Miscarriage by Expert

Justice Susan Glazebrook, DNZM[1]

Lies, damned lies, and statistics[2]

I would like to start by telling a story. The story is about Sally Clark, a British solicitor, married to Stephen, also a lawyer. The couple's first son, Christopher, died suddenly in December 1996. He was just under three months old. A post-mortem by a Home Office pathologist, Dr Alan Williams, concluded that Christopher had died of natural causes, probably of what is colloquially known as cot death but is more technically called sudden infant death syndrome or "SIDS".

Sally gave birth to her second son, Harry, in November 1997. In January 1998 Harry was also found dead. He was just under eight weeks old. A post-mortem was conducted by Dr Williams, the same Home Office pathologist as for Christopher's death. Harry's death led him to reconsider his conclusions about Christopher. His new view was that both Christopher and Harry had died as a result of child abuse.

Sally had been home alone with both boys when they died. A month later she was arrested and charged with their murder. At her trial a number of highly qualified medical experts gave evidence. The medical evidence was complex but, in essence, the experts called by the prosecution considered that both deaths were caused deliberately, either by shaking or smothering the babies. The experts called by the defence said that the evidence was not conclusive and that the causes of the deaths were simply unclear. There was evidence of trauma in both boys but that could have been related to the attempts to resuscitate them.

One of the witnesses for the prosecution was a well regarded paediatrician, Professor Sir Roy Meadow. He was, at the time of the trial, writing a preface to the report of a panel appointed to investigate the causes of SIDS in the United Kingdom. Based on figures he took from that

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[1] Judge of the Supreme Court of New Zealand. The views expressed in this paper are my own and not necessarily those of the Supreme Court. The paper was presented at the Commonwealth Magistrates' and Judges' Association Triennial Conference on 17 September 2015 in Wellington, New Zealand. Thanks to my clerk, Andrew Row, for his invaluable assistance with this paper. All the case studies mentioned in this paper have occurred outside New Zealand. I am not to be seen as suggesting that there have been are no miscarriages of justice in New Zealand. Overseas cases have been chosen to avoid discussion of New Zealand cases that could eventually come before the Supreme Court.

[2] The phrase is of uncertain origin but was popularised, at least in the United States, by Mark Twain.

report, Professor Meadow's evidence was that the chance of two children from an affluent non-smoking family like the Clarks dying of SIDS was one-in-73 million. In his evidence he apparently likened the probability to the chances of backing an 80-to-one outsider in the Grand National[3] four years running and winning each time.[4]

Sally was convicted of the murder of both boys and went to prison. Her first appeal against conviction was unsuccessful.[5] While some issue was taken in that first appeal with the accuracy of Professor Meadow's statistical evidence given at trial, the Court dismissed these errors as incapable of affecting the safety of the convictions.[6] The Court stated that "the trial was not about statistics" and that out of a 170 page summing up, only two or three pages dealt with the statistics. As a result, even if there had been a statistical error at the trial, there was an "overwhelming case against the appellant" and "in the context of the trial as a whole, the point on statistics was of minimal significance". The Court concluded that "there is no possibility of the jury having been misled so as to reach verdicts that they might not otherwise have reached".[7]

After the first appeal it came to light that microbiological tests had revealed that Sally's second son, Harry, had a colonisation of staphylococcus aureus bacteria at the time of his death. That had been known by Dr Williams, the Home Office Pathologist, since February 1998 but had not been disclosed to the defence or to any of the other medical witnesses. It had come to light only through the efforts of a lawyer who had not been satisfied with the verdict and who was acting pro bono for Sally.

This new evidence led to a review by the Criminal Cases Review Commission and a second appeal. That second appeal in 2003 was successful. The Court of Appeal said that, since there was evidence that was not before the jury that might have caused the jury to reach a different verdict on the count in respect of Harry, that verdict was unsafe and had to be

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3 A famous horse race held annually in Liverpool, England.

4 See *R v Clark* [2003] EWCA Crim 1020, [2003] All ER (D) 223 [*R v Clarke* (second appeal)] at [99].

5 *R v Clark* (2000) WL 1421196 (CA) [*R v Clarke* (first appeal)].

