Using the NAS Reports in Firearm and Toolmark Challenges

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Outline

- Major findings of the NAS Reports
- General Considerations in Using the NAS Reports
- Legal Landscape
- Potential Post-Conviction Challenges
- A Case Study: Lessons Learned
Major findings of the NAS Report
Two NAS Reports


The following HTML text is provided to enhance online readability. Many aspects of typography cannot be translated accurately to HTML. Please use the page mode as the authoritative form to ensure accuracy.
“The validity of the fundamental assumptions of uniqueness and reproducibility of firearms-related toolmarks has not yet been fully demonstrated” (p. 3)

Characterizing firearm/toolmark identification as “part science and part art form” (p. 55)
“Conclusions drawn in firearms identification should not be made to imply the presence of a firm statistical basis when none has been demonstrated.” (p. 82)

“[A]dditional general research on the uniqueness and reproducibility of firearms-related toolmarks would have to be done if the basic premises of firearms identifications are to be put on a more solid scientific footing.” (Id.)
Other than nuclear DNA analysis “no forensic method has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between evidence and a specific individual or source.” (p 8)

Toolmark identification tests “have never been exposed to stringent scientific scrutiny.” (p. 42)
It is “challenging” for an examiner to determine “the extent of agreement in marks made by different tools, and the extent of variation in marks made by the same tool.” (p. 153)

“[T]hese decisions involve subjective qualitative judgments by examiners” (p. 153)

The examiner makes “a subjective decision based on unarticulated standards and no statistical foundation for estimation of error rates.” (p. 154)
“Because not enough is known about the variabilities among individual tools and guns, we are not able to specify how many points of similarity are necessary for a given level of confidence in the result. Sufficient studies have not been done to understand the reliability and repeatability of the methods.” (p. 154).
“The committee agrees that class characteristics are helpful in narrowing the pool of tools that may have left a distinctive mark. Individual patterns from manufacture or from wear might, in some cases, be distinctive enough to suggest one particular source, but additional studies should be performed to make the process of individualization more precise and repeatable.”
The lack of a specific protocol for toolmark analysis is a “fundamental problem,” and the toolmark analysis guidance provided by the AFTE lacks specificity because it allows an examiner to identify a match based on “sufficient agreement”. (p. 155)
General Considerations in Using the NAS Report
When, if ever, have judges excluded forensic science?

- DNA in the early 1990’s
- Key factors:
  - Prominent critics (including an NRC panel)
  - Skillful litigators
  - Relative new method?
First Report Issued by National Academy of Sciences in 1992

DNA Technology in Forensic Science
Importance of the NRC

- *Hayes v. State*, 660 So.2d 257, 264 (Fla. 1995) ("When a major voice in the scientific community, such as the National Research Council, recommends that corrections made due to band-shifting be declared “inconclusive,” we must conclude that the test on the tank top is unreliable.").

- *State v. Johnson*, 186 Ariz. 329, 334, 922 P.2d 294 (Ariz.,1996) ("We, too, believe that endorsement by the NRC of the modified ceiling method is strong evidence of general acceptance within the relevant scientific community.")
Importance of the NRC

*People v. Venegas*, 18 Cal.4th 47, 89 (1998) (“Indeed, courts have recognized that the [NRC] is a distinguished cross section of the scientific community.... Thus, that committee's conclusion regarding the reliability of forensic DNA typing, specifically RFLP analysis, and the proffer of a conservative method for calculating probability estimates can easily be equated with general acceptance of those methodologies in the relevant scientific community.”)
Second report issued in May of 1996
Importance of the NRC

People v. Reeves, 91 Cal.App.4th 14 (2001) (“Though the NRC‘s recommendation has changed [from use of a ceiling principle to the unmodified product rule], the respect courts afford conclusions of this esteemed scientific body has not.”)
Importance of the NRC

*People v. Soto, 21 Cal.4th 512, 539 (1999)* ("[P]ublished appellate affirmation of general scientific acceptance controls subsequent trials. In a context of rapidly changing technology, every effort should be made to base that controlling effect on the very latest scientific opinions, including those published during the appellate phase of the case.")
Importance of the NRC

*Brim v. State, 695 So.2d 268, 274 (Fla., 1997)* ("[A]n abuse-of-discretion standard…. would prohibit an appellate court from considering any scientific material that was not part of the trial record in its determination of whether there was general acceptance within the relevant scientific community. We find that the abuse-of-discretion standard is incorrect.")
Importance of the NRC

*Brim v. State, 695 So.2d 268, 274 (Fla., 1997)* (“We recognize... that there may be times at which new scientific revelations may actually prove older methods unreliable, as opposed to simply unnecessary. In those isolated contexts, the older methods would not satisfy a Frye test.”)
PRESIDENT’S EDITORIAL

Thomas L. Bohan, Ph.D., J.D.

