

Expert evidence in criminal trials:

Assessing reliability, ensuring independence and promoting scientific rigour

Tim Owen QC

Matrix Chambers

I have chosen the subject of expert evidence in criminal trials for three reasons. First, any student of the criminal law will be aware that the use and misuse of expert scientific testimony has often caused problems for the courts. Secondly, because the risk of miscarriages of justice continues to exist despite advances in scientific research and a greater awareness of the need to assess the reliability of expert evidence. And thirdly, because in England and Wales there have been relatively recent reforms in the way expert witness testimony is considered by the Courts as a result of novel measures designed to reflect the recommendations of a landmark report by the Law Commission of England and Wales.

And of course I thought that these reforms would be of interest to a Mauritian legal audience given the similarities between our respective legal systems.

Scientifically rigorous but accessible forensic science matters greatly to the criminal justice system as a whole which is the “customer” for forensic evidence. It matters to members of the criminal Bar who rely on expert evidence when representing the defence or the prosecution in a criminal trial. It matters to the Judiciary in ensuring fairness of proceedings, directing the jury and upholding the rule of law. And it matters to society more generally in ensuring that the innocent are not convicted of crimes they did not commit and that the perpetrators of serious crimes are brought to justice.

The vast majority of serious cases before the Crown Court in England and Wales now include presentation of one or more types of forensic evidence. I am sure that it plays a significant part in most serious cases in Mauritius too.

But the fact that such evidence is now commonplace must not lead to complacency. Scientific developments, inconceivable 20 let alone 50 years ago, come with risks. The pace of change and complexity of techniques present challenges for all involved, especially for those of us who lack a scientific background. The court must be satisfied that there is a sufficiently reliable scientific basis for evidence to be admitted – how is this challenge to be met ?

The most obvious point for all of us who practice in the criminal law is the risk of a miscarriage of justice if the forensic science is wrong or the expert presents or interprets it incorrectly or indeed if the expert is deliberately misleading.

Let me give you a relatively example of the terrible consequences that may result through a failure to identify flawed expert evidence.

Sally Clark was an English solicitor who in November 1999 became the victim of one of the gravest miscarriages of justice in English legal history when she was found guilty of the murder of two of her infant sons. I later acted for Sally in her claim for compensation and so I have a strong personal interest in this truly awful episode in English legal history.

Sally's first son, Christopher, died suddenly within a few weeks of his birth in December 1996. The baby had fallen unconscious after being put to bed and was later declared dead after being transported to hospital. Sally suffered from post-natal depression and received counselling at a clinic but was in recovery by the time her second son, Harry, was born three weeks premature in November 1997. Aged only 8 weeks, Harry

was later found dead in a similar manner to Christopher in January 1998. On both occasions, Sally was at home alone with her baby and although there was evidence of trauma, this was wholly consistent with the attempts to resuscitate which Sally had described.

A month after Harry's death, Sally Clark was arrested, charged and stood trial for the murder of both her baby sons. The prosecution case was almost entirely based on what was later to be shown to be deeply flawed expert evidence presented by a man regarded at the time as a distinguished paediatrician, Professor Sir Roy Meadow.

He testified, on the basis of a Bayes' statistical analysis, that the chance of two children from an affluent family suffering sudden infant death syndrome – or cot death – was 1 in 73 million. He likened the probability to the chances of backing an 80-1 outsider in the Grand National horse race four years running and winning each time.

Sally Clark was convicted of double murder by a 10-2 majority on 9th November 1999 and given the mandatory sentence of life imprisonment. She was widely reviled in the media as being the callous murderer of her two infant sons. The nature of her convictions as a child killer made her a target for other prisoners and her life in prison was a living hell.

Despite recognition of the flaws in Meadow's statistical evidence, the convictions were upheld at the first appeal in October 2000. However soon after the first appeal failed, it came to light that micro-biological tests had in fact shown that Harry had colonisation of staphylococcus aureus bacteria indicating that he had died from natural causes. This crucial evidence had never been shown to the defence legal or medical teams although it had been shown to the Crown's pathologist, Dr Alan Williams, as early as

February 1998. It also became even clearer, thanks to further investigation, that the statistical evidence presented by Meadows was seriously flawed.