6 Vincent Scheurer, in an article "Convicted on statistics?" (available at <www.understandinguncertainty.org>), says that, to the outside observer, the medical evidence in Sally Clark's trial was extremely complicated. There were a number of different medical issues debated by some nine specialists who reached different and contradictory conclusions. He suggests that what is striking about the case is that "within the sea of complexity, the staggering figure of one in 73 million stands out like a beacon of simplicity. Unfortunately for Sally Clark, far from being a lighthouse to the truth this figure managed the feat of being both irrelevant and wrong."

7 *R v Clark* (first appeal), above n 5, at [256].

quashed.[8] As a result, the Court said that no safe conclusion could be reached that Christopher was killed unnaturally.[9] Sally was freed from prison, after an incarceration of over three years.

Her experience had, however, left Sally with major psychological and alcohol problems,[10] and she died on 16 March 2007 of accidental acute alcohol poisoning, aged 42. Her third son was then aged only eight. Sally's case prompted a review of a number of other cases by the Attorney-General which resulted in other convictions being overturned.[11]

It is probably true to say that, although the existence of the bacteria was the main reason for allowing the appeal, it is the statistical evidence given by Professor Meadow that became the focus of concern about this case.[12] It is therefore worth looking at how Professor Meadow calculated his odds. He started with the proposition that, for a family like the Clarks,[13] the probability of a single SIDS death was one in 8,543. He calculated the probability of two SIDS deaths in the same family as around one in 73 million, that being 8,543 times 8,543.

So why was he in error? The first mistake was that Professor Meadow's probability calculation methodology would only have been valid on the assumption that two SIDS deaths in the same family are independent of each other.[14] There are very strong reasons for supposing that assumption is false. There may well be unknown genetic or environmental factors that predispose families to SIDS so that a second case within a family that has already suffered a SIDS death is much more likely than would be the case in another apparently similar family.[15]

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8 *R v Clark* (second appeal), above n 4, at [134].

9 At [135].

10 Sally had post-natal depression and alcohol issues after Christopher's death but she had been in recovery by the time Harry was born: see "Obituary of Sally Clark" *The Telegraph* (online ed, 19 March 2007). It appears that evidence of Sally's issues with alcohol and depression was put before the jury: see *R v Clarke* (first appeal), above n 5, at [141].

11 See further Mark Townsend "Shaken baby convictions will stand" *The Guardian* (online ed, 12 February 2006).

12 In 2001, the Royal Statistical Society issued a statement relating to the issues in the Sally Clark case: Royal Statistical Society "Royal Statistical Society concerned by issues raised in Sally Clark case" (press release, 23 October 2001). See also Ray Hill "Multiple sudden infant deaths – coincidence or beyond coincidence?" (2004) 18 Paediatric and Perinatal Epidemiology 320. The Royal Statistical Society now has a "Statistics and the Law Working Group" which produced four practitioner guides between 2010 and 2014 to assist practitioners in communicating and interpreting statistical evidence in the administration of criminal justice. The guides are available at <www.rss.org.uk>.

13 A non-smoking household, with at least one waged income in the household, and the mother 27 years or older.

14 Hill, above n 12, at 325.

15 At 321–323.

Second, there is a real danger that the jury committed a statistical error known as the "prosecutor's fallacy". This fallacy consists of first showing that the "innocent" explanation for certain facts is highly improbable and then deducing guilt from that.[16] That is the wrong approach. The relevant question is whether it is more likely that the deaths were natural than that they were deliberate.

Professor Meadow should have assessed the probability of the alternative explanations – that the boys were victims of SIDS or that the deaths were caused by rare but natural causes missed by the pathologist performing the autopsies – and compared these explanations with the probability that a mother like Sally had murdered her first two children. Double murders by natural parents are very unusual and, indeed, one may think likely to be rarer than double SIDS.[17] If all this is taken into account, the probability of Sally's innocence was in fact quite high.

In any event (and the third error), the probability of a child dying from SIDS from a family like the Clarks was in fact one in 1,300 and not one in 8,543.[18] Professor Meadow had ignored a major risk factor for SIDS: the fact that both of the Clark babies were boys.

