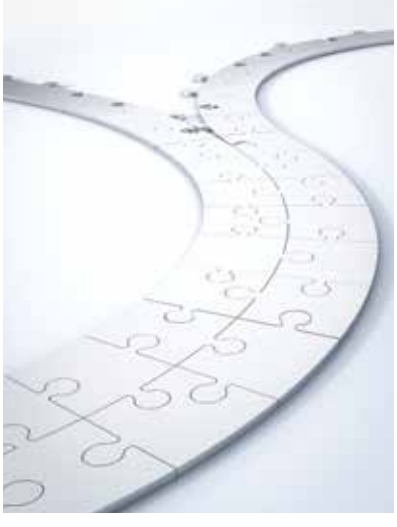
WRONGFUL CONVICTIONS AND DNA EXONERATIONS: UNDERSTANDING THE ROLE OF FORENSIC SCIENCE

BY **GERALD LAPORTE**

A review of erroneous convictions that involved forensic science can help identify critical lessons for forensic scientists as they perform testing, interpret results, render conclusions, and testify in court.



One of the greatest tragedies in the criminal justice system is the conviction of a person for a crime he or she did not commit. Erroneous convictions can have immeasurable consequences for exonerees, original crime victims, and families (see sidebar, "NIJ Listening Sessions with Victims and Exonerees of Wrongful Conviction").[1] Additionally, they may also have long-lasting negative effects on the witnesses, investigators, lawyers, judges, and other criminal justice professionals involved in erroneous convictions. It is therefore incumbent on us to understand the root causes of these tragic events to help ensure that injustice is not repeated.

Wrongful conviction cases have been associated with various causes, which will be discussed throughout this article; however, we specifically examine cases that included forensic science as a contributing factor. Our analysis reviews publicly available data on erroneous convictions and then presents a summary of the cases that have cited forensic science as a potential factor. The goal is to identify what we can learn from these cases to help mitigate the potential for erroneous convictions when forensic scientists perform testing, interpret results, render conclusions, and testify to their findings. During the analysis phase of this study, some inconsistencies were identified with respect to information that is generally available via websites and publicly accessible databases. Also of concern, there is a lack of understanding and reliance on formal research studies that are generally based on a robust experimental design.

The work we do as forensic scientists and the conclusions we reach have lasting effects on people's lives, so we must pursue every effort to understand and identify our weaknesses.

There will undoubtedly be debate as to the ultimate impact of forensic science in many of the exonerations reviewed. The extent to which forensic science is a contributing factor in each case will often include a certain degree of subjective interpretation because the majority of erroneous convictions involve complex investigations, multiple contributing factors, complicated juror decisions, and mistakes from policies and practices that have since changed. Moreover, we do not have all of the details or full transcripts from the evidence and testimony presented at trial, which may further inhibit our understanding and bias our opinions.

It is most important for forensic scientists to understand that the work we do and the conclusions we reach — either in forensic reports or testimony — have lasting effects on people's lives, so we must pursue every effort to understand and identify our weaknesses.

Inconsistencies in Publicly Available Data

According to the Innocence Project, a national litigation and public policy organization dedicated to exonerating wrongfully convicted individuals, 342 people have been exonerated as a result of DNA analysis as of July 31, 2016.[2] The Innocence Project lists six "contributing causes" for wrongful convictions:

- Eyewitness misidentification
- False confessions or admissions
- Government misconduct
- Inadequate defense
- Informants (e.g., jailhouse snitches)
- Unvalidated or improper forensic science

However, Jon Gould, who has written extensively about erroneous convictions, and his colleagues caution that "without a comparison or control group of cases, researchers risk labeling these factors as 'causes' of erroneous convictions when they may be merely correlates."[3] They designed a unique experimental strategy to study factors leading to rightful acquittals or dismissal of charges against an innocent defendant — near misses — that were not present in cases that led to the conviction of an innocent person. After identifying a set of erroneous convictions and near misses and analyzing the cases using bivariate and logistic regression techniques, Gould and his colleagues identified 10 "factors" (not causes) that led to a wrongful conviction of an innocent defendant instead of a dismissal or acquittal:

- Younger defendant
- Criminal history
- Weak prosecution case
- Prosecution withheld evidence
- Lying by a non-eyewitness
- Unintentional witness misidentification
- Misinterpreting forensic evidence at trial
- Weak defense
- Defendant offered a family witness
- States with a "punitive" culture

Rebecca Goldin, a professor of mathematical sciences, has also written about the challenge of conveying the differences between causation and correlation. As Goldin states:[4]

> Journalists are constantly being reminded that correlation doesn't imply causation; yet, conflating the two remains one of the most common errors in news reporting on scientific and health-related studies … . If one action causes another, then they

are most certainly correlated. But just because two things occur together does not mean that one caused the other, even if it seems to make sense.

The Innocence Project's website includes a referenced link to "unvalidated or improper forensic science" for 157 cases (46 percent) of the 342 cases. If we cross-reference the same 157 cases on the National Registry of Exonerations' (NRE's) website — a project that collects information about all known exonerations from 1989 to the present[5] — we find some inconsistencies in how the Innocence Project and NRE classify forensic science as a factor, making it challenging to reconcile the data. NRE is managed by the Newkirk Center for Science and Society at the University of California, Irvine; the University of Michigan Law School; and the Michigan State University College of Law. It identifies 133 DNA exoneration cases (39 percent), from the same pool of cases identified by the Innocence Project, in which forensic science is a contributing factor.