For her second appeal a report regarding the medical evidence was provided by Dr Sam Gulino, an eminent prosecution forensic pathologist for the State of Florida, USA. He commented scathingly about the poor quality of the pathologists' work in these cases:-

"Throughout my review, I was horrified by the shoddy fashion in which these cases were evaluated. It was clear that sound medical principles were abandoned in favour of over-simplification, over-interpretation, exclusion of relevant data and, in several instances, the imagining of non-existent findings."

Sally Clark's case was referred back to the [Court of Appeal](#) by the [Criminal Cases Review Commission](#), and her convictions were overturned in a second appeal in January 2003. She was released from prison having served more than three years of her sentence.

The case was widely criticised because of the way statistical evidence was misrepresented in the original trial, particularly by Meadow. He stated in evidence as an [expert witness](#) that "one sudden infant death in a family is a tragedy, two is suspicious and three is murder unless proven otherwise" ([Meadow's law](#)). He claimed that, for an affluent non-smoking family like the Clarks, the probability of a single cot death was 1 in 8,543, so the probability of two cot deaths in the same family was around "1 in 73 million". Given that there are around 700,000 live births in Britain each year, Meadow argued (wrongly) that a double cot death would be expected to occur once every hundred years.

In October 2001, the [Royal Statistical Society](#) (RSS) issued a public statement expressing its concern at the "misuse of statistics in the courts". It noted that there was "no statistical basis" for the "1 in 73 million" figure. In January 2002, the RSS wrote to the [Lord Chancellor](#) pointing out that "the calculation leading to 1 in 73 million is invalid". There are several reasons why this is the case.

First, Meadow's calculation was based on the assumption that two SIDS deaths in the same family are independent. The RSS argued that "there are very strong reasons for supposing that the assumption is false. There may well be unknown genetic or environmental factors that predispose families to SIDS, so that a second case within the family becomes much more likely than would be a case in another, apparently similar, family." The prosecution did not provide any evidence to support its different assumption. In a 2004 article in *Paediatric and Perinatal Epidemiology*, Professor of Mathematics Ray Hill of [Salford University](#) concluded, using extensive SIDS statistics for England, that "after a first cot death the chances of a second become greatly increased", by a dependency factor of between 5 and 10.

Second, it is likely that the court committed a statistical error known as the "[prosecutor's fallacy](#)". Many press reports of the trial reported that the "1 in 73 million" figure was the probability that Clark was innocent. However, even if the "1 in 73 million" figure were valid, this should not have been interpreted as the probability of Clark's innocence. In order to calculate the probability of Clark's innocence, the jury needed to weigh up the *relative* likelihood of the two competing explanations for the children's deaths. Although double SIDS is very rare, double infant murder is likely to be rarer still, so the probability of Clark's innocence was quite high. Hill calculated the odds ratio for double SIDS to double homicide at between 4.5:1 and 9:1.

Hill raised a third objection to the "1 in 73 million" figure: the probability of a child dying from SIDS is 1 in 1,300, not 1 in 8,500. Meadow arrived at the 1 in 8,500 figure by taking into account three key characteristics possessed by the Clark family, all of which make SIDS less likely. However, Meadow "conveniently ignored factors such as both the Clark babies being boys – which make cot death more likely". Hill also argues:

“When a cot death mother is accused of murder, the prosecution sometimes employs a tactic such as the following. If the parents are affluent, in a stable relationship and non-smoking, the prosecution will claim that the chances of the death being natural are greatly reduced, and by implication that the chances of the death being homicide are greatly increased. But this implication is totally false, because the very same factors which make a family low risk for cot death also make it low risk for murder.”

During the second appeal, the court noted that Meadow's calculations were subject to a number of qualifications, but "none of these qualifications were referred to by Professor Meadow in his evidence to the jury and thus it was the headline figures of 1 in 73 million that would be uppermost in the jury's minds". The appeal court concluded that "the evidence should never have been before the jury in the way that it was when they considered their verdicts". The judges continued, "we rather suspect that with the graphic reference by Professor Meadow to the chances of backing long odds winners of the [Grand National](#) year after year it may have had a major effect on [the jury's] thinking notwithstanding the efforts of the trial judge to down play it".