In the meantime, what are the lessons we can take from this tragic saga? The first is that Professor Meadow was not a statistician. Nevertheless he was allowed to give statistical evidence in front of the jury. His evidence was not seriously challenged by defence counsel at trial and no contrary evidence was called from a defence statistician.[19] Further, the first appeal was unsuccessful, despite the statistical errors being brought to the Court's attention. So can Professor Meadow really carry all the blame?[20] Or should the criminal justice system itself shoulder a large part of it?

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16 At 325.

17 At 321–323.

18 At 324–325.

19 In the first appeal, the Court of Appeal noted there had been no assistance from a medical statistician for either side: see *R v Clark* (first appeal), above n 5, at [120].

20 Professor Meadow in fact was struck off the Medical Register by the General Medical Council in 2005 for serious misconduct in relation to Sally's case but reinstated in 2006 after he appealed. In *General Medical Council v Meadow* [2006] EWCA 1390, Auld LJ commented that, when assessing the culpability of an expert witness accused of misconduct, all the circumstances must be considered including the emotional strain of testifying: "Not least … should be an appreciation of the isolation of an expert witness, however seasoned in the role, in the alien confines of the witness box in an adversarial contest over which the judge and the lawyers hold sway." Dr Alan Williams, the Home Office Pathologist who conducted the post-mortem examinations on both the Clark babies, also suffered consequences. He was banned from Home Office pathology work and coroner's cases for three years. The decision was upheld by the High Court. Those consequences to the doctors involved are obviously nothing like the trauma that Sally Clark

It seems to me that it is is up to us as judges to ensure that expert witnesses stick to their areas of expertise. Statistical evidence should only be presented by those qualified to do so. This will not only be statisticians, of course, as many scientists (and especially forensic scientists) will be familiar with the particular statistical techniques and probabilistic assessments in their field of expertise.

The second lesson is to ensure that we as judges have a basic understanding of probability and statistics and their uses and limitations. And that we encourage the counsel who appear in our courts to do the same.[21]

The third is to ensure that, when statistical evidence is presented to a jury (or indeed to a judge alone in judge alone trials), it is presented in as simple a manner as possible and that it is properly explained, including the assumptions on which it is based and any qualifications to the evidence.

As judges, we need to make sure that vague phrases such as "consistent with", "cannot be excluded" and "could have come from" are explained. "Consistent with" for example usually seems to mean "not inconsistent with" and this concept is often useless unless the alternative explanations are also considered.[22] As the Sally Clark story illustrates, even if an outcome is unlikely assuming innocence, it could conceivably be even more unlikely assuming guilt.

None of this is to suggest that statistical and probability evidence is not good evidence. Of course good statistical and probability evidence is very often the best evidence. Indeed, such evidence is becoming more and more important in our courts, DNA evidence being the most prominent example of this. And statistics can also provide real assistance for other types of evidence, such as shoeprint and glass fragment evidence by comparing, in statistical and probability terms, the likelihood of a guilty and innocent explanation for possible matches (often referred to as the "likelihood ratio").[23] This type of evidence can be much more meaningful and fairer than assertions by experts of matches.

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and her family suffered by her being wrongfully sent to prison or to the subsequent tragedy of her death but their professional (and probably personal) lives must have been adversely affected.

21 The Royal Statistical Society's Practitioner Guides, described above at n 12, are a useful tool in this regard.

22 See Colin Aitken, Paul Roberts and Graham Jackson "Practitioner Guide No 1: Fundamentals of Probability and Statistical Evidence in Criminal Proceedings – *Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses*" (Royal Statistical Society, 2010) at 60–62.

23 See at 59. See also Graham Jackson, Colin Aitken and Paul Roberts "Practitioner Guide No 4: Case Assessment and Interpretation of Expert Evidence – *Guidance for Judges, Lawyers, Forensic Scientists and Expert Witnesses*" (Royal Statistical Society, 2014) at 38–39.

It is not just in trials that statistics can provide assistance. For example, risk assessment tools have been shown to provide better (although not perfect) predictions of the risk of recidivism than unstructured clinical judgement.[24] Statistics can thus play a role in sentencing and, of course, we must never forget the DNA exonerations that have occurred in recent years.