Exhibit 1 lists information on the 24 discrepant cases. A review of each of these cases, including case narratives from both the Innocence Project and NRE and internet articles when applicable, found that in these cases, the Innocence Project's website did not include a clear description of the improper forensic science, there was ambiguity in the narrative, and the evidence described was actually exculpatory. As

Exhibit 1. Discrepant Cases

	Exoneree	State	Innocence Project Forensic Narrative	Contributing Factor(s) Listed on National Registry of Exonerations
1	Avery, Steven	WI	Microscopic hair examination	Mistaken witness identification
2	Burnette, Victor	VA	Microscopic hair examination	Mistaken witness identification
3	Cotton, Ronald	NC	No description of a forensic error	Mistaken witness identification
4	Cunningham, Calvin	VA	Hair: Exculpatory, similar but not consistent	Mistaken witness identification
5	Cruz, Rolando	IL	Co-defendant (not guilty); boot print	False confession; perjury or false accusation; official misconduct
6	Gray, David	IL	No secretor testing performed	Mistaken witness identification; perjury or false accusation; official misconduct
7	Halsey, Byron	NJ	Uncertain	False confession; perjury or false accusation
8	Hernandez, Alejandro	IL	Co-defendant (not guilty); boot print	False confession; perjury or false accusation; official misconduct
9	Jones, Ronald	IL	ABO blood typing	Mistaken witness identification; false confession; official misconduct
10	McClendon, Robert	OH	No description of a forensic error	Mistaken witness identification
11	McSherry, Leonard	CA	No description of a forensic error	Mistaken witness identification
12	Nesmith, Willie	PA	No description of a forensic error	Mistaken witness identification

continued on the next page

Exhibit 1. Discrepant Cases (continued)

	Exoneree	State	Innocence Project Forensic Narrative	Contributing Factor(s) Listed on National Registry of Exonerations
13	Ochoa, James	CA	No description of a forensic error; fingerprint and DNA exculpatory	Mistaken witness identification; official misconduct
14	Powell, Anthony	MA	No description of a forensic error; DNA not admissible at the time	Mistaken witness identification; official misconduct
15	Rivera, Juan	IL	No description of a forensic error	Mistaken witness identification; false confession; perjury or false accusation; official misconduct
16	Snyder, Walter	VA	No description of a forensic error	Mistaken witness identification; false confession; perjury or false accusation; official misconduct
17	Towler, Raymond	OH	No description of a forensic error; hair lacked sufficiency	Mistaken witness identification
18	Turner, Keith	TX	No description of a forensic error	Mistaken witness identification
19	Waller, James	TX	No description of a forensic error; hair was not the same	Mistaken witness identification
20	Waller, Patrick	TX	No description of a forensic error; ABO could not exclude	Mistaken witness identification
21	Warney, Douglas	NY	No description of a forensic error; ABO was exculpatory	False confession; official misconduct
22	Whitley, Drew	PA	No description of a forensic error; hair was similar, but analyst could not be certain	Mistaken witness identification; perjury or false accusation
23	Williams, Willie	GA	No description of a forensic error	Mistaken witness identification
24	Woods, Anthony	MO	No description of a forensic error	Mistaken witness identification

stated previously, some erroneous convictions involved subjective assessments when it comes to contributing factors (see sidebar, "The Case of Steven Avery").

Further, the NRE website lists a total of 1,944 exonerations since 1989 (this includes both non-DNA and DNA exonerations), and improper forensic science is cited in 24 percent of *all* exonerations, not just DNA exonerations such as those reported by the Innocence Project. Researchers John Collins and Jay Jarvis also discuss the discrepancy in the percentages of exonerations citing forensic science as a contributing factor.[6] Therefore, for the purpose of this article, we use the 133 cases listed by NRE — not the 157 cases cited by the Innocence Project — for further analysis.

NRE lists six categories of "contributing factors" (not causes) that are similar to those on the Innocence Project's website:

- Mistaken witness identification or eyewitness misidentification
- Perjury or false accusation
- False confession
- Official misconduct
- Inadequate legal defense
- False or misleading forensic evidence

Although neither the Innocence Project nor NRE use the 10 factors identified by Gould and his colleagues, NRE's categorical descriptions are more aligned with the academic literature and were therefore used for this article.

