

Changes in Forensic Science & Legal Impacts

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General Practice Review

Forensics and Criminal Law

- Currently 2,688 exonerations nationwide
- 664 exonerations attributed to flawed/misleading or fraudulent forensics or “junk science”
- Includes SBS/AHT; Fire/Arson Inv.; Ballistics, fingerprints, shoeprints, false confessions
- National Registry of Exonerations
- <http://www.law.umich.edu/special/exoneration/Pages/about.aspx>

Forensics and Civil Law

- Medical Malpractice/Wrongful Death/PI
- Product Liability
 - Fire/Arson Investigations
- Subrogation Claims
- Expert Witnesses—admissibility and qualifications
- *Daubert vs. Frye*

Changes to Forensic Science

- NAS Report, 2009
 - DNA is only reliable forensic science discipline
 - Scientific foundation laid outside of law enforcement in science/medical community
- PCAST Report, 2016
 - Foundational Validity
 - Validity as Applied
 - Courts should not admit forensic evidence without foundational validity and applied validity

Foundational Validity

Foundational validity for a forensic-science method requires that it be shown, based on empirical studies, to be ***repeatable, reproducible, and accurate***, at levels that have been measured and are appropriate to the intended application. Foundational validity, then, means that a method can, *in principle*, be reliable. **It is the *scientific* concept we mean to correspond to the *legal* requirement, in Rule 702(c), of “reliable principles and methods.”**

Validity as Applied

Validity as applied means that the **method has been reliably applied *in practice***. It is the *scientific* concept we mean to correspond to the *legal* requirement, in **Rule 702(d)**, that an expert “**has reliably applied the principles and methods to the facts of the case.**”

Rules of Evidence & Science

- Iowa Rule of Evidence 5.702 states that a witness may be qualified by knowledge, skill experience, training or education. Witnesses under 5.702 may offer opinion testimony that is based on scientific, technical, or other specialized knowledge.
- The Iowa Supreme Court has interpreted Rule 702 to hold that the “witness must also be qualified to answer the particular question propounded.”
Tappe v. Iowa Methodist Med. Ctr., 477 N.W.2d 396 (Iowa 1996).

Daubert, Frye or Iowa Nice?

- In Iowa, “trial courts may, in their discretion,” consider the facts enumerated in Daubert, but are not required to do so. In re Johnson, 2002 WL 31309172, at *4 (Iowa Ct. App. Oct. 16, 2002)(quoting Leaf v. Goodyear Tire & Rubber Co., 590 N.W.2d 525, 533 (Iowa 1999)).
 - Rule 702 and our cases applying it have served us well, and we see no need to replace them in favor of a mandatory application of the Daubert test, whether the evidence is scientific or technical in nature. Nevertheless, we believe the “observations” in Daubert will be helpful to a court in assessing reliability of evidence in complex cases. Leaf, 590 N.W.2d at 532.

A Fire Example

- However, the “[f]ailure to test, although not determinative of a proffered expert's status, is instructive. The Sixth Circuit **has found that a failure to test a hypothesis may disqualify a witness from testifying as an expert.**” *Coffey v. Dowley Mfg., Inc.*, 187 F.Supp.2d 958, 977 (M.D.Tenn.2002), *aff'd*, *Coffey v. Dowley Mfg. Inc.*, 89 Fed.Appx. 927 (6th Cir.2003). *See, e.g., Pride v. BIC Corp.*, 218 F.3d 566, 578 (6th Cir.2000) (affirming **exclusion of expert testimony regarding the cause and origin of a fire purportedly caused by a lighter, due to a failure to conduct testing**). This is especially true here, due to Doran's inability to rely on critical aspects of Claytor's investigation.

Indiana Ins. Co. v. Gen. Elec. Co., 326 F. Supp. 2d 844, 852 (N.D. Ohio 2004)

Example Cont.

- We conclude the district court did not abuse its discretion in admitting the expert testimony of Russell. As the foregoing demonstrates, he is sufficiently qualified in fire investigation to address the matters covered in his testimony. “[N]o **particular education is required; experience is sufficient to qualify a witness as an expert.**” *Id.* at 535. **Any deficiency in Russell's college education is offset by his considerable experience and continuing education in fire investigation and goes to the weight of his testimony rather than its admissibility. See Iowa R. Evid. 5.702** (stating a witness may be qualified as an expert “by knowledge, skill, experience, training, *or* education” (emphasis added)); *see also Hutchison v. American Family Mut. Ins. Co.*, 514 N.W.2d 882, 885 (Iowa 1994) (stating if witness has threshold qualifications to testify as an expert, any inquiry concerning the *extent* of his qualifications goes to the weight of his testimony). Moreover, a **witness does not need to be “a specialist in the particular area of testimony so long as the testimony falls within the witness'[s] general area of expertise.”** *Mensink v. American Grain*, 564 N.W.2d 376, 379 (Iowa 1997).

