was not to make a determination of the science; but that is exactly what it did. The tribunal assumed that SBS was an established and acceptable hypothesis. The tribunal did not have to determine the science for it acted as though the validity of the syndrome were proven. The clue for the lay tribunal was in the name: if the syndrome existed, it had to be caused by shaking. Had the shoe been on the other foot and a proponent of SBS had been facing charges, it is likely the tribunal would have accepted any evidence from the respondent as expert. In short, any doctor giving evidence that the Triad was caused by shaking could do so freely for, in the tribunal's mind, that was obvious and already known. If it was all right for the lay majority tribunal members to be of that opinion from the outset, how could it then be said that any expert giving such opinion was acting outside his or her expertise in telling them again?

A tribunal of the Medical Practitioner Tribunal Service found Squier had dishonestly gone beyond her expertise in SBS cases by expressing, *inter alia*, doubt that the forces involved in shaking were sufficient to cause the syndrome. On appeal, the high court quashed the finding of dishonesty on the charges brought by the GMC and restored her name to the medical register (Dyer, 2016). In her proposition paper on causes and consequences, Squier carefully analyses those areas where Mitting did not disturb the tribunal's findings against her.

It was not the function of the high court to reach its own conclusions on the charges, but rather to examine whether each finding could reasonably have been made on the evidence. No new evidence was called on appeal and the court was limited to that before the tribunal. The essential difference between evidence given in academic and forensic settings was not considered. As Squier correctly says, the value of a paper is in its results - not its conclusions. Whilst this may seem counter-intuitive, it should be seen in relation to expert evidence generally. In the forensic environment, the expert witness gives an opinion *on the facts*.⁵⁷ As the facts vary, so may expert opinion as to their interpretation. Not only that; other experts may have a different opinion on the same facts. In the scientific world, the same applies. The scientist gathers the data and they are presented as the results of the research. What follows is the opinion, the interpretation of these results. Other scientists are at liberty to give their own opinion/interpretation of these results just as in court other experts can express their differing opinions on the same facts. Squier treated the forensic opinion as though it was a scientific one. In giving opinion on the results in a scientific paper (which she was at liberty to do), she did not mention the authors' opinions. In the forensic environment, this was deemed to be wrong and she was censured for this failure.

It is axiomatic, and does not need to be spelt out in a rule, that an expert must not cite the work of others as supporting her view when it does not. If it is capable of doing so, but only with significant qualification, she must say so ... One of the overriding duties of an expert is not to mislead. Baldly stating, without qualification, that a research paper is a proper foundation for the proposition that the expert is seeking to advance is justified if that is the conclusion of the research paper; but if it is not, it should not be cited, without qualification, as supportive. (Mitting, 2016, para.34)

In mitigation, perhaps, all the experts involved were aware of the cited literature and of the authors' conclusions. There could have been no prospect of them being misled by believing that Squier's interpretations of the results in the papers were those of the authors.

⁵⁷ An expert may also give an opinion as to the facts where specialist expertise is necessary to determine the facts.

Relevant knowledge

In its guidance to doctors, the GMC (2013, para.12) says that an expert must give expert testimony and opinions only about issues that are within his/her professional competence *or* about which the expert has relevant knowledge. The expression of an unconventional opinion is not to be taken as evidence that the expert does not have that relevant knowledge. It is tempting to accuse those who express views with which the majority does not agree as being ignorant. Staying with the conventional view, despite transgressing the boundary of the expert's specific expertise, is unlikely to attract GMC scrutiny or censure. The logic appears to be that an 'acceptable' opinion emanates from a relevant knowledge base whereas an 'unacceptable' opinion does not. An expert who gives an unacceptable opinion could not have the relevant knowledge and therefore cannot be an expert.

Proper explanation

Although the GMC 'relevant knowledge' hurdle is justifiable where a registered practitioner may not have the professional competence to be an expert, it still begs the issue of what the GMC considers to be relevant knowledge. In opining upon the boundary line between expert and non-expert opinion, Mitting introduces a new test: that of a *proper* explanation.

The 'boundary line' between a proper explanation of support or doubt and trespassing impermissibly outside the expertise of the witness is imprecise and difficult to identify in any particular case. (Mitting, 2016, para.17)

As with relevant knowledge, this test also begs the question of what a *proper* explanation might be. Does it mean 'acceptable'? If so, acceptable to whom? The court? The medical fraternity? How can the orthodox majority, firm in its belief in the validity of SBS, consider any challenge to it as acceptable or proper?

By following the medical orthodoxy on SBS, the hazards of relevant knowledge and proper explanation are avoided and the proponents of the hypothesis are free from the jeopardy of a GMC charge that they have gone beyond their expertise when giving evidence supportive of it. For example, a proponent of SBS without biomechanical expertise can say that the forces sustained in a low-level fall are insufficient to cause the Triad without crossing the boundary, but any medical

expert maintaining that low level falls might explain the Triad will be disciplined. It surely requires the same degree of relevant knowledge to accept as to reject? How can it be right for a neuropathologist to be permitted to give evidence *accepting* the opinion of a neuroradiologist (and thereby add to its weight) when evidence *rejecting* that opinion (which would detract from its weight) is disallowed as being outwith the neuropathologist's expertise?

Court control of expert evidence

The court controls the admissibility of expert evidence through well-established rules and criteria. Opinion evidence is confined to matters within the expertise of the expert. Whether evidence is expert is a matter of fact for the court to determine - although the range and depth of expertise is a question which the court may be able to determine only on hearing the evidence of other experts.

In the criminal courts, it is spelt out that when considering the reliability of expert scientific opinion, the court should be on the alert for flaws detracting from its reliability (Courts and Tribunals Judiciary, 2015, para.19A.6). Red flags would include experts espousing a hypothesis which has not been subjected to sufficient scrutiny (including, where appropriate, experimental or other testing), or which has failed to stand up to scrutiny. As with the scientist, the court has a duty to ensure hypotheses are thoroughly challenged before placing any reliance upon them; without scientific foundation, one hypothesis is as good (or useless) as another. Experts, medical or other, failing in their responsibilities will find themselves censured by the court and their evidence rejected.

Although the constitution of GMC disciplinary tribunals has since changed to a majority of lay members, the dictum of the court of appeal, set in 2006, remains good. The court decides who qualifies as an expert in a given field:

... the appellate court must accord due deference to the evaluation of a panel substantially composed of doctors for the obvious reason that they are better placed to make a peer judgment ... where the charge before the panel relates to clinical work. But where the only charge relates to the doctor's evidence given during legal proceedings there is no similar foundation for deference. It is the judges ... who set the standards that they require of the expert witnesses appearing before them. In my opinion the judges are best placed to evaluate whether and to what extent an expert witness fell below those standards. (Justice Thorpe in Supreme Court, 2006, para.280)

The GMC's interest in controlling expert witnesses is resulting in fewer doctors coming forward to assist the courts when doing so places them in jeopardy of the GMC. As illustrated by the Squier case, this is having an adverse impact on the administration of justice. Save for wholly exceptional cases, the GMC should leave the issue of whether an expert has crossed the boundary line of his/her expertise to the court in which the evidence is given.

References

- Courts and Tribunals Judiciary (2015) *Criminal Practice Directions*, available at <https://www.judiciary.gov.uk/publications/criminal-practice-directions-2015/> (accessed November 2017).
- Donaldson, I. (2016) 'Francis Bacon's comments on the power of negative observations in his *Novum Organum*, first published in 1620', *Journal of the Royal Society of Medicine*, 109, 12, pp.459-60.
- Dyer, C. (2016) 'Shaken baby expert witness wins High Court appeal', *British Medical Journal*, 355, p.i5985.
- General Medical Council (2013) *Acting as a Witness in Legal Proceedings*, 22 April, available at https://www.gmc-uk.org/Acting_as_a_witness_in_legal_proceedings.pdf_58832681.pdf (accessed November 2017).
- Mitting, J. (2016) *Approved Judgement*, Squier versus GMC, EWHC 2739, 3 November.
- Squier, W. (2011) 'The 'shaken baby'syndrome: pathology and mechanisms', *Acta Neuropathologica*, 122, 5, pp.519-42.
- Supreme Court (2006) *Approved Judgment*, General Medical Council v Roy Meadow, Court of Appeal (Civil Division) 1390.
- Swedish Agency for Health Technology Assessment and Assessment of Social Services (2016) *Skakvåld - Triadens roll vid Medicinsk Utredning av Misstänkt Skakvåld. En Systematisk Översikt Statens*, available at <http://www.sbu.se/sv/publikationer/SBU-utvarderar/skakvald-Triadens-roll-vid-medicinsk-utredning-av-misstankt-skakvald/> (accessed January 2017).