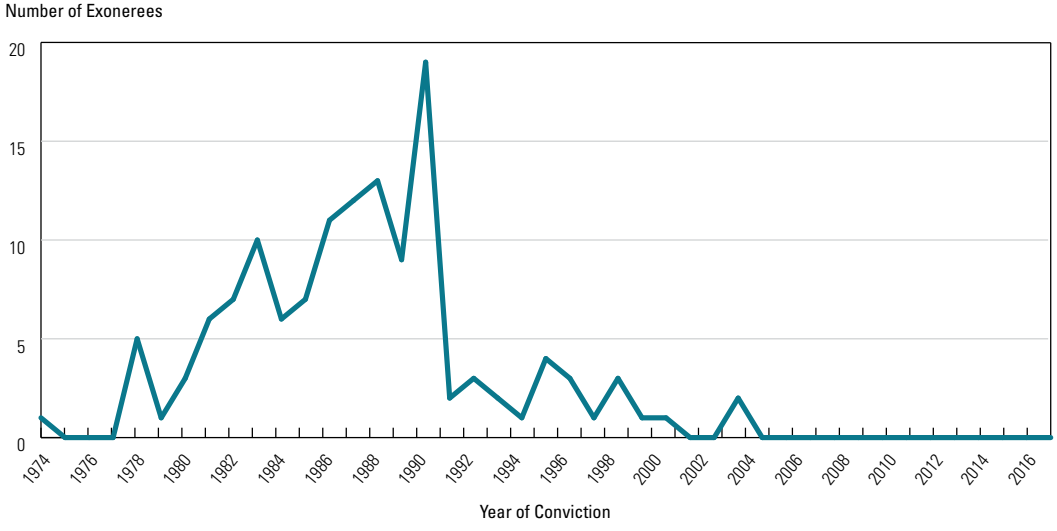
Forensic Science

Unlike any other single scientific discovery, advances in DNA technology have improved how we investigate cases and interpret forensic evidence (see sidebar, "NIJ's Postconviction DNA Testing Program"). Because DNA can provide factually irrefutable evidence in some cases, the idea that innocent people can be found guilty has gained more awareness and acceptance over the past two decades. As a result, we have come to learn more about erroneous convictions.

Nonetheless, the use of forensic science has also been linked with wrongful convictions in past cases and characterized in the media and legal reviews as "faulty," "misleading," and "junk science." Forensic science — when incorrectly perceived as a single discipline — causes observers to conflate matters and acquire their own misperceptions about all forensic science disciplines. Moreover, there can be a variety of methods within a single forensic discipline — and it is often a method, not the entire discipline, that may have been improperly applied or interpreted. Even more pervasive, references to wrongful convictions in the popular media do not cite scholarly articles and often rely on other media articles and unverified sources.

To demonstrate the diversity of forensic science disciplines, the National Institute of Standards and Technology coordinates the development of standards through the Organization of Scientific Area Committees (OSAC) for Forensic Science. The OSAC has identified 23 forensic science subcommittees,[7] which include a variety of disciplines and subdisciplines, such as bloodstain pattern analysis, firearms and tool marks, forensic toxicology, forensic odontology, trace evidence, and mitochondrial DNA analysis. As we discuss later in this article, the

Exhibit 2. Number of Exonerees by Year of Conviction



Note: Data are based on 133 cases of wrongful conviction listed by the National Registry of Exonerations, 1974-2016.

majority of wrongful convictions have been associated with serology (e.g., ABO blood typing and secretor status) and microscopic hair analysis, a subdiscipline of trace evidence. ABO blood typing has a strong scientific foundation and is based on well-founded population statistics, so the root cause of many of these exonerations is likely not a weak foundation in the science but possibly in how the results are interpreted and conveyed — if, in fact, the forensic science analysis substantively contributed to the erroneous conviction.

A Closer Look at the Cases

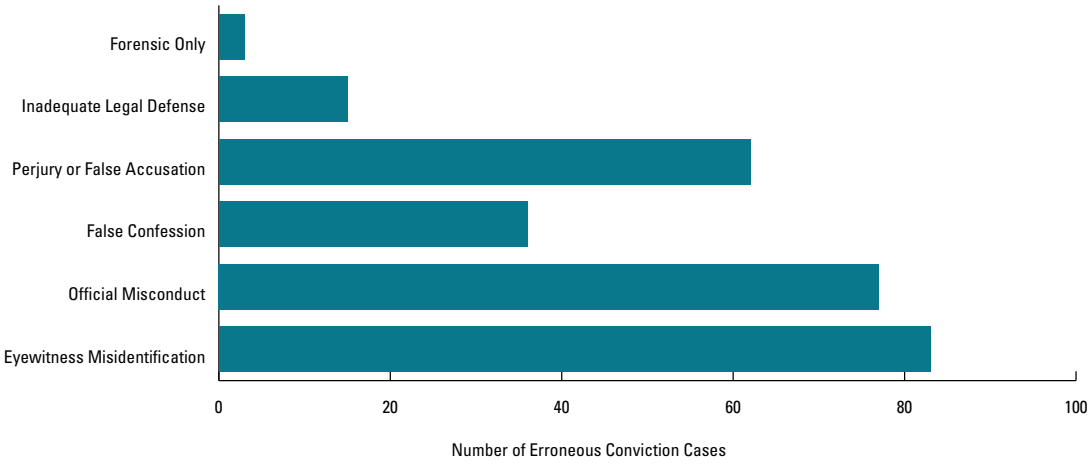
Exhibit 2 shows the number of exonerations from 1974 through 2003 in which NRE cites forensic science as a contributing factor. Based on the year of conviction, 83 percent (110 cases) occurred before 1991, but only two exonerations occurred after 2000, both in 2003. In the first case, according to NRE's website, a DNA analyst identified seminal fluid in two different areas on the victim's underwear. The results from one of the samples excluded Ronjon Cameron; the results from the second sample neither included nor excluded him. More sophisticated DNA testing in 2012 excluded Cameron as the contributor. An examiner reviewed the original case and concluded that Cameron should have been excluded at the time of trial.[8] NRE lists inadequate legal defense, perjury, and false accusations as other contributing factors in the case. The victim also stated that Cameron, whom she knew, was the perpetrator. In the second case, DNA samples from two suspects, Dewayne Jackson and his cousin Dupree Grissom, were inadvertently swapped. Jackson was wrongfully convicted, but in 2010, Grissom was convicted of a separate crime and then linked to the original crime.[9]