Strengthening Forensic Science: A Way Station on the Journey to Justice
Bohan’s main points

- The NAS report has not yet had a significant impact on criminal trials.
- This lack of immediate response may be due to the conclusory manner in which the criticisms were framed.
- Earlier NAS reports (polygraph and bullet lead) carefully reviewed all the studies claimed to have validated the practice in question before concluding that the practice had not been validated.
Bohan’s main points

- With respect to the pattern-based techniques that the latest report criticized, the tabulation of prior studies needs to be done.

- The report’s conclusions about lack of validation have not been accepted by the practitioners of the questioned practices, most of whom continue to cite studies that they claim constitute validation.

- This contrasts with the response to the NAS report on bullet lead. Once that report issued there was an immediate cessation of attempts to proffer bullet lead testimony.
FBI LABORATORY ANNOUNCES DISCONTINUATION OF BULLET LEAD EXAMINATIONS

Washington, D.C. -- The FBI Laboratory today announced that, after extensive study and consideration, it will no longer conduct the examination of bullet lead. Bullet lead examinations have historically been performed in limited circumstances, typically when a firearm has not been recovered or when a fired bullet is too mutilated for comparison of physical markings. Bullet lead examinations use analytical chemistry to determine the amounts of trace elements (such as copper, arsenic, antimony, tin, etc.) found within bullets. The result of that analysis allows crime-scene bullets to be compared to bullets associated with a suspect. Since the early 1980's the FBI Laboratory has conducted bullet lead examinations in approximately 2,500 cases submitted by federal, state, local, and foreign law enforcement agencies. In less than 20% of those cases was the result introduced into evidence at trial.
One factor significantly influenced the Laboratory's decision to no longer conduct the examination of bullet lead: neither scientists nor bullet manufacturers are able to definitively attest to the significance of an association made between bullets in the course of a bullet lead examination. While the FBI Laboratory still firmly supports the scientific foundation of bullet lead analysis, given the costs of maintaining the equipment, the resources necessary to do the examination, and its relative probative value, the FBI Laboratory has decided that it will no longer conduct this exam.

Letters outlining the FBI Laboratory's decision to discontinue these examinations are being sent to approximately 300 agencies that received laboratory reports indicating positive results since 1996. The letters are being sent so that these agencies may take whatever steps they deem appropriate, if any, given the facts of their particular case. It is important to note that the FBI Laboratory has not determined that previously issued bullet lead reports were in error.
Effect of FBI’s actions

“If the FBI Laboratory that produced the CBLA evidence now considers such evidence to be of insufficient reliability to justify continuing to produce it, a finding by the trial court that the evidence is both scientifically reliable and relevant would be clearly erroneous, and a finding that the evidence would be helpful to the jury would be an abuse of discretion.”

_Ragland v. Commonwealth_, 191 S.W.3d 569, 580 (Ky. 2006)
Bullet lead analysis cases

Bruce Budowle, Ph.D.; Maureen C. Bottrell, M.S.; Stephen G. Bunch, Ph.D.; Robert Fram, M.A.; Diana Harrison, B.S.; Stephen Meagher; Cary T. Oien, M.S.; Peter E. Peterson, Ph.D.; Danielle P. Seiger, M.F.S.; Michael B. Smith, B.A.; Melissa A. Smrz, M.S.; Greg L. Soltis, M.S.; and Robert B. Stacey, M.A.