RESPONSE PAPER

Waney Squier and shaken baby syndrome: implications for medicine and the medical expert witness

Toni C. Saad

Cardiff & Vale University Health Board, Cardiff, Wales

Contact: ToniSaad@doctors.org.uk

Toni C. Saad is a foundation doctor at University Hospital of Wales, Cardiff. He holds an MA in bioethics and medical law, and publishes in the field of medical ethics in law, including in the Journal of Medical Ethics and Clinical Ethics. He is the book review editor of New Bioethics.

Introduction

By recounting her involvement in the controversy around Shaken Baby Syndrome and making an evidence-based case against the validity of this diagnosis, Waney Squier has given the medical profession an opportunity for uncomfortable reflection. In this short response, I draw out some of this case's implications for the medical profession in relation to the scientific process and its involvement in the legal process. I argue that the case Waney Squier brings against Shaken Baby Syndrome is natural to the iterative process of scientific investigation, and that its implications demand the attention and action of the medical profession.

The scientific process

Philosophers of science sometimes distinguish between objectivity of *process* and objectivity of *product*, where objectivity means accurate representation of the world as it really is (Reiss and Sprenger, 2014).⁵⁸ If science were not (theoretically) objective in this way, it would be of little use: if its process were purely subjective, then so would its product. For this reason, it is assumed that scientific conclusions are such only if they are drawn from scientific evidence. Conclusions based on opinion, even that of experts, are to be tested rather than accepted. Although expert opinion and professional consensus certainly have an important place in science, particularly in its application in such fields as medicine (it is sometimes the only thing available), it cannot be allowed to go unchecked or unchanged by evidence. What is considered scientific or professional orthodoxy must keep in step with emerging scientific evidence. It is, therefore, the duty of any person forming or acting upon a scientific opinion, especially if its consequences are substantial, to assess all relevant evidence. The scientific process must have a free hand to generate the scientific product; this is what the conscientious pursuit of truth requires. And it follows that this might involve, at times, questioning or even rejecting received wisdom.

The history of science and medicine is replete with examples of people whose work challenged settled opinion, from the advances of the Renaissance anatomists which overturned centuries of Galenic orthodoxy, to Barry Marshall, who drank a laboratory culture of *helicobacter pylori* to debunk the mainstream opinion that gastric ulcers are caused by stress. Dominant views have been shown to be wrong again and again though, curiously, it still seems to take everyone by surprise when this happens. Considering that it is a normal part of the scientific process to question old theories in the light of new evidence, maybe we should be more prepared than we usually are to hear the case against the supposed consensus.

Historians might one day remember Squier's account of the putative Shaken Baby Syndrome as another example of an established opinion being overturned by scientific evidence. She has challenged the widely accepted hypothesis of Shaken Baby Syndrome and has made clear that such a challenge is justified. Diagnosis of Shaken Baby Syndrome (or abusive head trauma) from the triple pathology of subdural haematoma, retinal haemorrhage and encephalopathy has been shown to be dubious: the largest and most recent systematic review (Lynøe *et al.*, 2017) shows the Triad cannot rightly be called Shaken Baby Syndrome or abusive head trauma because

⁵⁸ Science can be thought of as objective in other senses, too, in that it is free from personal biases or, as some allege, free from normative commitments (see Reiss and Sprenger, 2014).

it is far from clear that the syndrome is caused by shaking or violence. Squier documents the circular reasoning and poor-quality evidence on which the majority opinion in this area rests. Though the ramifications of Squier's conclusion are profound and uncomfortable, all she has done is engage in the iterative process of the pursuit of scientific truth - at a personal cost. She is bringing to light the current best evidence against making the diagnosis-cum-accusation of Shaken Baby Syndrome. Anyone who sincerely claims to practise evidence-based medicine must, therefore, give her account a fair hearing.

The expert witness: professional conduct

If Squier's account is to be believed, we must wonder why her colleagues were so intolerant of her differing, albeit robustly evidence-based, opinion. Questioning orthodoxies can be interpreted as a slight against persons, and perhaps in the present case, because of its significant legal ramifications, the potential for resentment and reaction is even greater. Yet, what has happened to Waney Squier has the potential to deter future expert witnesses from making full-orbed evidence-based judgments. Those holding unpopular, albeit evidence-based, opinions may be silenced lest the weight of medical magisterium bear down upon them, and the medical expert witness will be tempted to toe the party line whatever the issue.

Crucially, these events also suggest that expert witnesses, at least in alleged Shaken Baby Syndrome cases, may have given an unjustifiable opinion to the court. The General Medical Council explicitly lays out what it expects from expert witnesses:

You must give an objective, unbiased opinion and be able to state the facts or assumptions on which it is based. If there is a range of opinion on an issue, you should summarise the range of opinion and explain how you arrived at your own view ... if your opinion is qualified (for example, as a result of conflicting evidence), you must make this clear. (General Medical Council, 2013)

It is for the jury, not a witness, to decide on the evidence. Based on Squier's account, it seems there is reason to doubt that medical expert witnesses have fairly summarised the range of reasonable opinions on Shaken Baby Syndrome or explained to juries that there is a body of evidence which undermines the current 'official line'. While I am not suggesting that expert witnesses have deliberately misled the courts, Squier's evidence gives reason to question whether medical expert witnesses are following professional guidance. If they were, the current mainstream

opinion on Shaken Baby Syndrome would perhaps not be so doggedly defended. Expert witnesses have a duty to disclose relevant opposing information, and such material has existed for some time. Perhaps Squier's work will prove compelling enough to overturn the orthodoxy of the moment and thereby change the way expert witnesses testify in cases of alleged Shaken Baby Syndrome.

There is, therefore, a case to be made that the General Medical Council should enforce its guidance to expert witnesses, particularly in relation to their involvement in Shaken Baby Syndrome cases. There is precedent in the case of Roy Meadow and *Preiss v General Dental Council* to suggest that this would probably not result in findings of serious professional misconduct (see Devaney, 2007). Nevertheless, future enforcement of the guidance could lead to better understanding in the medical profession about the responsibilities and limits of the medical expert witness.

The medical expert witness: problems and solutions

The most serious implications of Squier's account have to do with justice. Behind the miscarriage of justice which the questions marks over the diagnosis of Shaken Baby Syndrome now imply lies a subtler threat to the British legal tradition of trial by independent jury. Clause 39 of *Magna Carta*, assented to by King John in 1215, contains the following:

No free man is to be arrested, or imprisoned, or disseised, or outlawed, or exiled, or in any other way ruined, nor will we go against him or send against him, except by the lawful judgment of his peers or by the law of the land. (Magna Carta Project, 2018)

Though not a complete innovation, *nisi per legale iudicium parium* (except by the judgment of his peers) has since stood as an aspirational ideal for legal procedure.⁵⁹ In the reign of Edward III, an adversarial system became the norm. In 1670, the famous Bushel's case established beyond all doubt the independence of the jury (Stephens, 1896).⁶⁰ The United Kingdom's legal system remains adversarial: the defendant is represented by an attorney while the court is an impartial

⁵⁹ Trials by jury of a sort were established by John's father, Henry II, and in various forms in other jurisdictions.

⁶⁰ This is the fascinating trial of William Mead and William Penn, two Quakers accused of unlawful assembly. Despite the judge's belief that they were guilty, the jury ruled several times unanimously that they were not, even in the face of great pressure and heavy sanctions from the judge (see Tolles, 1998). The case is named after the juror who opposed the judge most persuasively.

observer and arbiter rather than an inquisitor. The accused is judged by his peers in the form of a jury.

We now take for granted that courts sometimes call upon medical expert witnesses, but it was not always so. The precedent for the medical expert witness in England was established in the trial of Edward Oxford in 1840. Oxford stood accused of discharging a firearm in the direction of Queen Victoria, though he caused no injury. The defence argued that Oxford was insane, and called upon medical witnesses to testify to this. Previous insanity trials had summoned witnesses who were medical professionals, but in the Oxford trial, medical witnesses were called upon *qua* medical experts, not as mere witnesses who happened to be experts in their field. The court recoiled at this development. The defence, however, asked the expert witness, Dr John Davis, his direct opinion on the question of Oxford's insanity. The prosecutor objected that Davis should be asked so directly for his final opinion rather than commenting on hypotheses. Justice Alderson maintained the objection: "It is putting him [Davis] in the place of the jury." The defence then tried a different line of questioning, but was interrupted by Lord Denman: "If you ask the symptoms of madness, the jury will apply their minds to the facts proved, but we cannot suppose all the facts proved,"⁶¹ and that he is to give a verdict of sanity or insanity in the place of jury... It is asking the witness to find the prisoner guilty or not guilty" (Freemon, 2010, pp.361-6). However, by the end of this trial, the medical witnesses were doing exactly what Lord Denman has complained about: stating their direct opinion of the defendant's insanity, and, therefore, on his innocence. The precedent for a new class of witness was set.