In the 133 DNA exoneration cases, 55 percent of the exonerees are African American, 38 percent are Caucasian, and 7 percent are Hispanic.[10] With respect to the original crime victims, 69 percent are Caucasian, 13 percent are African American, 6 percent are Hispanic, and 12 percent are unknown. Also, approximately 15 percent of the original crime victims were under the age of 18 at the time of the crime, and a significant number of victims could be perceived as "vulnerable," such as young female adults (e.g., under age 25) and elderly females (e.g., over age 60). A detailed analysis of exoneree demographics and their relationship to crime type and contributing factors or whether victimology influences investigations, prosecutions, and jury decisions in erroneous convictions was not the subject of this report, but it might prove an interesting area for future research.

Exhibit 3. Contributing Factors to Wrongful Convictions

Forensic Science (FS) + Number of Additional Contributing Factors	Number of Cases (%)
FS	3 (2%)
FS + 1 additional contributing factor	39 (29%)
FS + 2 additional contributing factors	48 (36%)
FS + 3 additional contributing factors	36 (27%)
FS + 4 additional contributing factors	6 (5%)
FS + 5 additional contributing factors	1 (1%)
Total	**133 (100%)**

Exhibit 4. The Relationship Between Forensic Science and Other Contributing Factors in Erroneous Convictions



Note: Data are based on 133 cases of wrongful conviction listed by the National Registry of Exonerations, 1974-2016.

Erroneous convictions, like most catastrophic mistakes in the criminal justice system, are rarely caused by a single identifiable act or weakness. Instead, multiple failures in the process can lead to a negative outcome. Of the 133 DNA exonerations, 98 percent also involved two to five additional contributing factors (see exhibit 3). Only 2 percent (three cases) cited forensic science as the sole contributing factor. The largest number, 36 percent (48 cases), included forensic science and two additional factors.

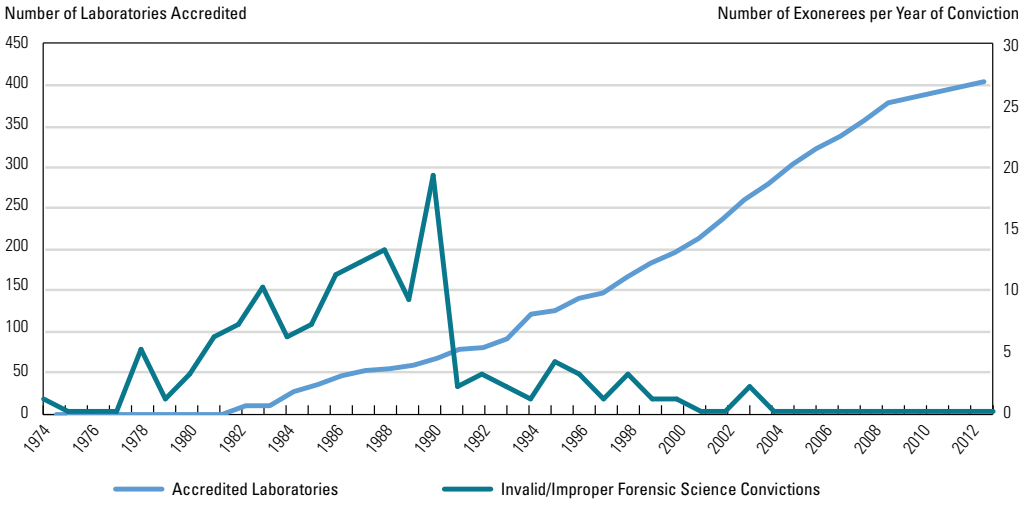
Exhibit 4 shows the relationship when forensic science is cited as a contributing factor along with other contributing factors — inadequate legal defense, perjury or false accusation, false confession, official misconduct, and mistaken witness identification. The most significant number of wrongful convictions in which forensic science is considered a contributing factor is attributable to eyewitness misidentification and official misconduct.

Official Misconduct Cases

The most egregious cases involve malfeasance or official misconduct. There were at least 16 cases from 1980 to 1991 involving forensic charlatans, all of whom were later terminated. Sadly, the testing results in some of those cases would have exculpated the exoneree.