Murder of Dorothy Wood

To my next case study, which occurred in May 1996. Mrs Dorothy Wood, a frail, arthritic and totally deaf 94 year old woman, was asleep at her home in Huddersfield, England. In the early hours of the morning, an intruder, by means of a jemmy or screwdriver, forced open a small transom window[25] above her bed, scrambled through it and suffocated Mrs Wood with her pillow. Suspicion fell on Mark Dallagher. Mr Dallagher was, as one of my colleagues is wont to say, a rather unsatisfactory chap. In addition to living close to Mrs Wood, Mr Dallagher was a serial burglar and he frequently effected entry through a transom window.

The Police found ear prints on the glass immediately below the transom window during the course of their scene examination. These were examined by two experts and compared with control prints provided by Mr Dallagher and others. They reported a match with Mr Dallagher's ear prints and he was duly arrested, tried and found guilty of murder in 1998.[26] It is fair to say that the main evidence relied on by the prosecution at trial was the ear print evidence and it appears from news reports that this was the first time ear print identification had been used successfully in evidence in England.[27]

The first ear print expert at trial was a Dutch police officer who had specialised in ear print identification for some ten years but without formal qualifications or training. The second expert was a forensic science professor. Both experts agreed at trial that the technique was in its infancy and that it would be useful if further research was done. But this did not stop them proffering their opinions. The Dutch police officer testified that he was "absolutely

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24 See generally S Glazebrook "Risky business: Predicting recidivism" (2010) 17 Psychiatry, Psychology and Law 88.

25 A transom window is a window above the transom of a door or larger window.

26 There was other evidence at trial. Mr Dallagher's history of burglaries was admitted as similar fact or propensity evidence and there was a jailhouse confession. According to the informant, Mr Dallagher revealed information about the killing, and in particular, about the use of the pillow; information which was not known to the general public: *R v Dallagher* [2002] EWCA Crim 1903, [2003] 1 Cr App R 12 at [3].

27 See for example, "Ear print catches murderer" (15 December 1998) BBC <www.news.bbc.co.uk>.

convinced" that the ear print was Mr Dallagher's. The Professor said it was highly likely to be Mr Dallagher's ear print, although but he could not be 100 per cent satisfied. No challenge to the admissibility of the evidence was made by the defence at trial.

In 2002, four years after being convicted, Mr Dallagher successfully appealed[28] on the basis that ear print evidence, in the current state of knowledge, could not safely be used to identify a suspect.[29] And in 2004, DNA obtained from the ear print excluded Mr Dallagher as the source of the ear print.[30] The Crown then abandoned the prosecution.

So what lessons do we take from this case? The first is that, even if there is not a challenge to the admissibility of evidence, the courts should take care, in cases of novel science in particular, to ensure that it has a sufficient scientific base to be admitted as expert evidence.

The second is that the witnesses should not have given evidence in such definite terms in what was at the least a technique in its very early days. Scientific method generally does not deal in certainties and witnesses should not suggest otherwise (or be pushed into it by counsel).

The third is that witnesses should be properly qualified. The Dutch police officer seems to have been working largely alone without peer review, validation, or formal qualifications or training.

The fourth (and somewhat contradictory point) is that, just because a form of evidence is not accepted by the establishment, does not mean it is invalid – it may be at the cutting edge and set to overtake old thinking.[31]

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28 *R v Dallagher*, above n 26.

29 It has been shown for example that ears change shape depending on the temperature or how hard they are pressed on a surface. There was also a paucity of research into the technique which was in its infancy at the time of trial. David Bamber "Prisoners to appeal as unique 'earprint' evidence is discredited" *The Telegraph* (online ed, 2 December 2011). See further C Champod, I W Evett and B Kuchler "Earmarks as evidence: A critical review" (2001) 46 Journal of Forensic Sciences 1275.

30 Bob Woffinden "Earpint landed innocent man in jail for murder" *The Guardian* (online ed, London, 23 January 2004). See, however, Vicki Martin "DNA Profiling of earprints" (Abstract, 2004) available at <www.le.ac.uk>, which suggests that DNA evidence obtained from ear prints is too inconsistent to be utilised reliably. However, I have not been able to source the underlying study and it is possible that the DNA from the ear print in this case may still have been sufficient to exclude Mr Dallagher as the source of the ear print.