From its inception, the system of medical expert witnesses has posed potential problems. The special privilege of the expert witness is to provide not only facts, but also a professional opinion on these facts. Perhaps, therefore, the expert witness runs the risk of becoming a thirteenth juror, or even a second judge. The General Medical Council's guidance does not, however, endorse trial by expert - far from it. It acknowledges that a professional opinion given in court might need to be qualified by, or contextualised within, a range of reasonable views. The medical expert witness is to give an unbiased professional opinion of the facts as presented to him, not a verdict. The acute problem Squier has identified is the possibility that expert witnesses in cases of alleged Shaken Baby Syndrome are merely perpetuating the questionable orthodoxy about the aetiology of the syndrome, and thereby inevitably prejudicing the court's opinion of the facts. Indeed, the

⁶¹ The phrase 'we cannot suppose all the facts proved' appears especially pertinent to Shaken Baby Syndrome.

putative diagnosis of Shaken Baby Syndrome or abusive head trauma is itself an accusation, if not a verdict, of guilt. If the expert witness does not convey to the court the balance of the evidence, there is reason to doubt whether the jury can make an informed decision. At the very least, medical expert witnesses should refer to the evidence Squier has laid out as they exercise their duty to summarise the range of professional opinion on the matter. Moreover, Squier's work seems to imply that expert witnesses would be justified in giving the opinion that the pathological Triad traditionally labelled Shaken Baby Syndrome is probably not caused by violence towards the child. Certainly, it is no longer tenable to express the opposite opinion as though it were true beyond a shadow of a doubt.

To the suggestion that new or stricter rules governing the conduct of expert witnesses are needed, I would reply that such innovation would be redundant since the duties of the expert witness are already explicit in principles set out by Justice Cresswell in 1993.⁶² The 'Cresswell principles' contain what is necessary to limit the role of the expert witness. They maintain that the expert witness is the servant of the court, must provide independent assistance to the court by way of evidence, and should disclose any material facts which undermine his opinion (*'Cresswell' Principles of Expert Evidence*, 2018; see also Brazier and Cave, 2016, p.247).⁶³ The problems raised by this case will not be solved by multiplying guidance and law, but by enforcing and abiding by what is already in place, and educating medical expert witness about the current state of evidence. It can be hoped that Squier's account will go some way towards achieving this. It is now the responsibility of medical professionals and organisations to act upon the evidence to which Waney Squier has drawn attention.

Conclusion

Squier's evidence and testimony suggest that it is high time that the medical profession re-evaluate its commitment to the Shaken Baby Syndrome hypothesis. The evidence which conflicts with current opinion on its aetiology is too great to ignore, as are its implications. If its aetiology can be called into question, then so can the testimony of the expert witnesses who taken it for granted,

⁶² In the *Ikarian Reefer* shipping case.

⁶³ Since 2011, expert witnesses no longer have full immunity (Brazier and Cave, 2016, p.246; see also Devaney, 2007).

as well as the verdict of the courts which have been informed by their opinion. Whatever may be the case, what Waney Squier has brought to light now gives the medical profession an opportunity to put its commitment to evidence-based medicine to the test, and thereby right some wrongs in both the textbooks and the courtroom.

References

- Brazier, M. and Cave, E. (2016) *Medicine, Patients and the Law*, Manchester University Press, Manchester.
- 'Cresswell' *Principles of Expert Evidence* (2018) available from <http://forensic-pc.com/documents/163584FAQ2.pdf> (accessed January 2018).
- Devaney, S. (2007) 'The loneliness of the expert witness', *Medical Law Review*, 15, 1, pp.116-25.
- Freemon, F. (2001) 'The origin of the medical expert witness', *Journal of Legal Medicine*, 22, 3, pp.349-73.
- General Medical Council (2013) 'Acting as a witness in legal proceedings', available at https://www.gmc-uk.org/static/documents/content/Acting_as_a_witness_in_legal_proceedings.pdf (accessed January 2018).
- Lynøe, N., Elinder, G., Hallberg, B., Rosén, M., Sundgren, P. and Eriksson, A. (2017) 'Insufficient evidence for 'shaken baby syndrome' - a systematic review', *Acta Paediatrica*, 106, 7, pp.1021-7.
- Magna Carta Project (2018) *1215 Magna Carta - Clause 39*, available at http://magnacarta.cmp.uea.ac.uk/read/magna_carta_1215/Clause_39 (accessed January 2018).
- Reiss, J. and Sprenger, J. (2014) 'Scientific objectivity', *Stanford Encyclopedia of Philosophy*, available at <https://plato.stanford.edu/entries/scientific-objectivity/> (accessed January 2018).
- Stephens, J. (1896) 'The growth of trial by jury in England', *Harvard Law Review*, 10, 3, pp.150-60.
- Tolles, F. (1998) 'William Penn: English Quaker leader and colonist', *Encyclopedia Britannica*, available at <https://www.britannica.com/biography/William-Penn-English-Quaker-leader-and-colonist#ref259823> (accessed January 2018).



RESPONSE PAPER

The role of the General Medical Council

Terence Stephenson

London Institute of Child Health, University College London

Contact: Ben.Pennington@gmc-uk.org

Professor Sir Terence Stephenson was president of the Royal College of Paediatrics and Child Health between 2009 and 2012. He was chair of the General Medical Council from January 2015 until December 2018.

The General Medical Council (GMC) is now doing more than ever to intervene earlier so that only those cases that really need to go to fitness to practice investigations actually go there. Putting aside our work with medical schools and employers, the GMC's core standards – *Good Medical Practice* (GMC, 2014) and accompanying explanatory guidance – are the bedrock of how we both protect patients and support doctors by clearly setting out what is expected of doctors in any given set of circumstances. Any doctor who follows this guidance has nothing to fear from the GMC.

Recent court proceedings, notably the hearings involving Waney Squier and her testimony in so-called 'shaken baby syndrome' cases, highlighted a number of important issues around the role of expert witnesses. Some reporting about these matters sought to characterise her fitness to practise case as concerned with the issue of whether the evidence she gave on the controversial topic of shaken baby syndrome was, or was not, 'correct'. This was not the case: instead, the fitness

to practise proceedings focused only on the way she gave expert evidence and her failure to fulfil her duties to the court and to meet the standards expected of an expert witness in a number of court cases.

The standards expected of doctors acting as expert witnesses are clearly set out in *Good Medical Practice* (see also Dyer, 2008), which summarises the obligations laid down by the courts on expert witnesses. *Good Medical Practice* makes clear that whether the expert witness is acting as a witness of fact or an expert witness, the expert witness has a duty to the court which overrides any other obligations to the person instructing or paying the expert witness.

The particular responsibilities of an expert witness include the duty to give expert testimony and opinions only about issues that are within the expert witness's professional competence or about which the expert witness has relevant knowledge, and to give an objective, unbiased opinion and be able to state the facts or assumptions on which it is based. An expert witness must not cite the work of others as supporting the expert witness's views when it does not. If the work is capable of doing so, but only with significant qualification, this must be admitted. It is important to be clear that, when giving evidence about matters which may be the subject of scientific controversy or debate, the role of the expert witness is, and remains, to help the court on specialist or technical matters that are within the expert witness's expertise.

As the High Court made clear in the Squier case, when there is a genuine disagreement on a scientific or medical issue or where it is necessary for one party to advance a particular hypothesis, an expert:

... who advances such a hypothesis owes a very heavy duty to explain to the court that what he is advancing is a hypothesis, that it is controversial (if it is) and to place before the court all the material which contradicts the hypothesis. Secondly, he must make all his material available to the other experts in the case. (cited in Mitting, 2016, para 34, 1)

When an expert witness speaks in a court of law, the expert witness's words carry immense weight. People who do not have a medical background, from judges to jurors, will rely on a doctor's advice and evidence to help them make decisions.

Any doctor who adheres to the courts' standards as an expert witness has nothing to fear from providing evidence-based opinion in the courts. That we receive so few complaints about expert witnesses is testimony to this. Since 2011, we have received only 15 referrals relating to expert witness activity by doctors – an average of three per year against the thousands of cases

heard that required doctors to provide expert testimony. Only two of these referrals became cases which went to tribunal.

The medical expertise that doctors bring to the judicial system is invaluable, and it is vital that doctors feel able to offer their services in this way. We cannot return to a climate in which doctors feel unable to contribute to the justice system. But, equally, the GMC would be derelict in its duties if we stood by and turned a blind eye to the core standards we, and the courts, expect of doctors in their professional lives. The new app we launched in December last year (General Medical Council, 2017) is one of a number of ways in which we are helping doctors to stay up to date with these standards. Any doctors who follow these standards have nothing to fear from their work being scrutinised. Our standards can and will support doctors when they appear as expert witnesses.

References

- Dyer, C. (2008) ,GMC issues guidance for expert witnesses', *BMJ*, 337, p.a989, 25 July.
- General Medical Council (2014) *Good Medical Practice*, GMC, Manchester, available at https://www.gmc-uk.org/-/media/documents/Good_medical_practice___English_1215.pdf_51527435.pdf (accessed July 2018).
- General Medical Council (2017) 'My GMP – ethical guidance app', available at <https://www.gmc-uk.org/home/ethical-guidance/my-gmp-app> (accessed July 2018).
- Mitting, J. (2016) *Judgment*, Squier v. GMC, 3 November, EWHC 2739 (Admin) available at <https://www.judiciary.gov.uk/wp-content/uploads/2016/11/squier-v-gmc-protected-approved-judgment-20160311-2.pdf> (accessed July 2018).