One effective strategy to reduce misconduct is through a rigorous laboratory accreditation program that includes numerous checks and balances. Collins and Jarvis[11] note that only one case out of the 200 they reviewed involved forensic malpractice in an accredited forensic laboratory (in 1988) and state that "[w]hile accreditation is not a promise of perfection, it has enforced professional accountability and transparency that has benefited all stakeholders of forensic science for over 25 years." According to the Bureau of Justice Statistics, as of December 31, 2014, 88 percent of the nation's 409 publicly funded forensic laboratories were accredited by a professional forensic science organization, compared with 82 percent in 2009 and 70 percent in 2002.[12] There has been a significant rise in the number of laboratories accredited over the past two decades, which may help to answer why there has not been a significant number of erroneous convictions related to forensic science since the mid-1990s. Exhibit 5 shows the

Exhibit 5. Number of Laboratories Accredited Per Year vs. Number of Exonerations (Year of Conviction)



Note: Data are based on 133 cases of wrongful conviction listed by the National Registry of Exonerations, 1974-2016.

increase in the number of accredited laboratories compared to the number of exonerees per year of conviction.

NRE identified official misconduct at various levels — not just forensic science malpractice — in 77 of the 133 cases. As a root cause, malfeasance can have a pervasive effect on the entire system and jeopardize other mitigating factors that might normally help identify potential errors during the investigation and prosecution stages. The impact of misconduct can be overwhelming to the system. Some modern examples of malfeasance include Annie Dookhan, a forensic chemist at a Massachusetts crime lab who was prosecuted and convicted for falsifying drug test results,[13] and Sonja Farak, who pleaded guilty to stealing drugs and tampering with evidence, also in a Massachusetts crime lab.[14] Some labs have closed because of a lack of quality control — the Detroit crime lab in 2008, the Nassau County (NY) crime lab in 2011, and the St. Paul (MN) police crime lab in 2012. Although many of these scandals are associated with bad forensic science, the root cause of the failures is the lack of a suitable quality control program or "bad forensic scientists."

Forensic Methods Associated with Erroneous Convictions

The forensic methods that are most frequently associated with wrongful conviction cases are forensic serology (e.g., ABO blood typing and secretor status), microscopic hair analysis, and bite marks. However, the last case involving any of these three disciplines was in the late 1990s. Very few (less than 1 percent) of the 133 exonerations involved the traditional forensic science disciplines that are often referred to as "impression and pattern evidence" — latent prints, firearms, bloodstain pattern analysis, footwear and tire tread analysis, and handwriting (see exhibit 6).[15]

What does appear to be noteworthy based on the data is that serology, microscopic hair analysis, and bite mark examination involve methods that are used to directly link a suspect to the victim by identifying the person. This is quite different from many other forensic disciplines where there is an indirect link, such as correlating a footwear impression at a crime scene to a shoe, a bullet to a gun, or even a fingerprint to an object (fingerprints are rarely recovered from the skin of a victim). Perhaps

Exhibit 6. Forensic Methods Most Frequently Associated with Wrongful Convictions

Forensic Discipline	No. of Cases	Percent of Forensic Cases (N = 133)	Percent of All DNA Exonerations (N = 342)	Range of Years
Forensic biology (serology)	76	57	22	1974-1997
Microscopic hair examination	61	46	18	1978-1998
Bite mark	10	8	3	1985-1998
DNA	7	5	2	1990-2003
Shoe impressions	2	1.5	<1	1982
Fingerprint	1	<1	<1	1997
Fiber	1	<1	<1	1985
Jean pattern	1	<1	<1	1989
Dog scent	1	<1	<1	1978-1981
Voice	1	<1	<1	1985

investigators, prosecutors, and jurors perceive forensic evidence that suggests a strong association between the suspect and the victim differently than physical evidence that may not be viewed as a direct association to the victim.

Take, for example, a case in which a rape victim identifies a suspect at the outset, but during the course of the investigation, the suspect's blood type is determined to match foreign blood on the victim. The direct link between the suspect and victim possibly creates a stronger perceived association. Now consider the same scenario, but instead of matching blood, a shoe impression is found at the scene. When a suspect's shoe is obtained, there is a need to show links between the suspect and the shoe and between the impression from the crime scene and the shoe. There is also a need to show that the suspect wore the shoe when the crime was committed. This type of evidence may be perceived differently and could potentially result in a scenario that causes investigators and prosecutors to seek more evidence. Jurors might also assign less evidential value to the footwear impression than the blood typing results. More research is needed to assess the perceived probative value of different types of forensic evidence and how they may influence investigations, litigation decisions, and factfinders.

Forensic serology cases

From 1974 to 1997, 76 exoneration cases involved forensic serology. Of course, the evolution of DNA typing superseded blood typing and secretor status, which likely explains why wrongful conviction cases involving forensic serology took place prior to the mid-1990s.

Forty-two (55 percent) of these exonerees were African American, 28 (37 percent) Caucasian, and six (8 percent) Latino. More than half of the cases (43) were associated with some form of official misconduct, and 12 directly involved forensic misconduct. With respect to other contributing factors, 51 also included mistaken witness identifications, 23 involved false confessions, and seven were associated with perjury or false accusations.