Hilsman v. Phillips, 764 N.W.2d 784 (Iowa Ct. App. 2009)

Fire Science

- **OLD:** burn patterns indicated accelerant used; canine alerts; if not an accident must be arson
- **NOW:** Can't use patterns after flashover; canine alert must be confirmed by lab; no negative corpus



Criminal Arson Trials

- Iowa Rules 5.702 allowing unqualified experts- SFM with
- Little to no training to testify as to cause and origin
- Ex: Thompson
- **Patrick Thompson's Defense Attacks Fire Investigation Again in Murder Trial**
- <https://who13.com/news/patrick-thompsons-defense-attacks-fire-investigation-again-in-murder-trial/>

So. . . .

- Civil vs. Criminal Matter
- Admissibility of Expert Opinions
- What types of science do you need to know?
- What is happening in the criminal law area that affects civil cases and vice versa?

SBS & AHT



- Dontshake.org
- National Center on Shaken Baby Syndrome
- Child Abuse Pediatricians
- <https://www.abp.org/content/child-abuse-pediatrics-certification>

Audrey Edmunds

- A mother and in home child care provider
- Six-month-old Natalie Beard died on October 16, 1995 after being with Audrey for an hour
- Several expert witnesses who testified to "a reasonable degree of medical certainty" that Natalie had been a victim of SBS. The experts unequivocally told the jury that, after suffering her fatal injury, Natalie would have had "an immediate and obvious response" and would not have seemed to be normal when her mother left her with Audrey.
- Was convicted in 1996 of first-degree reckless homicide for Natalie's death .
- 18 year sentence
- <https://www.law.northwestern.edu/legalclinic/wrongfulconvictions/exonerations/wi/audrey-edmunds.html>



Audrey Edmunds

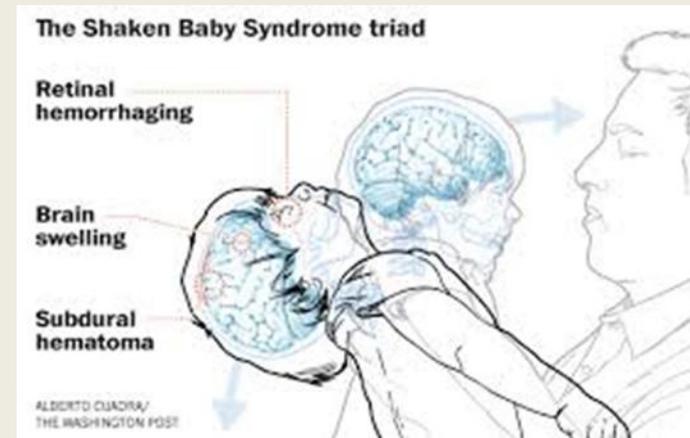
- By 2006, however, medical opinion had changed significantly.
- experts who testified that symptoms they once thought were proof of SBS had been linked to dozens of other causes, including accidents, illness, infection, old injuries, and congenital defects.
- One expert, Dr. Patrick Barnes, a pediatric neuroradiologist at Stanford University, testified that even something as mundane as an ear infection could spread to the brain with fatal consequences.
- On appeal the Wisconsin Court of Appeals held on January 31, 2008, that "**a shift in mainstream medical opinion**" had cast doubt on whether shaking could have caused the brain injury that caused Natalie Beard's death.
- The court ordered a new trial for Audrey, but the District Attorney's office dropped the case on July 11, 2008.
- https://www.amazon.com/Happened-Audrey-Terrifying-Journey-Accused/dp/0985799803/ref=asap_bc?ie=UTF8

Child Abuse/Medical Diagnosis

OLD: The Triad proof of shaking or abuse/impact
Infant fractures indicate abuse

NOW: other medical conditions that can cause the triad; differential diagnosis required. Eliminate other causes of the triad.

EX: infections, blood clot, accidental falls; rickets



DNA Evidence

Two types of DNA

- Nuclear: found in semen, blood, saliva, sweat, skin cells.
- Non-Nuclear (Mitochondrial)- found in hair, bones, finger nails.



"We ran a full DNA test, STR and Mitochondrial analysis...
and Bob here 'Googled' it just to make sure."