RESPONSE PAPER

When experts disagree

Stephen J. Watkins

Faculty of Public Health, Royal Colleges of Physicians

Contact: sjande.watkins@gmail.com

Stephen Watkins was a member of the council of the British Medical Association from 1991 to 2017, and Director of Public Health for Stockport until September 2018. He became Vice-President of the Faculty of Public Health of the Royal Colleges of Physicians in June 2018 and is Vice-President of Doctors in Unite (the medical practitioners' union). This paper presents his personal views and is based on a presentation given to the Manchester Medicolegal Society.

What happens in a court case when experts disagree? It occurs all the time and the answer is straightforward: the experts must act reasonably, trying to reach as much of a shared understanding as they can, and giving honest, balanced evidence. Then the judge of fact, be that the judge or a jury, must decide which view to accept.

But suppose that the question at issue is not the application of a shared body of knowledge to a difficult situation, but rather scientific truth itself? Should a jury decide scientific truth? Science does not advance because scientists are right. It advances because every true scientist has at the core of her soul a passionate belief that she might be wrong. The legal profession does not share this belief. It deals in certainties and in finality. Faced with scientific dissent, it believes the

dissenters are, at best, misguided. Otherwise, why would they deny what everybody in their discipline knows to be true?

Whether this approach is right and whether a jury should indeed be asked to decide scientific truth was the essence of the Court of Appeal decision in the *Cannings* case. The *Cannings* case was one of a number of miscarriages of justice which resulted from the widespread acceptance of the theory that multiple cot deaths occurred so rarely that it was likely they were hidden murders (see Frith, 2003). Not just likely enough to give rise to suspicion, but likely enough to be in itself a basis for conviction in the absence of a convincing alternative explanation.

This theory was wrong. I explained why it was wrong in an editorial in the *British Medical Journal*, discussing the case of Sally Clarke (Watkins, 2000). The theory is based on the proposition that highly unusual coincidences do not occur by chance, a mathematical fallacy disproved by every announcement of a lottery winner. Imagine an archery target with two arrows sticking in the very centre of it. This provides greater evidence of the archer's skill if the target is in place before the arrows are fired than if it is drawn around them afterwards. Probability theory requires calculation of the probability not only of the event in question, but also of all events that are as extreme or more extreme. When the target is drawn first, you calculate the chance of both arrows hitting the centre of the target. With two independent arrows, one probability is the square of the other. But when the target is drawn round the arrows afterwards, you calculate the chance of both arrows hitting the same point, whatever that point. There is, in fact, a wall full of arrows with the target drawn around the two that are closest together and the others ignored. Mathematical formulae for this situation often surprise people. For example, with only 23 people in a room, the odds are better than 50% that two of them have the same birthday. If cot deaths were random events, two cot deaths would occur in the same family somewhere in England once every seven years. But cot deaths are not random events. Recurrence rates are about five times the general rate, implying recurrence somewhere in England about once every year and a half.

Shortly after that editorial was published, the Royal Statistical Society also criticised the logic of the theory. It pointed out that you need to consider the relative probabilities of the different rare causes of recurrence. Even if all the recurrence rates in excess of random expectation were a result of covert murder, then for each individual there is still a 20% chance that the event was random. This is hardly a case for conviction 'beyond reasonable doubt'. Moreover, it is not true

that all the excess will be the result of covert murder. There are almost certainly other reasons for recurrence.

Yet, Sally Clarke was not the first woman to be convicted on the basis of this scientific theory. It is simply that, because she was a solicitor, her case attracted enough attention for the science to be the subject of debate. It still took years to secure the release of Sally Clarke. In the meantime, her health was so badly damaged that she died shortly after her release. In the meantime, another woman was imprisoned on the same fallacy. That woman was Angela Cannings. A third case, that of Trupti Patel, collapsed when the prosecution expert witness was sufficiently impressed by the scientific contention surrounding his theory that he felt obliged to draw attention to it. Had Roy Meadow not demonstrated such scientific integrity, it is probable that the series of miscarriages of justice would have continued.

This is now history. But what ought not to be history is the ruling of the court of appeal on Angela Cannings' appeal:

Whether there are one, two or even three deaths, the exclusion of currently known natural causes of infant death does not establish that the deaths resulted from the deliberate infliction of harm. That represents not only the legal principle which must be applied in any event, but, in addition, as we shall see, at the very least, it appears to us to coincide with the views of a reputable body of expert medical opinion. (Court of Appeal, 2004, para.13)

The Court of Appeal went on:

The trial, and this appeal, have proceeded in a most unusual context. Experts in many fields will acknowledge the possibility that later research may undermine the accepted wisdom of today. 'Never say never' is a phrase which we have heard in many different contexts from expert witnesses. That does not normally provide a basis for rejecting the expert evidence, or indeed for conjuring up fanciful doubts about the possible impact of future research. With unexplained infant deaths, however, as this judgment has demonstrated, in many important respects we are still at the frontiers of knowledge. Necessarily, further research is needed, and fortunately, thanks to the dedication of the medical profession, it is continuing. All this suggests that, for the time being, where a full investigation into two or more sudden unexplained infant deaths in the same family is followed by a serious disagreement between reputable experts about the cause of death, and a body of such expert opinion concludes that natural causes, whether explained or unexplained, cannot be excluded as a reasonable (and not a fanciful) possibility, the prosecution of a parent (or parents) for murder should not be started, or continued, unless there is additional cogent evidence, extraneous to the expert evidence, (such as we have exemplified in paragraph 10) which tends to support the conclusion that the infant, or where there is more than one death, one of the infants, was deliberately harmed. In cases like the present, if the outcome of the trial depends exclusively or almost exclusively on a serious disagreement between

distinguished and reputable experts, it will often be unwise, and therefore unsafe, to proceed. (Court of Appeal, 2004, para.178)

It has always seemed to me that the court was essentially saying in this paragraph that issues of scientific truth should not be left to the jury. If there is genuine scientific dissent, then it will be unsafe for the case to proceed. This must be reputable dissent, well founded on legitimate scientific evidence, and not fanciful. But a reputable body of opinion is not the same as a majority. In the Bolitho case, the House of Lords accepted as a reputable body of medical opinion a view held by only a handful of doctors (House of Lords, 1997). It did so because the small number of adherents to the body of opinion was outweighed by the strength of their careful analysis of the scientific evidence.

Waney Squier disagrees with the mainstream view that the Triad of bleeding in the retina, subdural haematoma and brain swelling is diagnostic of shaken baby syndrome. Is this disagreement an eccentric and fanciful view unreasonably asserted in the face of scientific knowledge, in which case the General Medical Council (GMC) may well have been right to proceed against her? Or is it a view firmly based on serious analysis and research which raises the real (not fanciful) possibility that the accepted scientific body of knowledge is wrong? Is that view shared by a reputable (albeit minority) body of opinion?

If it is the latter, you could take paragraph 178 of the Court of Appeal ruling in *Cannings*, replace the words ‘unexplained infant deaths’ in the first and fifth sentences with ‘shaken baby syndrome’, and the words ‘two or more sudden unexplained infant deaths in the same family’ with ‘an infant death demonstrating the Triad often associated with shaken baby syndrome’ and you have a clear legal basis for setting aside every conviction for shaken babies which is based primarily on the Triad.

So, what do we have here? An unreasonable eccentric properly restrained from confusing juries? Or a legitimate scientific dissenter improperly suppressed as she seeks to point out that (for the second time in less than two decades) we have had a series of miscarriages of justice involving the credulous acceptance of an unwarranted belief in a scientific theory? When I wrote my paper, ‘Science, justice and dissent’, for the *British Medical Journal*, I did not fully know the answer to this question. In what I have learned from the responses to that argument, it has become much clearer to me.

I am not an expert in this field, but I can recognise a sound argument, good (even if controversial) research and a reputable body of opinion. Over 100 doctors belong to Evidence Based Medicine and Science, an email group which challenges the concept of the Triad. George Nichols, the former state medical examiner of Kentucky, has told public defenders that if they have a case in which he had testified that somebody died as a result of shaken baby syndrome, he would like them to contact him so he can now testify for a reversal “as shaken baby syndrome is a belief system rather than an exercise in modern day science” (cited in Cenziper, 2015).

Sebastian Lucas of the department of histopathology at St Thomas’s Hospital in London has written to me saying:

I know most of the pathology players in the arena, both the doves (mostly female) and the hawks (mostly male) and, sadly, they hate each other.

