WORLD VIEW
A personal take on events

JESSE WILSON

Label the limits of forensic science

This week marks a chance to curb the misuse of crime-scene evidence in US courts and spare innocent people from going to jail, says **Robin Mejia**.

Wrongful convictions occur with shocking frequency in the United States. A record 166 exonerations were recorded in 2016 by the National Registry of Exonerations, bringing the total since 1989 to nearly 2,000. This represents only a fraction of those who should never have been sent to prison.

In 2005 I produced a documentary showcasing several cases in which flawed forensic analyses helped to get innocent people locked up. Riky Jackson went behind bars for two years because of incorrectly matched fingerprints. Jimmy Ray Bromgard spent nearly 15 years in jail, mainly because of hair comparisons that lacked scientific rigour. Now I'm a scientist who uses data analysis to promote human rights, and I'm disheartened to see these errors continue. That is why I hope that a US federal commission will vote next week to endorse practices that would transform how forensic analysts talk about evidence.

This would reduce the number of innocent people sent to prison. Consider Crystal Weimer, a single mother of three whose murder conviction was largely based on assertions that wounds on a dead man's hand were made by Weimer's teeth. Last June, after a multi-year, multi-lawyer saga, all charges against her were dismissed.

Weimer's case is unusual only in that the expert whose testimony helped to convict her later declared his previous testimony invalid. The Innocence Project, an organization that helps wrongfully convicted people, has secured more than 300 exonerations. It found that, in 46% of these, 'misapplication' of forensics contributed to conviction. Often, that refers to expert testimony that went beyond the bounds of science.

The proposals that will be put to a vote on 10 April lay out how forensic analysts should testify about evidence such as shoeprints, bullet ballistics, blood spatter and glass shards. Analysts must explain how they examined evidence and what statistical analyses they chose. They must also describe inherent uncertainties in their measurements. Most importantly, experts must never claim with certainty that anything found at a crime scene is linked to a suspect, and they must always try to quantify the probability that observed similarities occurred by chance.

Even if scientists can objectively quantify the similarities between evidence from a crime scene and evidence from a suspect, no one knows how often such matches would occur by chance. Suppose striations on a bullet from a crime scene resemble those from a bullet test-fired from a suspect's gun. How frequently would bullets from other guns have similar markings? Except for some types of DNA samples, just about every type of forensic comparison lacks that information.

I work with the Center for Statistics and Applications in Forensic Evidence, a consortium of four universities that aims to close holes in statistical analyses of pattern-matching evidence; it is funded by the US National Institute of Standards and Technology (NIST). We have preliminary results, but there is much to do before we know how reliable this type of evidence is. Alarmingly, once a technique has been accepted by courts, its use is hardly ever questioned in trials.

There have been a few changes: after a 2004 report from the US National Research Council, the Federal Bureau of Investigation (FBI) crime laboratory stopped performing a test that could purportedly trace a bullet to a particular batch of lead. It had been using that technique for over 30 years.

But, generally, problems persist. In 2009, the National Academy of Sciences documented reams of faulty forensic practices. In September last year, a report from the President's Council of Advisors on Science and Technology found deep, widespread problems in the use of 'pattern-matching' forensic analyses. It called for better training, standards to validate forensic methods and independence between forensic labs and prosecutors. The recommendations would have restricted the types of evidence admissible in court. The US Attorney General, Department of Justice and FBI demurred. Fortunately, some forensic labs did begin to make changes.

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This week's statement takes a different tack. It will insist that uncertainties of forensic evidence be clearly described. The vote will be conducted by the US National Commission on Forensic Science, an expert panel convened by the Department of Justice and NIST.

Even good lawyers aren't scientists, and right now prosecutors have an incentive to select forensic analysts who will assure juries that evidence is clear and convincing, not ones who will speak in appropriately cautious terms. Defence lawyers won't necessarily recognize that there's anything to refute in forensic evidence against their clients.

This week's statement is not legally binding. However, if the Department of Justice adopts its recommendations, lawyers must comply. And the document itself could help defence lawyers and judges to limit testimony to scientifically defensible statements.

I like to think that this vote could mark a turning point. It's not just scientists who must learn to grapple with uncertain evidence. Lawyers, too, must be able to do so. People's freedom depends on it. ∎

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