31 On this point, see for example: A A Moenssens "Novel Scientific Evidence in Criminal Cases; Some Words of Caution" (1993) 84 J Crim L & Criminology 1; K Belt "Novel Scientific Evidence and Judicial Gatekeeping: *R v Calder* and *Daubert v Marrell Dow Pharmaceuticals* Compared" (1998) 28 VUWLR 399; John DeWitt, James Richardson and Lyle Warner "Novel scientific evidence and controversial cases: a social psychological examination" (1997) 21 Law & Psych Rev 1.

Brandon Mayfield

This leads onto my next point. We do have to be wary of accepting what has always been accepted as necessarily reliable. Mr Brandon Mayfield was an American lawyer from Oregon and his fingerprints, which were held on an electronic database, came up in a search when the Federal Bureau of Investigation (FBI) was assisting with investigations into the train bombings in Madrid in March 2004.[32]

Three senior FBI fingerprint examiners concluded that Mr Mayfield's fingerprints were a 100 per cent match with those found at the site of the bombings. Thus, in May 2005, Mr Mayfield was arrested, despite protesting that he had never been to Spain. Approximately two weeks after Mr Mayfield was arrested, the Spanish National Police informed the FBI that it had identified an Algerian national as the source of the fingerprints. After the FBI undertook its own examination of the fingerprints of the Algerian, it withdrew its identification of Mr Mayfield's prints and he was released from custody.[33]

So is the Mayfield case an isolated incident? Well no. Indeed, in 2009, the United States National Academy of Sciences (NAS) in a report on the use of forensic evidence in courts, concluded that for many of the common types of forensic science (including firearms, handwriting and fingerprint identification), there was simply not sufficient scientific basis for the so called experts' conclusions.[34] The only exceptions[35] were nuclear DNA analysis, toxicology and drug analysis.[36]

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32 Brandon Mayfield was a recent convert to Islam.

33 See Office of the Inspector General "A Review of the FBI's Handling of the Brandon Mayfield Case" (2006) available at <www.oig.justice.gov>. See also A Kozinski "Criminal Law 2.0" (2015) 44 Geo LJ Ann Rev Crim Proc iii at iv (preface) for a brief discussion of the Mayfield case. In that article, Justice Kozinski, judge of the United States Court of Appeals for the Ninth Circuit, highlights numerous myths in the criminal justice system such as the myth that "fingerprint evidence is foolproof".

34 Nancy Gertner "National Academy of Sciences Report: A Challenge to the Courts" (2012) 27 Criminal Justice. See National Academy of Sciences "Strengthening Forensic Science in the United States: A Path Forward" (2009) [NAS Report]. The conclusions were simply not supported by their methodology or their training and there was not an adequate basis for individualisation, for linking crime scene evidence to a particular defendant, and much less for conclusions that were announced to an exceptional degree of certainty. For a discussion of the admissibility of fingerprint evidence in New Zealand, see *R v Carter* (2005) 22 CRNZ 476 (CA).

35 In summary, the NAS stated that, in terms of scientific basis, the analytically based disciplines (eg nuclear and mitochondrial DNA analysis, toxicology and drug analysis) generally hold a notable edge over disciplines based on expert interpretation (eg fingerprints, writing samples, tool marks, bite marks, and specimens such as hair): NAS Report, above n 34, at 7.

36 The NAS was highly critical of the competence of judges, lawyers and jurors, calling the courts "utterly ineffective" in apprehending and excluding poor expert evidence: NAS Report, above n 34, at 53.

Taking fingerprints as an example, the NAS said that there had been assumptions made without proper testing, for example that fingerprints are unique and do not change over time.[37] It also said that the matching process was so subjective that it could not be called scientific.[38] Further, there was inadequate training and validation of individual results. Since the report there has been more research conducted and better training and validation processes instituted in the United States.[39] So I am not suggesting (at least yet) that courts should be abandoning fingerprint evidence, but we do need to remember that it is not infallible.[40]

The Mayfield case had a fascinating aftermath, which illustrates another point I want to make. An experiment was carried out in which a group of five international fingerprint examiners were each given a pair of prints they were told were from the Mayfield case.[41] However, that was not the case. The two prints were from fingerprint sets that each examiner had in unrelated cases previously testified (under oath) were a conclusive match. Three out of the five examiners, thinking they were re-examining the flawed Mayfield prints, said that the prints did not match; one said he could not decide; and only one of the five said that the prints were a match. This experiment illustrates the dangers of an expert's judgment being influenced by prior expectations. This is called confirmation bias – the idea being that people see what they expect to see. Given fingerprint examiners will know they are comparing crime scene prints with those of a suspect and may know why the person is a suspect, they may be highly susceptible to the effects of confirmation bias.