A Perspective on Errors, Bias, and Interpretation in the Forensic Sciences and Direction for Continuing Advancement*

ABSTRACT: The forensic sciences are under review more so than ever before. Such review is necessary and healthy and should be a continuous process. It identifies areas for improvement in quality practices and services. The issues surrounding error, i.e., measurement error, human error, contextual bias, and confirmatory bias, and interpretation are discussed. Infrastructure is already in place to support reliability. However, more definition and clarity of terms and interpretation would facilitate communication and understanding. Material improvement across the disciplines should be sought through national programs in education and training, focused on science, the scientific method, statistics, and ethics. To provide direction for advancing the forensic sciences a list of recommendations ranging from further documentation to new research and validation to education and to accreditation is provided for consideration. The list is a starting point for discussion that could foster further thought and input in developing an overarching strategic plan for enhancing the forensic sciences.
“[E]xperiential inferences and foundational research have … helped build robust fields.”

The need to make the process better does not necessarily call into question the reliability of current or past practices.

Errors can occur, but understanding how errors can arise and employing a sound QA program, that emphasizes peer review, can minimize them.
Budowle’s main points

- A lack of a specific statistic does not mean a method is unreliable.
- “We strongly recommend that anyone interested in constructively critiquing a forensic discipline become intimately familiar with the foundations and practices of that discipline.”
“The results showed that fingerprint experts were influenced by contextual information during fingerprint comparisons, but not toward making errors. Instead, fingerprint experts under the biasing conditions provided significantly fewer definitive and erroneous conclusions than the control groups.”
Legal Landscape
Six (really 4) reported cases citing the NRC Report

- U.S. v. Rose (D.Md. 12/8/09) (fingerprints)
- U.S. v. Taylor (D. N.Mex. 10/9/09) (firearms)
- U.S. v. Mouzone (D. Md. 10/29/09) (firearms)
- U.S. v. Prokupek (D. Neb. 8/14/09) (dog sniff) (report of “little value”)
- Thomas v. Allen (NDAL 4/21/09) (MR) (just quotes)
Important firearm/toolmark cases

- Ramirez v. State, 810 So. 2d. 2d 836 (Fla. 2001)
Important firearm/toolmark cases

- *United States v. Williams*, 506 F. 3d 151 (2d. Cir. 2007)
Important firearm/toolmark cases

Possible Post-Conviction Challenges
Possible post conviction challenges

- Factual Innocence (DNA exonerations)
- Daubert/Frye
- Due process (*Ege v. Yukins* 485 F.3d 364 (6th Cir. 2007))
- Eighth Amendment reliability
- Knowing use of false evidence
- Brady claims
- Newly discovered evidence
Possible post-conviction challenges

- IAC for failure to pursue:
  - Discovery or funding opportunities
  - Daubert/Frye or other admissibility issues
  - Testing requested by the defendant
  - Cross examination of prosecution experts
  - Failure to object to improper characterization of evidence
  - Failure to employ or ineffective usage of defense experts
Case study: lessons learned
USA v. Taylor, 663 F.Supp.2d 1170 (D.N.M. 2009)

Discovery demand:

- Case file, including all bench notes of the analyst and any reviewer
- Documents and/or photographs relied upon in performing comparisons or rendering opinions, including SOPs, match criteria, photographs documenting the comparison
USA v. Taylor, 663 F.Supp.2d 1170 (D.N.M. 2009)

Discovery demand:

- Documentation of the exact points of comparison being relied upon for any firearm/toolmark comparison (*USA v. Robinson*, 44 F. Supp. 2d 1345)

- Documentation for any points of dissimilarity in any firearm/toolmark comparison conducted in this case and if the dissimilarity did not result in an exclusion an explanation as to why these points of dissimilarity do not lead to an exclusion.
USA v. Taylor, 663 F.Supp.2d 1170 (D.N.M. 2009)

Discovery demand:

- The results of any computer searches seeking a match with questioned evidence
- Calibration and maintenance records for all instruments and equipment used in the comparison
- Internal validation
- Proficiency tests of analyst and peer reviewer
- Accreditation documents
- Audit documents
by Special Agent Oscar G. Flores. He had inquired about the FDAS result in reference to this rifle (Item #7). I explained that there had not been any associations. He continued to explain that he had information that this rifle (Item #7) had been used in the 05-1268 homicide. I advised him that I would check into this case and also requested that the evidence (bullet Item 7, case #05-1268) be returned for comparison.
USA v. Taylor, 663 F.Supp.2d 1170 (D.N.M. 2009)

- Form over substance (page limits)
- Begins admissibility analysis with review of defendant’s confession
- Emphasizes the expert’s qualifications
- “[T]he test of reliability is flexible, and Daubert's list of specific factors neither necessarily nor exclusively applies to all experts or in every case.”
Cross/contrary evidence myth

“[V]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.”