Clark's release in January 2003 prompted the [Attorney General](#) to order a review of hundreds of other cases. Two other women convicted of murdering their children, [Donna Anthony](#) and [Angela Cannings](#), had their convictions overturned and were

released from prison. [Trupti Patel](#), who was also accused of murdering her three children, was acquitted in June 2003. In each case, Roy Meadow had testified about the unlikelihood of multiple cot deaths in a single family.

Meadow was [struck off](#) the medical register by the [General Medical Council](#) in 2005 for serious professional misconduct. It was during the GMC hearing that, when questioned directly, he made his first public apology for the effect of his 'misleading' evidence. He cited 'legal advice' and 'professional etiquette' as the reasons for the delay. He was reinstated in 2006 after he appealed and the court ruled that his actions in court had amounted to misconduct though not serious enough to warrant him being struck off. The senior Judge on the panel, the Master of the Rolls Lord Clarke dissented stating that in his view Meadow's actions had amounted to serious professional misconduct.

In June 2005, Dr Alan Williams, the Home Office pathologist who conducted the postmortem examinations on both the Clark babies, was banned from [Home Office](#) pathology work and coroners' cases for three years after the General Medical Council found him guilty of "serious professional misconduct" in the Clark case. At the same time he had chosen to withhold evidence of infection as a possible cause of the death of the second baby, he changed his original opinion regarding the first baby from death caused by lower respiratory infection to unnatural death by smothering. He failed to give any good reason for this change in opinion and his competence was called into question. His conduct was severely criticised by other experts giving evidence and opinion to the court and in the judicial summing up of the successful second appeal. He was given the opportunity to address the court to explain his decision to withhold the laboratory results. He declined to do so.

For Sally Clark, the fact that she was eventually shown to have been the victim of a grotesque miscarriage of justice – the worst imaginable – was of course of some comfort to her. But the experience of conviction and imprisonment utterly destroyed her. Tragically she developed serious psychiatric problems after her release and while we were still fighting to win her compensation for her dreadful ordeal, she was found dead at home in March 2007 from alcohol poisoning. She was 43 years of age and had in effect drunk herself to death.

One of the consequences of Sally Clark's case was that fresh attention was paid to the use of expert evidence to convict a number of parents of the manslaughter or murder of their infant children in what became known as the "battered babies" appeals.

In each case, convictions had been crucially influenced by expert evidence from prosecution medical witnesses who subscribed to a particular hypothesis which it was said gave rise to an overwhelming inference that a baby had been shaken to death by their parent or carer.

This accepted hypothesis concerning Shaken Baby Syndrome or SBS – but more accurately non-accidental head injury (NAHI) – depended on findings of a triad of intracranial injuries consisting of encephalopathy (defined as disease of the brain affecting the brain's functioning); subdural haemorrhage and retinal haemorrhages. For many years the coincidence of these injuries in infants aged between 1 month and 2 years had been considered by a body of respected medical experts to be the hallmark of NAHI. The mechanism for these injuries was said to be the shaking of the infant with or without impact on a solid surface which moves the brain within the skull damaging the brain and shearing the bridging veins between the dura and the arachnoid. The shaking may then cause retinal haemorrhages.

Between 2000 and 2004 a team of distinguished doctors led by Dr Jennian Geddes, a neuropathologist with a speciality with work with children, produced three papers setting out the results of her work into the triad hypothesis. In the third paper, the team put forward a new hypothesis, the “unified hypothesis” which challenged the supposed infallibility of the triad. It was called the unified hypotheses because it relied on the proposal that there was one unified cause of the three intra-cranial injuries constituting the new triad: that cause was not necessarily trauma. This new hypothesis did not seek to show that the triad was inconsistent with NAHI. It did however seek to show that it was not diagnostic. A crucial point in the context of deploying expert evidence to persuade a jury of guilt.