There will also be "adversarial bias" arising from an expert's involvement in the adversarial system.[42] Some commentators have said that it is almost an "inevitable" consequence of the

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37 At 144. For example, through variations in pressure applied and the impression medium.

38 At 142.

39 In the United States, there is a judicial reference manual on scientific evidence developed by the National Research Council and others: see "Reference Manual on Scientific Evidence: Third Edition" (2011) available at <www.fjc.gov>.

40 This is even so for those jurisdictions that still require a certain number of points of similarity before fingerprint evidence can be admitted: see Ian Freckelton and Hugh Selby *Freckelton & Selby: Expert Evidence* (looseleaf ed, vol 6, Lawbook Co) at [96-1056]–[96-1057].

41 Itiel E Dror, David Charlton and Alisa E Peron "Contextual Information Renders Experts Vulnerable to Making Erroneous Identifications" (2006) 156 Forensic Sci Int 74. See further S M Kassin, I E Dror, J Kukucka "The forensic confirmation bias: Problems, perspectives, and proposed solutions" (2013) 2 Journal of Applied Research in Memory and Cognition 42.

42 Emily Henderson and Fred Seymour "Expert Witnesses under Examination in the New Zealand Criminal and Family Courts" (Auckland University, 2013) at 27.

appointment of experts by partisans.[43] This adversarial bias may be present due to a number of factors[44] and lead to an expert moulding his or her evidence to fit appointing counsel's case.[45] This may be an unconscious bias through being part of a "team" and only getting one side of the story. In addition to being part of a side, cross examination could lead an expert to become defensive and to take more extreme positions than they would otherwise adopt.[46]

In an attempt to stem any bias, many jurisdictions have promulgated codes of conduct for expert witnesses. For example, in New Zealand, clauses 1 and 2 of the Code of conduct for expert witnesses emphasise that the expert has an "overriding duty to assist the court impartially" and is "not an advocate for the party who engages the witness".[47] This obviously serves as a reminder but is not a total solution to what can be unconscious and natural bias.[48] Nor are other solutions, such as court appointed experts or pre-trial consultation, necessarily without issues.

Equality of Arms

So to my final case study. In 1985, Anthony Ray Hinton was convicted of two separate killings of restaurant workers in Alabama. There were no eyewitnesses linking him to the crimes charged, no finger prints linking him to the scene, and no other physical evidence except for a supposed link between the bullets found at the crime scenes and a gun found at Mr Hinton's home. There was identification evidence from a later restaurant robbery[49] but he was not charged with that offence. The identification evidence from that later robbery was

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43 Geoffrey L Davies "Current Issues - Expert Evidence: Court-Appointed Experts" (2004) 23 CJQ 367 at 368.

44 See Henderson and Seymour, above n 42, at 28.

45 See for example the comment by the United States Supreme Court in the case of *Melendez-Diaz v Massachusetts* 557 US 305 (2009) where it said "[b]ecause forensic scientists are driven in their work by a need to answer a particular question related to the issues of a particular case, they sometimes face pressure to sacrifice appropriate methodology for the sake of expediency. A forensic analysis responding to a request from a law enforcement official may feel pressure – or have an incentive – to alter the evidence in a manner favourable to the prosecution".

46 As one commentator has suggested, "[p]ermitting cross-examination on these opposing views is as likely to polarise them further as it is to eliminate or reduce areas of difference": Davies, above n 43, at 377.

47 The Code of Conduct is contained in schedule 4 of the Judicature Act 1908. In addition to the Code of Conduct, expert witnesses with professional memberships may already be covered by some internal code of conduct or ethical standards

48 Whether such codes are enough to dispel more subtle and subconscious biases is another question. As some commentators have stated, while these types of codes "are impeccable normative ideals, experts who have been exposed to the direct and more subtle pressures of adversarial criminal proceedings might be forgiven for experiencing, if not total bewilderment, at least mild cognitive dissonance": P Roberts and A Zuckerman "Criminal Evidence" (2nd ed, Oxford University Press, Oxford, 2010) at 509.