Golden State Killer

- Police said they checked the crime scene DNA against one of the genealogy sites that have lately become popular — databases filled with the profiles of people who have volunteered their genetic codes in the hope of discovering their relatives and ancestors. GEDmatch, a free service, confirmed that police used it to identify DeAngelo.
- The suspected Golden State Killer was not in this database, either, but it didn't matter. A distant relative of his was, police say, and that person's DNA partially matched evidence related to the serial killer. Instantly, the pool of suspects shrank from millions of people down to a single family.
- Detectives then used traditional investigative techniques to narrow the family members down to one suspect: DeAngelo, a 72-year-old former police officer who lived within a few miles of many of the attacks.

Issues

- Complex mixtures (more than 2 people)
- Contamination
- Degraded samples
- Lab fraud/non-accreditation
- Statistical probabilities
- Probabilistic genotyping
- Privacy concerns

DNA Vocabulary

- **locus (loci):** fixed position on a chromosome (location)
 - Used to look at 13, now 20
- **Alleles:** the pair of genes (one from each parent)
- **PCR:** polymerase chain reaction (like a copy machine)
- **STR:** short, tandem repeats
- **Y-STR:** on the Y chromosome (male)

Resources

- DNA for the Defense, June 2012; NIJ.gov
- Using DNA to Solve Cold Cases, NIJ report, July 2002
- Inside the Cell, Dark Side of Forensic DNA by Erin Murphy
- Forensic DNA Evidence Interpretation, by John Buckleton
- Your own expert to consult

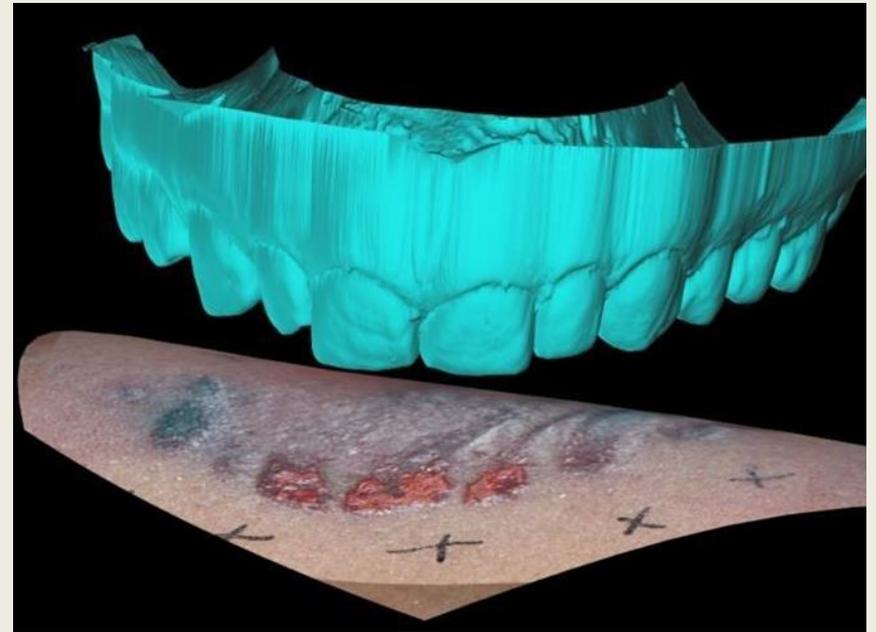
5 Basic Steps of DNA Testing

1. Extraction of DNA from cellular material
2. Quantification of amount of human DNA recovered
3. Amplification of areas of DNA being tested using PCR
4. Separation and typing of amplified DNA fragments- using capillary electrophoresis
5. Review, interpretation, comparison, and reporting

Bite marks

OLD: (1) dental characteristics differ substantially among people, particularly the front teeth, and (2) skin can reliably capture distinctive features