How to progress? A dispassionate enquiry into the clinical science is obviously needed. There was one such attempt a few years ago at the RCPATH, chaired by the then president Peter Furness. All the players were present for a summit conference, but it achieved no real cross-understanding beyond the three bullet point summary in Wise’s article [see Furness, 2009; Crown Prosecution Service, 2011]. I was there when the pathologists emerged from the meeting, and one by one the doves came up to me and wept on my shoulder.

I fear that, until the present generation of pathologists who tackle these cases have moved on into retirement and a younger generation take over and learn on the job, nothing will change. But the controversy hardly encourages recruitment into this subspeciality. (personal correspondence)

Doctors in Unite (the medical practitioners’ union) have expressed concern at the case of Waney Squier. As a result of the case, the 2016 annual representative meeting of the British Medical Association adopted a resolution reiterating its call (first made at the time of the Sally Clarke affair) for an inquiry into the way the courts deal with scientific dissent. A group of doctors organised to express a considered view; a key expert who has changed his mind and wants to reverse the convictions he helped secure; an enquiry into the clinical science (organised by the relevant royal college) that collapses in disagreement; expressions of concern by professional bodies. I think that is sufficient to demonstrate that there is scientific dissent.

If we ask whether Squier should be permitted to give evidence, then we ask the wrong question. In the presence of such obvious and legitimate scientific dissent, she should not need to do so. To quote again the Court of Appeal (2004) in *Cannings*, “if the outcome of the trial depends

exclusively or almost exclusively on a serious disagreement between distinguished and reputable experts, it will often be unwise, and therefore unsafe, to proceed”.

By now, attention should have turned to other questions. First, trials for shaken baby syndrome based primarily on the Triad should not be proceeding. They should stop now. Secondly, and very importantly, we must address the miscarriages of justice that have already occurred. Thirdly, we must ask why it is that for the second time in two decades there has been a series of miscarriages of justice based on the uncritical acceptance of controversial scientific theories. On both occasions, the issue was child murder, understandable a highly emotional issue. But is the medical profession allowing emotion to cloud scientific judgement? Is the legal profession allowing its search for certainty to overshadow the doubts that exist in science?

Fourthly, we must ask why the GMC was unable to recognise the difference between evidence of legitimate scientific dissent and ordinary expert evidence. Waney Squier asks whether it was arrogance or complacency that led her not to realise the risk of referral to the GMC. There have indeed been both arrogance and complacency in this matter – not, though, on the part of Waney Squier.

References

- Cenziper, D. (2015) ‘Prosecutors build murder cases on disputed Shaken Baby Syndrome diagnosis’, *Washington Post*, 20 March.
- Court of Appeal (2004) *Judgment, Regina v. Angela Cannings*, EWCA, Criminal Division, 19 January, available at <http://www.familylawweek.co.uk/site.aspx?i=ed1654> (accessed March 2018).
- Crown Prosecution Service (2011) ‘Royal College of Pathologists, meeting 10 December 2009, conclusion - areas of agreement and disagreement’ in *Non Accidental Head Injury Cases (NAHI, formerly referred to as Shaken Baby Syndrome [SBS]) - Prosecution Approach - Annex C*, 6 January, available as <https://www.cps.gov.uk/legal-guidance/non-accidental-head-injury-cases-nahi-formerly-referred-shaken-baby-syndrome-sbs-2> (accessed March 2018).
- Frith, M. (2003) ‘Scientist's claim on cot death is flawed, Appeal Court hears’, *Independent*, 5 December.
- Furness, P. (2009) *Report of a Meeting on the Pathology of Traumatic Head Injury in Children*, 10 December, Royal College of Pathologists, London, available at <https://pdfs.semanticscholar.org/2b63/80c7bf51262e1ca7670e7676a419f2572c5f.pdf> (accessed March 2018).
- House of Lords (1997) *Judgments - Bolitho v. City and Hackney Health Authority*, 13 November, available at <https://publications.parliament.uk/pa/ld199798/ldjudgmt/jd971113/boli01.htm> (accessed March 2018).

- Watkins, S. (2000) 'Conviction by mathematical error? Doctors and lawyers should get probability theory right', *British Medical Journal*, 320, pp.2-3.
- Watkins, S. (2016) 'The law is not equipped to consider scientific dispute', *British Medical Journal*, 352, p.1768.



RESPONSE PAPER

The General Medical Council's handling of complaints: the Waney Squier case

Peter Wilmshurst

Royal Stoke University Hospital, Stoke-on-Trent, United Kingdom

Contact: peter.wilmshurst@tiscali.co.uk

Peter Wilmshurst is a consultant cardiologist. He is even better known as a doctor who has challenged the use of libel laws to prevent publication of medical research. Inevitably, he has crossed swords with the pharmaceutical industry. He also has experience of the disciplinary systems of the General Medical Council, in small part through an accusation of complicity in the concealment of murder, and in greater part through his requests that the GMC examine the behaviour of doctors who seem to have crossed ethical boundaries. Wilmshurst is a whistleblower who, according to an ex-editor of the British Medical Journal, is “now widely respected for what he has done to help clean up medicine” (Smith, 2012).

Introduction

I believe that when a national regulator is inconsistent in dealing with complaints and when statutory legal tribunals make decisions that appear to be arbitrary and politically motivated, we need to question whether justice is being served and whether the public is being protected.

Summary of the Squier case as it relates to my comments

I am not a lawyer. My understanding of the General Medical Council's (GMC's) handling of the complaint against Waney Squier is as follows. Squier is a consultant neuropathologist who provided expert opinion in legal cases. She questioned the mainstream hypothesis in one area in which she provided expert opinion - cases of alleged non-accidental head injury in babies or 'shaken baby syndrome'. The mainstream hypothesis is that a triad of subdural haemorrhage, retinal haemorrhage and encephalopathy in young children is absolutely specific and diagnostic of non-accidental head injury. I am not qualified to comment on this hypothesis.

Waney Squier once accepted the mainstream hypothesis, but she changed her opinion. Her questioning of this mainstream hypothesis in her legal opinions led her into dispute with some other experts and prosecutors. In April 2010, the National Policing Improvement Agency complained to the GMC about Squier. After preliminary legal challenges in 2014 and early 2015, the substantive hearing of the complaint before a Medical Practitioners Tribunal (MPT) started on 5 October 2015. It lasted until 21 March 2016. The MPT found Squier guilty of misconduct and dishonesty in some cases of alleged non-accidental head injury in which she provided expert opinion (Medical Practitioners Tribunal Service, 2016). No questions were raised about any other aspect of Squier's practice as a neuropathologist. The finding of dishonesty is critical in determining severity of sanctions by an MPT. The MPT struck Waney Squier off the medical register in March 2016.

In November 2016, at her appeal to the high court, Justice Mitting found that the MPT had made "a number of unsustainable findings of great consequence". (Mitting, 2016, para.9). He said "The MPT's first, and principal finding, about Dr Squier's evidence was in effect that she had committed an offence of perjury. This finding was unjust because of a serious irregularity in the (MPT) proceedings before it." (para.11). The MPT stated that Squier had expressed opinions beyond her competence, but Justice Mitting felt that, "The boundary line between a proper explanation of support or doubt and trespassing impermissibly outside the expertise of the witness

is imprecise and difficult to identify in any particular case” (para.17). With respect to the findings of dishonesty, Justice Mitting declared:

The MPT had applied a modified Ghosh ... test⁶⁴ and concluded that her acts and omissions were dishonest by the standard of ordinary and honest doctors and that she must have realised they were. ... There had never been a suggestion that Dr Squier had an ulterior purpose. It has always been accepted that her views were genuinely held. ... The MPT should have made no finding about dishonesty in this case. (Mitting, 2016, para.54)

In summary, Justice Mitting upheld Waney Squier’s appeal in part. He set aside some of the findings of fact and overturned findings of dishonesty, but determined that her fitness to practise was impaired because of misconduct. He directed that the order to suspend Squier from the medical register should be replaced by conditions imposed on her registration for three years. Many conditions on registration are administrative rather than greatly restrictive, but in this case they included a restriction that prevents Squier providing expert opinions for courts and tribunals (other than coroners’ courts). I wish to consider a number of issues arising from this case, but in particular the inconsistencies in the ways the GMC and the MPT service deal with doctors whose opinions are not mainstream; inconsistencies in the ways that the GMC deals with, and itself uses, expert witnesses; and inconsistencies in the ways that MPTs make findings of dishonesty and apply sanctions.

As a doctor, I have had dealings with the GMC in a number of ways. I have been reported to, and investigated by, the GMC twice; I have reported other doctors to the GMC for research and financial misconduct; I have sat in and listened to some GMC hearings in their entirety and I have read the transcripts of other cases; and I have been both a witness of opinion (expert witness) and a witness of fact for fitness to practice panels (renamed medical practitioners tribunals in 2015).⁶⁵

Complaints to the GMC

It is commonly said that an average doctor should expect to be reported to the GMC once in his or her career. Most complaints are dismissed at an early stage without investigation, and few of those

⁶⁴ The customary test for determining dishonesty (see *R v Ghosh*, 1982, EWCA Crim 2, available at <http://www.bailii.org/ew/cases/EWCA/Crim/1982/2.html>).