49 The manager from the more recent shooting (for which Mr Hinton was not charged) identified Mr Hinton from a photo line-up.

given in Court despite the fact that Mr Hinton had been working in a locked warehouse over 25 kilometres away at the time of the later robbery.[50]

Mr Hinton's appointed lawyer for the murder trial mistakenly thought he would not be allocated sufficient funds to hire a qualified firearms examiner. Instead, he retained a visually-impaired (blind in one eye) civil engineer with no expertise in firearms identification and who admitted in court that he could not operate the microscope properly to examine the evidence. In the closing argument, the prosecutor said, when comparing the defence firearms witness and the expert called for the prosecution: "[t]here is no comparison. One man just doesn't have it and the other does it day in and day out, month in and month out, year in and year out, and is recognized across the state as an expert". Mr Hinton was convicted and sentenced to death. He was to spend 30 years on death row before being released in April 2015.

Mr Hinton's release came after 12 years of litigation when the United States Supreme Court finally reversed the lower Courts and ordered a new trial.[51] The new trial Judge dismissed the charges after scientists at the Alabama Department of Forensic Sciences tested the evidence and confirmed that the bullets from the crime scene could not be matched to Mr Hinton's weapon.[52] In fact, the bullets from the murders could not be matched to a single gun. When Anthony Hinton was freed among his first words were "the sun does shine".[53]

Mr Hinton's case is a stark example of the reality that there is often an inequality of resources between the prosecuting state and a defendant. This disparity is compounded when the defendant is indigent and relies on limited state funding and resources to present a defence.

In many countries expert evidence is largely provided by the prosecution. There are issues with this, apart from disparity of resources. First, the prosecution "owns" the crime scene, controlling its investigation and possession of any evidence taken from it. Secondly, many forensic scientists are employed by the state, leading to the sort of bias issues discussed

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50 Equal Justice Initiative "Equal Justice Initiative Wins Release of Anthony Ray Hinton" (2015) <www.eji.org>.

51 *Hinton v Alabama* 571 US – (2014).

52 In 2002, Mr Hinton's lawyers engaged three of the United States' top firearms examiners who testified that Mr Hinton's gun could not be matched to the crime evidence. Despite this, the prosecution refused at that stage to re-examine the case or concede error.

53 Equal Justice Initiative, above n 50.

earlier.[54] In addition, defence experts may not be available in a small jurisdiction and the state laboratories in these jurisdictions may be too small to be able to offer credible defence services, even if conflicts of interest could be managed.

Concluding Thoughts

This short paper has concentrated on miscarriages of justice arising, at least partly, from flawed expert testimony. The examples are not isolated ones. The Innocence Project reports that in more than 50 per cent of DNA exonerations cases, invalidated or improper forensic science contributed to the wrongful conviction.[55]

But we must not lose sight of the very great assistance that forensic techniques provide, both in the investigation and successful prosecution of criminals. The message though is for courts to be vigilant in making sure proper standards are kept by experts giving evidence. Even with proper vigilance, however, the reality is that flawed evidence may still be given. This may be due to a particular expert's fallibility but may be because scientific knowledge has moved on. This points to the need for robust post-conviction processes to address miscarriages of justice.

The fallible and, sometimes, ephemeral nature of science was encapsulated by a United States' State Court which said: "[s]cience moves inexorably forward and hypotheses or methodologies once considered sacrosanct are modified or discarded. The judicial system, with its search for the closest approximation to the 'truth', must accommodate this ever-changing scientific landscape."[56]

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54 D Dwyer "The Judicial Assessment of Expert Evidence" (Cambridge University Press, Cambridge (UK), 2008) at 32.

55 Innocence Project "Wrongful Convictions Involving Invalidated or Improper Forensic Science that Were Later Overturned through DNA Testing" <www.innocenceproject.org>. As the NAS report, above n 34, noted at 42, "even those [forensic scientists] who are critical of the conclusions of The Innocence Project acknowledge that faulty forensic science has, on occasion, contributed to the wrongful conviction of innocent persons".

56 *State v Behn* 868 A 2d 329 (NJ Super Ct App Div, 2005) at 343.