NIJ's Postconviction DNA Testing Program

NIJ has contributed considerably to advances in DNA technology and forensic DNA analysis; as a result, our nation's forensic laboratories have adopted new methods and technologies over the past two decades. NIJ also administers the Postconviction Testing of DNA Evidence to Exonerate the Innocent grant program to assist in defraying the costs associated with postconviction case review, evidence location, and DNA testing in violent felony cases where the results of such testing might show actual innocence. Since the program's inception in 2008, NIJ has supported more than 50,000 case reviews that have resulted in 28 exonerations. Learn more at NIJ.ojp.gov, keyword: postconviction.

A review of these cases finds some subjectivity and ambiguity in how much the forensic serology testimony factored into the wrongful conviction. There does appear to be a number of cases in which mixtures of body fluids from the victim and suspect may have caused misinterpretation of the results. However, without conducting a review of the actual laboratory data and the testimony, it is difficult to assess the impact of the forensic findings. What is clear in many cases is that ABO blood typing and secretor status were used to either include or exclude — but rarely to identify — the exoneree.

Microscopic hair examination

From 1978 to 1998, 61 of the cases involved microscopic hair examination. As with forensic serology methods, DNA analysis (both nuclear and mitochondrial) has become more commonplace when hair is submitted as evidence.

In these cases, 33 (54 percent) of the exonerees were African American, 24 (39 percent) Caucasian, and four (4 percent) Latino. Thirty-six of these cases also involved official misconduct, and seven involved forensic misconduct by two examiners, who were later terminated. Of the 61 cases, 59 also involved eyewitness misidentification, and 17 involved false confessions.

Further, there was some ambiguity in the interpretation of the evidential value of the hair examination. For example, as discussed by Collins and Jarvis, a criminalist testified in one case "that two Caucasian hairs on Clyde's shirt were microscopically similar (but not conclusively identical) to hair from the victim's head." Without understanding the context of the entire testimony and the criminalist's explanation of "similar (but not conclusively identical)" — as well as the impact of the other factors in this case (e.g., mistaken eyewitness identification) — it is virtually impossible to ascertain with certainty how the microscopic hair examination affected jurors' decisions. Also, it is important to note that 11 of the exonerees in this group were part of four different cases — not 11 different cases.

Bite mark examinations

From 1985 to 1998, 10 cases involved bite mark examinations; seven of these cases involved official misconduct. Thirty percent (three) of the cases also included mistaken eyewitness identification, which is significantly less than the percentage of cases involving forensic serology and microscopic hair examination. In half of these cases, analyses performed by defense experts actually exculpated the exonerees; however, the data set is too small to reach any significant conclusions.

Over the years, the American Board of Forensic Odontology (ABFO) has changed its guidance for associating bite mark impressions. In a December 2000 document,[16] the ABFO issued the following guidance:

> The term reasonable medical certainty conveys the connotation of virtual certainty or beyond reasonable doubt. The term deliberately avoids the message of unconditional certainty only in deference to the scientific maxim that one can never be absolutely positive unless everyone in the world was examined or the expert was an eye witness. The Board considers that a statement of absolute certainty such as "indeed, without a doubt," is unprovable and reckless. Reasonable medical certainty represents the highest order of confidence in a comparison. It is, however, acceptable to state that there is "no doubt in my mind" or "in my opinion, the suspect is the biter" when such statements are prompted in testimony.

In its most recent guidance (2016), the ABFO states that "[t]erms assuring unconditional identification of a perpetrator, or identification 'without doubt,' are not sanctioned as final conclusions in an open population case."[17]

Moving Forward

Unpredictable juror decision-making, the unknown impact of other contributing factors, subjective assessments of information, and lack of complete information result in some uncertainty in how much forensic science has contributed to wrongful convictions. However, there are some critical lessons that forensic scientists can take away from these findings.

First, forensic misconduct is fervently unacceptable; it has a pervasive and infectious effect on the entire criminal justice system. All forensic laboratories and forensic scientists are obliged to make every effort to prevent forensic misconduct. Accreditation, implementation and enforcement of a code of ethics, and appropriate training should mitigate forensic misconduct.

Second, forensic scientists must avoid ambiguous terminology in their reports and testimony because they will mislead investigators, litigators, and factfinders. Forensic science professionals strive to convey their findings accurately and reliably. But terminology such as "consistent with," "similar to," and "cannot be differentiated" — qualitative terms that forensic scientists often use to avoid making conclusive statements that two or more items are not from the same source — may be interpreted differently by courts and juries when used in a certain context and not fully explained. These ambiguous phrases can have repercussions beyond what they were originally intended to do, which is for the forensic scientist to communicate uncertainty. Therefore, all forensic disciplines need to clearly define the language they will use and be cognizant of potential misinterpretation by nonscientists.

Third, and along related lines, forensic scientists must convey impartial and objective conclusions based on accurate and reliable techniques. It is also just as important to clearly articulate limitations and uncertainty so that all users understand the confines of the forensic findings. In reviewing the erroneous convictions that involved forensic serology, there appears to be an underlying issue with mixture interpretation and statistical assessments. Forensic scientists need to demonstrate core competency in the use of and interpretation of statistics. Having an advanced level of statistical training through undergraduate and graduate forensic science programs is essential.

Fourth, errors are often inevitable; when they do occur, it is critical to focus on the underlying problems that contributed to the event — and then to learn from the error. This is an especially challenging issue because the general tendency is to blame an individual.