⁶⁵ In this paper, I refer to both fitness to practise panels and medical practitioners tribunals as tribunals.

investigated go to an MPT. In 2016, some 9140 complaints were received by the GMC; only 1451 (15.9%) were investigated and just 245 (2.7%) went to an MPT (General Medical Council, 2017).

When there are findings of misconduct without dishonesty at tribunals, it is unusual for a doctor to be removed from the medical register. The additional finding of dishonesty makes suspension or erasure much more likely. This is because the finding of dishonesty means that the tribunal determined there was a deliberate attempt to mislead or deceive, rather than error on the part of the doctor. Even when there is a finding of dishonesty, removal from the medical register is not always the sanction. It is reported that when there are findings of dishonesty, “doctors are less likely to be struck off than nurses (by the Nursing and Midwifery Council) or other healthcare professionals (by the Health and Care Professionals Council)” (Dyer, 2017).

Complaints about me to the GMC

I was reported to the GMC for the first time when I was the chairperson of the medical committee of a national governing body (Wilmshurst, 2007). On behalf of the committee, I reported that we had concerns that there had been misconduct in research from a UK institution. The research required injection of a radioactive isotope into patients with acute neurological illness. The GMC’s first action was to investigate me under its disparagement rule, which is intended to stop one doctor making malicious comments about another. The committee’s decision to express concern had been agreed unanimously, but no other committee member was investigated by the GMC. I pointed out that the disparagement rule conflicted with the GMC’s statement that if one doctor has concerns about the conduct of another doctor, he has a duty to raise the concerns.

The GMC dropped its investigation of me, but it took a lot of effort for me to persuade the GMC to examine the allegations from my committee. Even then, the GMC failed to investigate one of our most serious concerns, that the research had been falsified. The institution refused to allow the GMC access to the research data and the GMC did not use its legal powers to compel disclosure. Nevertheless, the GMC found that many of our concerns were justified, including the fact that the research had no ethics committee approval, no ARSAC approval for use of the isotope,⁶⁶ and there were no patient consent forms. The GMC accepted the word of senior doctors

⁶⁶ The [Administration of Radioactive Substances Advisory Committee](#) advises government on the certification of doctors and dentists who want to use radioactive medicinal products on people.

(including a professor and consultants) that they did not know they needed these approvals. I find this implausible. Some authors of the research informed the GMC that they had allowed themselves to be named as authors without having any involvement in the research, which was an admission of research misconduct. The GMC decided to take none of these senior doctors to a tribunal, but to issue ‘advice about future conduct’ – the GMC’s most lenient way of dealing with an allegation (besides exoneration).

The second occasion on which I was referred to the GMC arose from an allegation that I was complicit in concealment of a murder by my junior medical staff. A man aged 76, who was receiving palliative treatment for inoperable lung cancer, was admitted during the night with severe pneumonia. He died a few hours later, having told the junior staff that he did not want to be resuscitated. This was properly documented. I was the consultant physician on call, but I did not see the patient. His family alleged to the police and coroner that he had been poisoned, initially saying that nurses were responsible, but later claiming that junior doctors were. A forensic biochemist instructed by the coroner found no trace of poison. The coroner found that death was by natural causes (pneumonia and lung cancer). The family persisted in the claims that the man had been poisoned and reported two junior doctors to the GMC, alleging murder and accusing me of complicity in a cover up. Two years after the death, the GMC decided to take no action. During this time, the junior doctors were applying for new posts and were required to disclose that they were the subjects of a GMC investigation. This was likely to have affected their prospects of appointment.

My complaints about other doctors to the GMC

I have reported a number of doctors to the GMC, alleging research and/or financial misconduct. In many cases, but not all, my allegations have been found proved and the doctors have received sanctions, including removal from the medical register. I know that at every stage of the GMC’s disciplinary and fitness to practise processes there are major flaws. There are flaws at the assessment stage. In one case, I complained about a doctor and the GMC decided not to investigate my complaint. Two years later, the BBC broadcast a programme making allegations about the doctor’s conduct that mirrored my complaint. As a result of the BBC programme, the GMC did investigate and the doctor was struck off the medical register. I am concerned that patients may have suffered during the two years between my rejected complaint and the BBC programme. When

the GMC conducts an investigation, it is often flawed, as I have frequently found, most recently in relation to the migraine intervention with STARFlex technology (MIST) trial. I will use this as an example.

I was principal cardiologist in the MIST trial. Another member of the steering committee, Simon Nightingale, and I became concerned that the sponsor, NMT Medical, was applying pressure on the steering committee to misrepresent the trial results. The steering committee originally asked Nightingale and me to draft the paper, but the sponsor did not like what we wrote. A writing committee - consisting of the other three members of the steering committee (excluding Nightingale and me), one additional doctor and a vice president of NMT - was appointed by NMT. It wrote the final version of the paper (Dowson *et al.*, 2008). The final version of the paper that we were sent contained incorrect data and failed to disclose serious complications resulting from NMT's device. Simon Nightingale and I refused to be authors, and informed the other members of the steering committee by email that we could not accept authorship of false research.

The role of the vice president of NMT in writing the paper was not disclosed in the published paper, but it was confirmed by track changes in the draft paper and later at the tribunal faced by Andrew Dowson, the first author of the paper (Medical Practitioners Tribunal Service, 2014a). The tribunal also confirmed that Dowson had failed to disclose his own financial conflicts of interest, including ownership of shares in NMT and payments of £2,000 per week from NMT during the four years of clinical trial.⁶⁷

I reported the members of the writing committee to the GMC, alleging that they had colluded with NMT to publish inaccurate data. After the paper was published in *Circulation*, I wrote to the editor and pointed out errors and omissions in the paper (Dowson *et al.*, 2008). As a result, *Circulation* published online a 700-word correction, a new version of the paper and a data supplement (Dowson *et al.*, 2009; see also Wood, 2009). Simon Nightingale and I were not allowed to see the new version before it was published. The new version is still inaccurate.

After an initial investigation into my allegations of research misconduct, the GMC informed me that it would take no action because there was no evidence that the published research paper contained false data or that the author knew the data were false. I responded that a long correction and a new version of the paper had been published after the journal editor had been

⁶⁷ Another member of the writing committee and second author on the paper, Michael Mullen, did declare ownership of shares and payments from NMT.

informed that the paper contained false data, which obviously meant that the initial version was false. I also reminded the GMC that Nightingale and I had informed the steering committee members before publication that the data were false. The GMC reopened its investigation.

At the end of that reinvestigation, the GMC informed me that its expert on medical ethics had said that because the paper had been corrected and not retracted, the GMC could not take no action. The expert claimed that the GMC could act on allegations of research fraud only if a paper were retracted. I responded that the opinion of the GMC's expert on medical ethics was at variance with the way the GMC had dealt with allegations of research misconduct in other cases. I said that the GMC had struck Andrew Wakefield off the medical register and suspended Anjan Banerjee for research fraud, but their fraudulent research publications were not retracted until after tribunals had determined that they had falsified the research and had imposed sanctions (Wilmshurst, 2002, 2007). A cycle of the GMC finding reasons to drop the investigation and then reopening it after I had explained that its reasons were spurious went on from 2008 (when I first complained) until 2012.

Correspondence with the GMC caused me to become increasingly concerned about the reports of the GMC's expert on medical ethics. I had asked the GMC to investigate the four doctors on the writing committee, but I made specific allegations about individual doctors. The reports of the GMC's expert demonstrated that he was confused about which specific allegations were directed at which particular doctors, and about which doctors had made particular statements. The expert sent one report saying there was no evidence that a particular writing committee member had been trading in the sponsor's shares during the trial. I pointed out that I had accused other doctors of that, but not the one he had exonerated. The expert attributed to one doctor a statement in the *Times* newspaper made by - and clearly attributed in the *Times* - to a different doctor. The GMC's assistant registrar wrote admitting that the expert's "report is in places, contradictory and ambiguous". As a result, the assistant registrar identified potential flaws in the decisions of the GMC's case examiners, who relied on the expert's opinion.

Over a period of four years, the GMC made a number of other attempts to drop the case, but eventually decided to bring two of the four members of the writing committee before tribunals. They were Andrew Dowson and Michael Mullen, the first and second authors of the paper in *Circulation*. Both had owned shares in NMT during the MIST trial. They faced different charges because the GMC decided that a doctor should not be held responsible for collective decisions and

actions. This is a worrying decision because it limits the GMC's ability to act against doctors that conspire to commit misconduct. Often conspiracy to commit misconduct is more serious than action by a single individual. (I cannot imagine a law that prohibited a lone gunman robbing a bank, but not a group of gunmen.)