In light of this new development in expert medical opinion, in 2005 four cases were referred to the Court of Appeal in which parents had been convicted of the murder or manslaughter of their infant children. Having heard evidence from a large number of medical experts, the Court of Appeal quashed three of the four convictions and in doing so it observed that it may be helpful for judges, practitioners and experts to be reminded of the obligations of an expert witness as summarised by Cresswell J. in the *Ikerian Reefer* [1993] 2 Lloyds Re 68 at p.81:

- “1. Expert evidence presented to the court should be and seen to be the independent product of the expert uninfluenced as to form or content by the exigencies of litigation.
2. An expert witness should provide independent assistance to the court by way of objective unbiased opinion in relation to matters within his expertise.

3. An expert witness should state the facts or assumptions on which his opinion is based. He should not omit to consider material facts which detract from his concluded opinions.
4. An expert should make it clear when a particular question or issue falls outside his expertise.
5. If an expert's opinion is not properly researched because he considers that insufficient data is available then this must be stated with an indication that the opinion is no more than a provisional one.
6. If after exchange of reports, an expert witness changes his view on material matters such change of view should be communicated to the other side without delay and when appropriate to the court."

In a fascinating lecture on the role of the expert witness in 2015, the President of the Supreme Court, Lord Neuberger, who studied science before he became a lawyer, made the important point that experts and their views are very much creatures of their time even in a field which may seem as black and white as elementary physics.

"An expert's view on what is, in principle, a timeless issue may be perceived as being "right" because it complies with the generally accepted contemporary view of the time even though it will be thought to be completely wrong headed later. Thus, what now appears to be the crazy medical practice of bleeding or drawing blood from all ill or weak patients was generally accepted as self-evidently beneficial for over two millennia. Galen's medical writings, although containing much rubbish, were treated as almost a sacred tract for nearly fifteen hundred years from around 200 AD. That was so even though we now know it to be harmful in most cases and

fatal in some. Yet an expert witness who denied the value of the practice even in an 18th century trial would have found his evidence unceremoniously rejected.”

It follows that all of us who practice law must be aware of the potential for shifting sands when it comes to expert evidence. And we must not be afraid to demand the highest standards of rigour and independence of mind in those who claim to be experts in their field. There is no doubt that Professor Meadow’s performance in the Sally Clark case was open to very serious criticism and had devastating consequences. But another cause for concern is that no one in court at the original trial seems to have seriously set about challenging his unreliable statistical evidence. What this demonstrates is that if we are to improve the standards of expert evidence we must look to all those involved in the litigation process and not just the experts. Practitioners and Judges have to understand the relevant technicalities and statistics better than they currently do.

In response to cases like that of Sally Clark and others, the Law Commission produced in March 2011 a really excellent Report on expert evidence in criminal proceedings following a two year consultation period. One of the principal concerns of the Law Commission was that expert evidence was being admitted to readily with too little scrutiny and recommended the introduction of a statutory admissibility or reliability test – a proposal which was supported by the senior judiciary.

The Commissions criticised the judicial approach to the admissibility of expert evidence as being one of *laissez-faire*.

“Too much expert opinion evidence is admitted without adequate scrutiny because no clear test is being applied to determine whether the evidence is sufficiently reliable to be admitted. This problem is exacerbated in two ways:

- First, because expert evidence (particularly scientific evidence) will often be technical and complex, jurors will understandably lack the experience to be able to assess the reliability of such evidence. There is a danger that they may simply defer to the opinion of the specialist who has been called to provide expert evidence.
- Secondly, in the absence of a clear legal test to ensure the reliability of expert evidence, advocates do not always cross examine experts effectively to reveal potential flaws in the experts' methodology, data and reasoning. Juries may therefore be reaching conclusions on the basis of unreliable evidence. This conclusion is confirmed by a number of miscarriages of justice in recent years.”

The idea was that there should be a list of factors to assist Judges in applying the test and that existing case law would be codified. Apart from providing a much surer basis for the admissibility of expert evidence, a further objective of the proposals was to avoid the risk of the jury being confused and distracted by complex and conflicting expert accounts.

The Government response in November 2013 rejected the recommendations for primary legislation. Possibly influenced by a view that in recent years, Governments had enacted far too much legislation affecting the criminal justice system.