NOW: PCAST says no foundational validity; no standards for a match



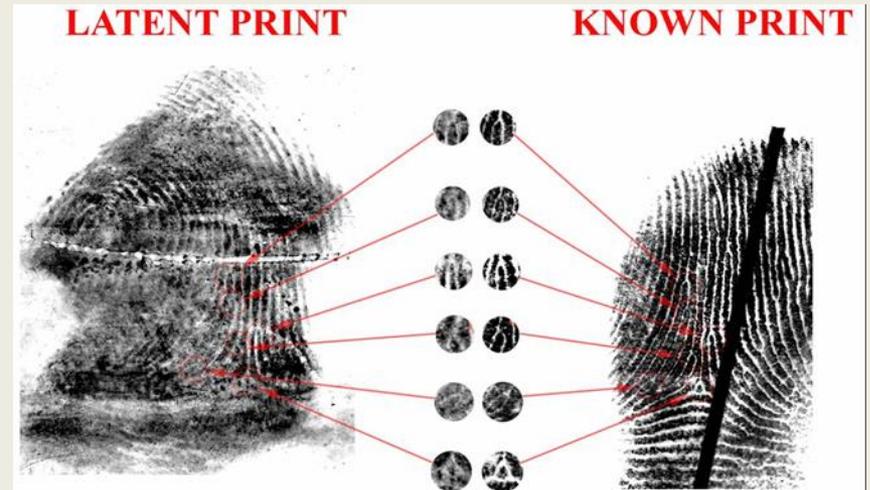
Admissible or not

- Under *Frye*, for expert testimony to be admissible, it must be generally accepted within the relevant scientific community. Here's the question at issue: **When it comes to bite mark evidence, what is the relevant scientific community? For prosecutors such as Mourges and Consiglio, it is *other bite mark analysts*.** That is, the relevant community of “scientists” whose opinion judges should consider when evaluating the scientific validity of bite mark analysis should be people who already believe that bite mark analysis is scientific. You almost have to admire the brazenness of this argument. It's like saying that if a judge is evaluating the scientific merit of palm readers, he should only consider the opinions of other palm readers. And yet so far, the argument has worked every time it has been tried.

<https://www.washingtonpost.com/news/the-watch/wp/2017/01/30/incredibly-prosecutors-are-still-defending-bite-mark-evidence/>

Latent Fingerprints

- **OLD:** comparing an unknown print(latent print) to a known print is reliable
- **NOW PCAST:** Latent Fingerprint analysis is a foundationally valid subjective methodology *but a has a higher false positive rate than many jurors would expect*



Footwear/Shoeprints

OLD: a known shoe to an impression found at the crime scene can be reliably identified by:

- Class Characteristics: design, size, and general wear
- Identifying characteristics: Cuts, nicks, etc. from wearing the shoe

NOW: no foundational validity per PCAST to associate shoeprints with particular shoes based on specific identifying marks



Microscopic Hair Comparisons

- **OLD:** match hairs found on victim/crime scene to hair of suspect to reasonable degree scientific certainty or a **MATCH**
- **NOW:** use DNA; no foundational validity; subjective; no known characteristics



FBI admitted errors with MHC

- The Iowa review focuses on 3 admitted errors, the analyst:
 1. identified or implied an identification of hair to a person
 2. Stated or implied statistical weight to hair match
 3. Used own experience in lab to imply de facto statistical significance to the match

Flawed forensic hair testimony from the FBI Lab

The FBI has identified for review roughly **2,500 cases** in which the FBI Lab reported a hair match.

Reviews of **342 defendants' cases** have been completed. About 1,200 cases remain, including 700 in which police or prosecutors have not responded to requests for trial transcripts or other information.

268 trials in which hair evidence was used against defendants.

FBI examiners gave flawed forensic testimony in **257 of those 268 trials**, or more than **95 percent**.

268 trials in which hair evidence was used against criminal defendants.

257 trials with flawed forensic testimony.

32 death-penalty cases with flawed forensic testimony.

NOTE: The FBI is completing reviews of about 900 lab reports.

Source: National Association of Criminal Defense Lawyers and Innocence Project analysis of FBI and Justice Department data as of March 2015

THE WASHINGTON POST

Challenge the Evidence

- Get your own Expert
- Research, Research, Research
 - NAS Report: <https://www.nap.edu/catalog/12589/strengthening-forensic-science-in-the-united-states-a-path-forward>
 - PCAST Report: Report on Forensic Science in the Courts:
 - https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf
- Pre-trial challenges
 - Reliability of evidence
 - Limit opinions with Motions in Limine
- Trial challenges
 - The goal is to educate your judge/jury

CONTRADICTION OF JASON CARTER

- 2017 CIVIL WRONGFUL DEATH SUIT
- NO FORENSIC EVIDENCE
- Bill Carter's investigation found out that Jason had several reasons for getting Shirley Carters killed. It ranged from his financial troubles and an alleged mistress who Shirley Carter knew about. Jason Carter was also the next in line to inherit the farm. All this made Bill Carter resolute in his belief that Jason had killed his mother.

ACQUITTAL IN CRIMINAL CASE

- A jury found Jason Carter not guilty of murder in March.
- Undisclosed alternate suspects
- Failure to investigate and collect forensic evidence
- \$10M civil judgment to stand against Jason Carter after being acquitted in mother's death

Questions

- Contact me to brain storm or discuss possible experts.
- Tell me your successes and challenges!
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- Phone: 515-344-3410