The final recommendation is best stated in a quote from Dr. Paul Camille Hippolyte Brouardel, a French pathologist: "If the law has made you a witness, remain a man of science. You have no victim to avenge, no guilty or innocent person to convict or save — you must bear testimony within the limits of science."[18]

The Case of Steven Avery

One case that involved ambiguity was the exoneration of Steven Avery. The Innocence Project's description, which conflicts with the one on the National Registry of Exonerations' website, says that "[a] state forensic examiner testified that a hair recovered from a shirt of Avery's was consistent with Beerntsten's hair [victim]." According to a transcript of the cross-examination of the forensic examiner who conducted the microscopic hair analysis, the examiner located three head hairs on a shirt seized from Avery and concluded that two of the head hairs were inconsistent with the victim's hair.[1] The examiner concluded that the third questioned hair found on the shirt was "consistent" with the victim's hair; however, the examiner then explained that a microscopic hair comparison is not a method that can be used to identify the actual source of a questioned hair.

Here are portions of the cross-examination:

Q: Ms. Culhane, is it possible to prove identification by hair analysis?
A: No.

Q: Is the hair of many people consistent with each other?
A: Yes.

Q: Is it unusual for hair from different people to be consistent with each other?
A: No, it's not.

Q: For example, is it unusual for the hair of white Caucasians to be consistent with each other?
A: No.

Q: If, for example, you took hair from 10 different people, would it be unusual to get consistencies between the hair[s] from those people?
A: No.

Q: It would be usual, wouldn't it?
A: Yes, it would be.

Q: Other than the standards that you have spoken of, did you have any other standards?
A: I did have a pubic hair.

Q: But, of head hair, did you have any standards other than the ones you testified about?
A: No, sir.

Q: You had no standards that were purportedly from hospital or ambulance personnel?
A: No, sir.

Q: Do you have any standard purportedly from the husband of the victim?
A: No, sir.

Q: Any standard purportedly from a Diane Messman or John Gould?
A: No.

Q: Any standard from any of Mr. Avery's children?
A: No, sir.

Q: The hair that you found from the white sheet that was inconsistent with the victim's hair, did you analyze it to determine if it was consistent with Mr. Avery's?
A: No.

Q: The hair that was found on the brown T-shirt, did it have any distinguishing characteristics?
A: By distinguishing, do you mean unusual characteristics?

Q: Yes.
A: No.

Q: Isn't that what makes it possible for you to find a hair inconsistent with another, that it has some distinguishing characteristic?
A: Well, by distinguishing, if you mean characteristics specific to that hair, yes, it does. It has nothing out of the ordinary or unusual that would make it rare or anything like that.

Q: What is it about the hair that makes it possible to distinguish it from other hair?
A: The structural features. By that, I mean the presence of a medulla, which is the center portion of the hair, the color, the diameter.

Q: Are any of those structural characteristics rare?
A: No.

Q: Are they common?
A: Yes.

Q: Are you able to give the opinion as to the probability of the hair from the brown T-shirt being from the same source as the D-12 sample?
A: I don't understand what you mean by --- I ---

Q: The hair on the brown shirt, that's consistent with the D-12 standard. Can you give an opinion as to the probability whether they're from the same source?
A: No.

Q: All you can say is that it's not impossible that they're from the same source, isn't that correct?
A: That's right.

Q: And if you were given other standards and compared it against that hair from the brown T-shirt, it could be consistent with some or all of those, isn't that right?
A: It's conceivable. Yes.

Note

1. See page 370 of the transcript, http://www.law.virginia.edu/pdf/faculty/garrett/innocence/avery.pdf.

NIJ Listening Sessions with Victims and Exonerees of Wrongful Conviction

by **Eric Martin** and **Angela Moore**

In February 2016, NIJ and its partners in the Office of Justice Programs and external organizations hosted "Exonerees and Original Victims of Wrongful Conviction: Listening Sessions to Inform Programs and Research." The listening sessions provided a forum for victims or survivors of crimes that resulted in wrongful convictions and for individuals who have been exonerated to share their experiences. The listening sessions were powerful and overwhelming, and the themes that emerged demonstrate the critical need for criminal justice systems to address the unique and largely unmet needs of original victims and exonerees of wrongful convictions.

In these sessions, original victims and survivors described the media's insensitivity, the revictimization of the exoneration process, the lack of victim services compared to what they received during the original prosecution, and the need for peer support. Exonerees shared their challenges in transitioning to civilian life, problems with reconnecting with family and friends, difficulties in obtaining a job — or even basic necessities, such as a driver's license or other identification — and the lack of restitution for their lost wages and Social Security benefits. Both the original victims and exonerees expressed frustration with criminal justice systems not being held accountable for wrongful convictions.

Overall, the listening sessions revealed that, currently, there is no systematic response to the needs of original victims and exonerees of wrongful convictions. The services offered to original crime victims are inadequate and do not address the revictimization often experienced during the exoneration process. For exonerees, there are really no services available, except for those provided to formerly incarcerated individuals re-entering society. Not only are these insufficient, but they are also inappropriate.