But the judiciary decided to take a rather radical step to ensure that the Law Commission's views were not to gather dust on the shelves. The Criminal Procedure Rules Committee – the body Chaired by a senior Judge and which writes the crucial set of Rules that regulate the practice and procedure of criminal trials in England and Wales – adopted as many of the Commission's recommendations as it could adopt through Rules. And these have been accompanied by Practice

Directions. Thus although the common law remains the source of the criteria by reference to which the court must assess the admissibility, the Rules simply list those matters which must be covered in the experts' report so that the Court can conduct such an assessment. The Practice Direction lists the factors the court may take into account in determining the reliability of expert opinion.

In addition, the Rules encourage discussion between the parties in advance of the trial and enable the court to direct that the experts meet and if possible produce a report setting out the areas where they agree and disagree. In this way, the issues to be put to the jury may be narrowed to those where there is disagreement.

SLIDES

To complete the process whereby the Procedure Rules and Practice Direction have become embedded in the system to form a new common law test of admissibility, Vice President of the Queen's Bench Division, Sir Brian Leveson, presided in an appeal to the Court of Appeal in which a central issue concerned the admissibility of so called expert evidence from a retired psychiatrist and psychotherapist. The defendant was charged with sexually abusing his daughter over a two year period between the age of 10 and 12. He had sought to rely on the expert evidence whose opinion was that the daughter was suffering from false memory syndrome in that she had a delusional belief as a result of "recovered memories" and had filled in gaps in her memory to make a coherent narrative. According to the expert report, such recovered memories could not be relied upon in the absence of independent confirmatory information. The trial judge held the evidence to be inadmissible and the Court of Appeal upheld his ruling. Sir Brian commented as follows:

“Before leaving an examination of the principles governing admissibility of this type of evidence, it is appropriate to note the general concern about expert witnesses. Whilst legislative reform has not been taken forward, following the Law Commission Report on Expert Evidence in Criminal Proceedings, there is real concern about the use of unreliable or inappropriate expert evidence. As a result, Part 33 of the Criminal Procedure Rules has been revised (with effect from 1 October 2014) and a new Practice Direction is to be published which will incorporate the reliability factors recommended by the Law Commission for the admission of expert evidence. The Advocacy Training Council, also, is in the course of preparing a “tool kit” for advocates to use when considering expert evidence and its admissibility, itself based upon the recommendations in the Law Commission Report.

44. When these changes occur, a new and more rigorous approach on the part of advocates and the courts to the handling of expert evidence must be adopted. That should avoid misunderstandings about what is (and what is not) appropriately included in an expert’s report and so either avoid, or at least render far more straightforward, submissions on admissibility such as those made in this case. In particular, as we have emphasised, comment based only on analysis of the evidence which effectively usurps the task of the jury is to be avoided.”

And thus without Parliamentary intervention, the law governing the admissibility of expert evidence in criminal trials in England and Wales has been radically altered in a way which, I believe, is for the better in terms of ensuring greater rigour before expert evidence is introduced.

I was soon to discover as an advocate what the impact of this new approach would be.

In 2015 I appeared for a man called Dennis Slade in an appeal to the Court of Appeal Criminal Division. Mr Slade was alleged to be a major professional criminal controlling a gang of violent armed robbers and drug dealers in the North of England. He and two others had been convicted of conspiring to murder a rival crime boss following a lengthy surveillance operation which included the use of a bug placed in an Audi vehicle which it was believed was being used by Slade and his gang to track the movements of their target prior to shooting him dead outside his house in Leeds.

The key evidence at the trial had been a voice recording said to be of the three defendants as they drove around Leeds in the Audi RS6 car. The evidence of what was being said was potentially highly incriminating but the three defendants denied that the voices on the tape recording were theirs. Contrasting expert evidence from well-respected voice recognition experts was given on behalf of the prosecution and defence but at the time of the trial the only methods available to them were auditory analysis and acoustic analysis. The former usually involves the expert witness repeatedly listening to the recording through high-powered headphones and making a Judgment. The latter involves the application of computer software to make a computerised analysis which may include spectrograms of specific sounds and formant measurements (that is computerised measurements of resonance or areas of high energy in the recorded speech).