I was informed that Mullen's tribunal would be first - in October 2012. In the months preceding the tribunal, I informed the GMC that I was concerned it was trying to lose the case. I protested after the GMC said that it would not be calling Simon Nightingale and John Lilleyman, strategic adviser to the national research ethics service (NRES), as witnesses. Both had said they wished to give evidence.⁶⁸ When I arrived to give evidence on the first day of Mullen's tribunal, I was sent away because legal argument was taking place. I was told I would be notified when I was needed. Over the next seven weekdays, I was informed that the legal arguments continued. In the middle of the next week, I was informed that the GMC had dropped the case against Mullen. The reason was that the GMC had intended to call only two witnesses – their medical ethics expert and me. The GMC had expected me to be a witness of fact and also to provide a specialist opinion on the cardiac and medical issues in the MIST trial, which would have meant that I also had a role as a witness of opinion (ie, an expert witness). Michael Mullen's legal team, instructed by the medical protection society, objected to me being a witness of opinion for the obvious reason that I was not independent. I was the complainant. So, I was biased because I believed Mullen to be guilty. I entirely accepted this and so did the tribunal members (Medical Practitioner Tribunal Service, 2012). They determined that I could be a witness of fact, but not of opinion. Because the GMC had not arranged for any other witness of opinion on the cardiac issues, it was forced to drop the case against Mullen.

The second tribunal, hearing the case against Andrew Dowson, first author of the paper, started in October 2014. Before it started, I asked the GMC to confirm that it would be calling an expert cardiologist to be a witness of opinion rather than relying on my evidence. I assumed that I would be considered biased and barred from being a witness of opinion. I also asked whether it would be calling Simon Nightingale, John Lilleyman and a patient who had written to the GMC complaining about the conduct of Dowson during the research. It transpired that the GMC had not

⁶⁸ NRES was, at the time of the MIST trial, responsible for all research ethics committees in the UK. It has since been replaced by the health research authority.

instructed a cardiologist expert and I was asked to be both a witness of fact and a witness of opinion yet again. I expected a repeat of the farce which resulted in the GMC abandoning the Mullen case. Dowson's legal team, which was also instructed by the medical protection society, did not challenge me as a witness of opinion. It had appointed a cardiologist as its expert. It is pertinent to Waney Squier's case that the tribunal:

... found his evidence on the reporting of equivocal findings and on the statistical plausibility of (certain) findings to be less cogent and persuasive. It noted that these matters fell outside his specific areas of clinical expertise and it accorded them less weight" (Medical Practitioners Tribunal Service, 2015a).

As far as I am aware, he has not been referred to the GMC for straying outside his area of expertise.

Andrew Dowson's tribunal hearing lasted almost four months. He was found guilty of multiple charges of misconduct, including two findings of dishonesty, and was suspended from the medical register for four months (Medical Practitioners Tribunal Service, 2015b). One charge of misconduct was found not proved because the GMC had not called as witness for cross-examination any representative from the national research ethics service or its successor, the health research authority. I believe that if John Lilleyman had been called, as he and I wanted, that charge could have been examined properly.

Andrew Dowson appealed to the high court. In November 2015, Justice Edis upheld the findings of dishonesty and Dowson's suspension from the medical register. (MPTS, 2015c). The suspension of Dowson for only four months and the fact that the GMC did not ask for, and the tribunal did not impose, any conditions preventing him conducting clinical research in the future are strange because this appearance before a tribunal was not Dowson's first. In March 2004, Dowson (who was then, and is still, director of headache services at King's College Hospital) was found to have entered false clinical findings (such as blood pressure and pulse) on clinical record forms of patients he claimed to have seen in a migraine trial sponsored by Allergan, the pharmaceutical company, when he had not (Medical Practitioners Tribunal Service, 2015a). He signed the forms to certify they were a true record. He was the principal investigator in that multi-centre trial. The northern and Yorkshire multi-centre research ethics committee that approved the Allergan trial was notified. The committee informed Dowson that he was not fit to be a trial principal investigator, suspended its favourable opinion (ie, ethics approval) of the trial pending

replacement of Dowson as principal investigator, and referred him to the GMC.⁶⁹ In 2006, a tribunal found that Dowson was guilty of misconduct in the Allergan-sponsored research and placed conditions on his registration.

The 2014 tribunal found that Dowson's misconduct and dishonesty in the MIST trial had started in September 2004 (six months after he was reported to the GMC for misconduct in the earlier Allergan migraine trial) (Medical Practitioners Tribunal Service, 2015a). His misconduct continued after the 2006 tribunal finding of misconduct, when he had conditions imposed on his registration. Because Dowson had committed research misconduct repeatedly over a number of years and because some offences were judged to be dishonest, I was surprised by the brevity of the period of his suspension from the medical register.

One of the charges of misconduct found proved at the 2014 tribunal was that, after the 2006 tribunal findings, Andrew Dowson did not inform the West Midlands multi-centre research ethics committee (which approved the MIST trial) or Simon Nightingale or me that the GMC had found him guilty of misconduct in the earlier Allergan trial. The 2014 tribunal noted that he had sought advice about this from the medical protection society, which advised him that concealing the findings of the 2006 tribunal from the West Midlands multi-centre research ethics committee and from co-researchers was acceptable. The 2014 tribunal disagreed (Medical Practitioners Tribunal Service, 2015a). During the four months of Andrew Dowson's suspension, I informed the GMC that he had continued as a member of the medical advisory board of migraine action (a medical charity). The GMC responded that it had no objection to him sitting on the medical advisory board during his suspension. This raises the question of what suspension from medical practice means.

In summary, I found numerous flaws in the way the GMC investigated my complaints of misconduct in the MIST trial, and how it managed the prosecution of charged doctors. The GMC used experts who made obvious errors. The GMC wanted me to be a witness of opinion in related cases against Mullen and Dowson when, as the complainant, I was biased. The tribunal in Mullen's case excluded me from testifying as a witness of opinion on the cardiac issues because of my bias, but I was permitted to provide an opinion on the same issues by the tribunal in Dowson's case. Despite Andrew Dowson having been found guilty of research misconduct, the findings of

⁶⁹ This research was unconnected with the MIST trial.

dishonesty resulted in only a short suspension and no restriction on him undertaking future research.

Experience as an expert witness in court

I have provided expert medical opinion to the courts (coroner's inquests, civil cases and one criminal case). All experts in legal cases are required to confirm that their overriding duty is to provide the court with unbiased opinion, and that this duty overrides any obligation to those who have instructed them and will pay their fees. One might imagine that this would result in evidence-based expert opinion so that experts would be in agreement on any particular point.

Lawyers working in a particular field know the ways in which different experts in the field are likely to interpret findings. So, where possible, lawyers pick experts who hold opinions likely to benefit their client's case. Experts are also human and may be influenced by association with their client's legal advisers, who they will speak to at case conferences and on the telephone. In some cases, lawyers can obtain an expert opinion and not use it if it does not help their client's case - and they are not always required to disclose the discarded expert opinion to the other side. As a result, in many cases, opposing parties have 'objective' experts whose opinions are entirely at variance.

The GMC's approach to incorrect opinions

Before the case of Waney Squier, I had never heard of an instance where a medical expert in a legal case was subject to a disciplinary hearing by the GMC because the opinion the expert expressed were considered wrong. Intellectual conflicts over interpretation of scientific and medical findings are as old as science and medicine, but two things that I know of medicine are pertinent. One is that it is a mistake to believe that a particular finding is always, or is never, associated with a particular disease. From our earliest days in medical school, we are taught that there are always exceptions, even if they are very rare. The second is that, as medical science advances, we are forced to discard mainstream hypotheses that are found to be incorrect. If every challenge to mainstream hypothesis were met with GMC sanctions, medical science and patient care would not advance. Whether an old medical hypothesis should be replaced by a new is

generally decided by consensus based on good evidence, but the process can be delayed when opinion leaders and learned societies are slow to accept new evidence.

When a court hears conflicting opinions from expert witnesses, the judge or jury must decide which opinion to accept. The reasons for preferring one expert's opinion may be given in the judgment, but are not always clear. I was involved in a civil case as an expert for the defence. The claimant's expert and I disagreed about some issues. At the judge's request, we met to produce a joint report. We outlined our agreements and disagreements. We agreed that one scenario should be rejected, but perversely the judge surprised us both by deciding that was what had happened. Whatever one thinks of the adversarial legal system in England, it allows many factors to influence the judgment. So, even if a judgement is wrong, there will have been the opportunity to explore other options. If the court arrives at an incorrect verdict, the fault is not that of an expert witness alone. The lawyers who cross-examine the expert, the judge and the jury must share blame for the flawed verdict.

The GMC's case against Waney Squier is, I think, unique. I do not know of another case in which the GMC has determined that the views espoused by a doctor are so seriously flawed that they should result in the doctor being removed from the medical register. The GMC has failed to strike off doctors even when they had been providing spurious clinical advice directly to desperate patients. In such a case, the patient must reach a decision about treatment without any of the additional, independent, objective guidance available in a court. Blame for the patient receiving inappropriate treatment rests entirely on the authoritative doctor and the gullible patient bears no part of the blame. Yet, the GMC treats such doctors more leniently than it did Waney Squier.