Although substantial attention has been devoted to determining the causes of wrongful convictions, there has been limited focus on what happens to victims and exonerees when exonerations occur. To address this gap in knowledge, NIJ has commissioned a special report and a mini-documentary on wrongful convictions. The special report describes in detail the themes from the listening sessions and policy recommendations derived from them. The mini-documentary, a companion to the special report, gives some of the victim and exoneree participants a chance to share their stories with the public. Learn more at NIJ.ojp.gov, keyword: just wrong.

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For More Information

Learn more about NIJ's work in postconviction testing and wrongful conviction at NIJ.ojp.gov, keyword: postconviction.

Notes

1. Seri Irazola, Erin Williamson, Julie Stricker, and Emily Niedzwiecki, "Addressing the Impact of Wrongful Convictions on Crime Victims," *NIJ Journal* 274, October 2014, https://www.nij.gov/journals/274/pages/victim-impact-wrongful-convictions.aspx; Leslie Scott, "'It Never, Ever Ends': The Psychological Impact of Wrongful Conviction," *American University Criminal Law Brief* 5 no. 2 (2010): 10-22, http://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1063&context=clb; and Stephanie Armour, "Wrongly Convicted Walk Away With Scars," *USA Today,* October 13, 2004, at 1A, http://www.usatoday.com/money/workplace/2004-10-13-dna-exonerated-jobs_x.htm.
2. See http://www.innocenceproject.org.
3. Jon B. Gould, Julia Carrano, Richard Leo, and Joseph Young, "Predicting Erroneous Convictions: A Social Science Approach to Miscarriages of Justice," Final report to the National Institute of Justice, grant number 2009-IJ-CX-4110, February 2013, NCJ 241839, https://www.ncjrs.gov/pdffiles1/nij/grants/241389.pdf.
4. Rebecca Goldin, "Causation vs Correlation," *SENSE about SCIENCE USA,* August 19, 2015, http://www.senseaboutscienceusa.org/causation-vs-correlation.
5. See http://www.law.umich.edu/special/exoneration/Pages/about.aspx.
6. John M. Collins and Jay Jarvis, "The Wrongful Conviction of Forensic Science," *Forensic Science Policy & Management* 1 no. 1 (2009): 17-31.
7. See https://www.nist.gov/topics/forensic-science/about-osac.
8. See http://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=4802.
9. See http://www.law.umich.edu/special/exoneration/Pages/casedetail.aspx?caseid=3821.
10. In comparison, the NRE has a record of 1,944 exonerations (child sex abuse, sexual assault, homicide, and other crimes) and reports that 47 percent are African American, 39 percent are Caucasian, 12 percent are Hispanic, and 2 percent are other races/ethnicities. However, in crimes involving child sex abuse (212 exonerations), 64 percent are Caucasian, 26 percent are African American, and 10 percent are Hispanic.
11. Collins and Jarvis, "The Wrongful Conviction of Forensic Science."
12. Matthew R. Durose, Andrea M. Burch, Kelly Walsh, and Emily Tiry, *Publicly Funded Forensic Crime Laboratories: Resources and Services,* 2014, Bulletin, Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics, November 2016, NCJ 250151, https://www.bjs.gov/content/pub/pdf/pffclrs14.pdf.
13. See Katie Mettler, "How a Lab Chemist Went From 'Superwoman' to Disgraced Saboteur of More Than 20,000 Drug Cases," *Washington Post,* April 21, 2017, https://www.washingtonpost.com/news/morning-mix/wp/2017/04/21/how-a-lab-chemist-went-from-superwoman-to-disgraced-saboteur-of-more-than-20000-drug-cases/?utm_term=.a6f589123d19.
14. Tom Jackson, "Mass. Crime Chemist Admits Daily Drug Use in Lab, Sparking a Second Scandal," *The Washington Post,* True Crime section, May 5, 2016, https://www.washingtonpost.com/news/true-crime/wp/2016/05/05/mass-crime-chemist-admits-daily-drug-use-in-lab-sparking-a-second-scandal/?utm_term=.200b64084697.
15. Impression evidence is created when two objects come in contact with enough force to cause an "impression," such as a fingerprint or the marks on a bullet caused by the barrel of a firearm. Pattern evidence may be additional identifiable information found within an impression, such as the examination of shoeprint evidence to identify a particular brand, model, or size (class characteristics). If a shoe is recovered from a suspect that matches this initial pattern, the forensic examiner can also look for unique characteristics that are common between the shoe and the shoeprint, such as tread wear, cuts, or nicks (individual characteristics).
16. See ABFO Bitemark Methodology Guidelines, http://abfo.org/wp-content/uploads/2012/08/ABFO-Standards-Guidelines-for-Evaluating-Bitemarks-Feb-2018.pdf.
17. See ABFO ID and Bitemark Guidelines, https://abfo.org/resources/id-bitemark-guidelines/.
18. Dr. P.C.H. Brouardel, 19th-century French medico-legalist, quoted in *ASCLD/Lab Guiding Principles of Professional Responsibility for Crime Laboratories and Forensic Scientists,* http://www.identacode.org/ASCLD_Guiding_Principles.pdf.

Image source: Westend61, Getty Images.

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