The appeal to the Court of Appeal was based on fresh evidence from the UK's leading voice recognition expert, Professor Peter French, who has an internationally renowned and respected, appearing as an expert both for the prosecution and the defence. Prof French had been a defence expert at trial and had relied on acoustic analysis. But after the trial had concluded, he had begun to use a new method for voice recognition in the form of Automatic Speaker Recognition technology or the Batvox system – a

method widely used by banks and other organisations for security purposes and accepted as a reliable basis for expert evidence in a number of other European jurisdictions (including Germany, France and Spain) but never previously used in England and Wales. French claimed that the ASR technology could demonstrate not only that the assertion by the prosecution's expert witness of alleged consistency of voices recorded on the relevant occasions in the Audi RS6 car was erroneous but also that the presence of the appellants in the car on such occasions could positively be excluded. Plainly, if French's evidence were accepted as reliable, this would be overwhelming proof that the wrong men had been jailed for a very grave offence.

The appeal succeeded but not on the basis of the new expert evidence which the Court of Appeal declined to admit. Applying the more rigorous process of assessing reliability demanded by the Rules and the Practice Direction, the Court was unwilling to accept that the Batvox system satisfied the reliability principle. In particular the Court was not satisfied that the use of a likelihood ratio generated by the software used by the Batvox system to identify or to exclude from identification a particular voice sample was justified as a means of determining voice identification or exclusion. In explaining the Court's concerns, Lord Justice Davis made clear that a fundamental concern was the extent to which the Court was being asked to admit what was essentially decisive evidence but without being able to understand how the software actually produced such decisive results. There was also a concern about how to present the evidence to a lay jury.

“179. Secondly, in a number of respects it seems to us that the evidence ultimately amounts to little more than a bare assertion that the software is so

designed as to ensure the right results: with no explanation of how the court can be confident that is so. For example, the selection by the software of the subset of voices from the reference population has not been explained; and no clear reason has been shown why the court should simply accept the assertion that the system has made the best choices. It does not seem to us to be a sufficient answer to this concern to say that it is only proposed that ASR should be used in conjunction with other forms of analysis. In this case, indeed, it is apparent that Professor French was caused to adjust his opinion by the results of the Batvox testing, which – in his words – took him beyond his original conclusion that the voice of M1 was very unlikely to be that of Mr Pearman. It is also apparent that the Batvox results, amounting effectively to categorical exclusion or elimination with a fairly high degree of confidence, were inconsistent with the evidence of Mrs McClelland and with the views (so far as made known to this court) of Dr Holmes and Mr Duckworth. The court therefore has to consider that it is being asked to admit what in actuality is advanced as decisive evidence, not simply supportive evidence.

180. Thirdly, we are concerned that counsel for the appellants were unable to give any satisfactory answer to the question of how evidence of this nature should or could appropriately be presented to a jury. It seems that even a witness as distinguished as Professor French would in reality be telling a jury that the system had produced a certain result, with no real explanation of what features had contributed to that result and therefore no real scope for cross-examination. How are the jury to evaluate such evidence? What, for example, are a jury to make of the proposition that the results of the Batvox tests are 38 times more likely if the suspect was not the man whose voice can be heard in

the questioned recording than if he was? Are they to regard “38 times more likely” as significantly high or insignificantly low? The absence of any satisfactory answer to such questions reflects the fact that the system simply produces a result, expressed in a mathematical formula (with the attendant danger of a potentially misleading appearance of certainty), but without any explanation of which features of similarity or dissimilarity have contributed to that result.”

As the advocate who failed to persuade the Court of Appeal that my expert evidence passed the test of reliability, I was of course disappointed by the outcome of the appeal. But I understood and pay tribute to the Court’s reasoning. The experience of acting for Sally Clark after she was released from prison and was attempting, ultimately unsuccessfully, to rebuild her life was one I will never forget. It made me realise how dangerous can be the consequences of failing properly to assess whether the opinion of someone claiming to be an expert in his or her field is truly reliable and safe. The recent reforms to the admissibility of expert evidence in England and Wales represent an important change for the better and should do much to reduce the chances of another case like Sally Clark’s occurring again.

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