But, a prominent critic, cited in the NRC report will not be permitted to testify before the jury because she is not a firearm examiner.
“The use of firearm identification evidence in criminal trials is hardly novel.”

_Daubert_, fn 11: “Although the _Frye_ decision itself focused exclusively on ‘novel’ scientific techniques, we do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence.”
“[N]o federal court has yet deemed it inadmissible.”

*People v. Reilly*, 196 Cal.App.3d 1127, 1135:
“Of course, a court should examine relevant decisions from other jurisdictions on the question of consensus, bearing in mind that the needed consensus is that of scientists, not courts.”
Whether the particular theory can be and has been tested

“[I]ndustry standards generally require an examiner to document in detail, through note-taking and photographs, the basis for his findings [and] require confirmation by at least one other examiner. These factors… indicate at least some significant level of testability and reproducibility.”
Whether the theory has been subjected to peer review and publication

“The Association of Firearm and Toolmark Examiners (AFTE), the principle professional organization for firearms and toolmark examiners, publishes a peer-reviewed journal, the AFTE Journal. Furthermore, the Government cites two articles in the Journal of Forensic Science, another peer-reviewed publication, on the subject of firearm and toolmark identification. Therefore, this factor clearly weighs in favor of admissibility.”
The known or potential rate of error

“Data from CTS testing done between 1978 and 1991 suggest that the rate of false identification is less than 1%. However, both Mr. Nichols and the Grzybowski article acknowledge that uneven test administration, make-up, and level of difficulty significantly limit the usefulness of this result. Nonetheless, this number at least suggests that the error rate is quite low.”
Existence and maintenance of standards

“‘[T]he decision of the toolmark examiner remains a subjective decision based on unarticulated standards.’” (quoting the 2009 NAS Report)
General acceptance “in the relevant scientific or expert community”

“The AFTE Theory appears to be widely accepted by trained firearms examiners, although it is not universally followed.... In any case, it does appear that the use of ‘pattern matching’ to determine whether or not there is a match, an approach which, in one form or another, underlies both AFTE and CMS, is generally accepted among firearms examiners in the field.”
Defining the relevant scientific community

- **NAS Report**, p. 15: “The forensic science system is underresourced … in the sense that it has only thin ties to an academic research base that could support the forensic science disciplines and fill knowledge gaps.”

- **Bohan article**: “It seems obvious that a broad swath of scientists should be engaged in examining each forensic technique about which serious questions have been raised.”
“[W]hile we acknowledge that acceptance by a community of unbiased experts would carry greater weight, we believe that acceptance by other experts in the field should also be considered. And when we consider that factor with respect to fingerprint analysis, what we observe is overwhelming acceptance.”
Positive aspects of Taylor

“Because of the seriousness of the criticisms launched against the methodology underlying firearms identification, both by various commentators and by Defendant in this case, the Court will carefully assess the reliability of this methodology, using Daubert as a guide.”
Positive aspects of **Taylor**

“[B]because of the limitations on the reliability of firearms identification evidence... Mr. Nichols will not be permitted to testify that his methodology allows him to reach this conclusion as a matter of scientific certainty.”
Positive aspects of Taylor

“Mr. Nichols also will not be allowed to testify that he can conclude that there is a match to the exclusion, either practical or absolute, of all other guns. He may only testify that, in his opinion, the bullet came from the suspect rifle to within a reasonable degree of certainty in the firearms examination field.”
Positive aspects of Taylor

“One additional problem with firearms examination, not necessarily neatly encapsulated by any one of the Daubert factors, bears mentioning. Generally, as was done in this case, the examiner is handed only one suspect weapon and the recovered projectile or projectiles.”
Positive aspects of Taylor

“The problem with this practice is the same kind of problem that has troubled courts with respect to show-up identifications of people: it creates a potentially significant ‘observer effect’ whereby the examiner knows that he is testing a suspect weapon and may be predisposed to find a match.”
“[W]hen liberty hangs in the balance… the standards should be higher than… have been imposed across the country. The more courts admit this type of toolmark evidence without requiring documentation, proficiency testing, or evidence of reliability, the more sloppy practices will endure; we should require more.”