Mainstream medicine states that there is no theoretical basis for homeopathy and no good evidence of clinical benefit beyond the psychological benefit to a patient of spending time with a doctor discussing the patient's illness. Some might argue that homeopathy does no direct harm, but if faith in homeopathy prevents a patient receiving beneficial treatment, the patient may well suffer harm. Yet, the GMC has taken no action against any doctor treating patients with homeopathic medicine. There are more serious examples.

In 2014, a fitness to practise panel found that Julian Kenyon was guilty of misconduct for use of, so called 'sono photo dynamic therapy' (SPDT) on patients with inoperable cancers

(Medical Practitioners Tribunal Service, 2014b).⁷⁰ Kenyon charged desperate patients many thousands of pounds for treatment (in one case £9000) that an oncology expert testified had no proven benefit. He admitted telling a terminally-ill patient, and an undercover *Sunday Times* journalist purporting to be the husband of a terminally-ill patient, that SPDT produced an 80% reduction in tumor bulk, that in 10% of patients the treatment produced a complete response equating to a cure, and that in those not cured there was a strong possibility that median survival time would be increased. There is no evidence supporting these claims. The medical practitioners tribunal found that he had “made highly significant misleading statements to a vulnerable and terminally ill patient and also to someone who (he) believed to be the husband of another vulnerable patient.” The tribunal found Kenyon guilty of misconduct.

There is no evidence that SPDT works and no theoretical reason why this treatment would help patients. There were separate concerns about the way Julian Kenyon acquired some of the equipment. The medicines and healthcare products regulatory agency (MHRA) informed the GMC that it is an offence in the UK to supply the equipment used by Kenyon, but he had imported the equipment and it is not an offence to use it. So, the MHRA had no powers to seize the equipment despite having concerns about its safety and suitability. Trading standards were reportedly also concerned that Kenyon’s advertising claims breached the Cancer Act. The GMC did not even consider some of the other unproven treatments Kenyon used. Having found Kenyon guilty of misconduct and of making misleading claims, the tribunal did not find him to be dishonest or remove him from the medical register.

Whether there is dishonesty is based on satisfying the Ghosh test, which originally applied in criminal law but is named after a surgeon convicted of fraud in 1982 (Ghosh versus Regina, 1982). As laid down by the appeal court, the two-limbed Ghosh test for dishonesty in criminal trials states:

A jury must first of all decide whether according to the ordinary standards of reasonable and honest people what was done was dishonest. ... If it was dishonest by those standards, then the jury must consider whether the defendant himself must have realised that what he was doing was by those standards dishonest.

⁷⁰ SPDT is not photo dynamic therapy, which is an entirely different and established treatment for cancer. The similarities in name may mislead patients.

Effectively, this has been modified to change the words ‘honest people’ to ‘honest doctors’ and ‘jury’ to ‘tribunal’. The second limb of the test fails if the tribunal believes that the doctor did not know that what he did was dishonest and did not think that other doctors would consider it to be dishonest. Often forgotten is the next sentence of the judgment:

In most cases, where the actions are obviously dishonest by ordinary standards, there will be no doubt about it. It will be obvious that the defendant himself knew that he was acting dishonestly.”

In my opinion, the GMC has allowed doctors, whose behaviour most people would believe to be grossly dishonest, to claim that they did not think it was dishonest and did not think others would consider it dishonest, to escape a finding of dishonesty. Applying the Ghosh test, the tribunal was satisfied that Kenyon believed this bogus treatment worked and accordingly decided that he was not dishonest. The tribunal merely placed conditions on Kenyon’s registration for one year, conditions which actually allowed him to continue using SPDT under certain conditions, including providing a quarterly log of the use of SPDT to the GMC.

It is clear that Waney Squier genuinely believes that the mainstream hypothesis of the link between the Triad and non-accidental head injury is wrong. Therefore, even if she is mistaken, there is no justification for the finding of dishonesty. Even if she is mistaken, her holding this opinion is less likely to harm patients than the mistaken opinions of many other doctors. I contrast the GMC’s response to Squier stating opinions that may or may not be incorrect (I cannot judge) with the GMC’s inadequate response to doctors who propagate patently false medical research which has the potential to harm many patients, and who do so knowing it to be false.

I reported Anjan Banerjee and Timothy Peters to the GMC, which found that they had been publishing false research. Banerjee was suspended from the medical register for one year, but Peters, associate dean for postgraduate medical education at London University, received only a severe reprimand and returned to work (Wilmshurst, 2007). The GMC found that Richard Eastell, research dean of Sheffield medical school, had published false statements in research publications, but decided not even to issue a warning because this would have a detrimental effect on his ability to secure future funding for his research (General Medical Council, 2009). David Hurlestone, award-winning bowel cancer researcher and consultant, received only three months’ suspension from the medical register for dishonesty in three research studies (General Medical Council, 2010).

The severity with which the GMC treated Waney Squier for expressing sincerely-held opinions that were not mainstream contrasts greatly with the lenient treatment of dishonest senior doctors who falsified research and knew what they published was false. Doctors can give patients bogus treatments if the doctor believes in the treatments or claims to believe in them, but if a doctor deviates from an established dogma and upsets a politically powerful group, the GMC will come down hard on the doctor.

References

- Dowson, A., Mullen, M., Peatfield, R., Muir, K. *et al.* (2008) 'Migraine intervention with STARFlex technology (MIST) trial: a prospective, multicenter, double-blind, sham-controlled trial to evaluate the effectiveness of patent foramen ovale closure with STARFlex septal repair implant to resolve refractory migraine headache', *Circulation*, 117, pp.1397-404.
- Dowson, A., Mullen, M., Peatfield, R., Muir, K. *et al.* (2009) 'Correction', *Circulation*, 120, pp e71-2, available at <http://circ.ahajournals.org/cgi/content/full/circulationaha;120/9/e71> (accessed March 2018).
- Dyer, C. (2017) 'Doctors are less likely to be struck off for dishonesty than other health workers', *British Medical Journal*, 359, p.j5184.
- General Medical Council (2009) 'Determination: Dr Richard Eastell', Fitness to Practise Panel, GMC, Manchester, 5 November.
- General Medical Council (2010) 'Determination: Dr David Hurlstone', Fitness to Practise Panel, GMC, 21 January.
- General Medical Council (2017) *Working with Doctors, Working for Patients: our Annual Report 2016*, GMC, Manchester.
- Ghosh *versus* Regina (1982) *Judgment*, EWCA Crim 2 (05 April) available at <http://www.bailii.org/ew/cases/EWCA/Crim/1982/2.html> (accessed March 2018).
- Medical Practitioners Tribunal Service (2012) 'Determination: admissibility of evidence to practise panel: hearing commencing 22 October: Dr Michael Mullen (3273049)', MPTS, Manchester.
- Medical Practitioners Tribunal Service (2014a) 'Transcript: case of Andrew John Dowson', Fitness to Practise Panel (Misconduct), MPTS, Manchester, 4 December.
- Medical Practitioners Tribunal Service (2014b) 'Record of determination: Dr Julian Norman Kenyon (1467655)', Public Record, MPTS, Manchester, 9 December.
- Medical Practitioners Tribunal Service (2015a) 'Determination on the facts: hearing commencing 29 October 2014: Dr Andrew John Dowson (2953399)', Fitness to Practise Panel, MPTS, Manchester.
- Medical Practitioners Tribunal Service (2015b) 'Determination on sanction: hearing commencing 29 October 2014: Dr Andrew John Dowson (2953399)', Fitness to Practise Panel, MPTS, Manchester.
- Medical Practitioners Tribunal Service (2015c) *Dr Dowson v The General Medical Council*, EWHC 3379 (Admin), Appeals Circular A24/15, MPTS, Manchester, 18 December.

- Medical Practitioners Tribunal Service (2016) 'Determination on facts, Dr Waney Marian Valerie Squier (1555161)' MPTS, Manchester, 11 March, available at www.insidejusticeuk.com/pdf/mpts-determination-of-facts.pdf (accessed March 2018).
- Mitting, J. (2016) *Approved Judgment*, Squier versus GMC, EWHC 2739 (Admin), 3 November.
- Smith, R. (2012) 'Richard Smith: a successful and cheerful whistleblower', *British Medical Journal*, blog, 10 October, available at <http://blogs.bmj.com/bmj/2012/10/10/richard-smith-a-successful-and-cheerful-whistleblower/> (accessed March 2018).
- Wilmshurst, P. (2002) 'Institutional corruption in medicine', *British Medical Journal*, 325, 23 November, pp.1232-5.
- Wilmshurst, P. (2007) 'Dishonesty in medical research', *Medico-Legal Journal*, 75, pp.3-12.
- Wood, S. (2009) 'MIST correction published; no new information on disputed echo review for PFO/migraine trial', *Medscape*, 10 September, available at www.medscape.com/viewarticle/708718 (accessed March 2018).