

Wrongful Convictions and Forensic Science

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Overview of presentation

- Adversarial vs inquisitorial criminal procedures
- Forensic science: Fingerprint identification and DNA profiling
- How wrongful convictions occur
- Investigative and evidentiary errors, unconscious biases
- Strengthening forensic science, guidelines for reporting a match
- What legal professionals need to know
- Safeguards to avoid wrongful convictions

Adversarial vs Inquisitorial

Adversarial

- Passive judge
- Evidence exclusions to avoid prejudice
- Party-centred
- Advantages party with most resources
- Partisan experts, hired guns
- Rebuttal experts “let the best expert win”
- Trial by ambush

Inquisitorial

- Judge active search for truth
- All case decisions reviewed
- Court-centred
- No independent investigation by defence
- Single court-appointed expert, not so independent
- Minor role for defence
- Trial by dossier, more confirmatory review

Forensic science

- 19th century: fingerprint
 - Compare latent mark lifted from crime scene to 10-prints of (un)known suspects.
 - Evidence at court is number of points of similarity between mark and print.
- 21st century: DNA profiling
 - Compare crime scene sample to (un)known suspect sample; kit analysis, amplify, interpret.
 - Evidence is likelihood of random match in population.
- Although forensic evidence is valuable in solving crimes and prosecuting criminals, errors occur.

FEATURES	FINGERPRINTS	DNA
Forensic uses	since 1900	since 1990
Uniqueness	presumed; twins differ	twins same, family similar
Scientific foundation	none	unchallenged
Expert training	years of specialist training	technicians use analysis kits, scientists testify in court
Training content	the biology of fingerprints; use of tools; human judgment and skills	kits, technology, chemistry
Test basis	pattern matching	pattern matching
Criteria for match	arbitrary	empirically validated
Points of similarity tested	not all have <i>a priori</i> set of points	9 -15 loci
Test outcomes	match, mismatch, insufficient, inconclusive	match, mismatch, inconclusive
Verification/checking	yes	yes
Expression of similarity	most certain; some probabilistic	probabilistic
Expression of certainty	yes	no
Challenge match in court	rare	yes, but rare
Factfinder assess match	no	no

Investigative and evidentiary errors in forensic evidence

Investigative

- Careless gathering of samples
- Inappropriate testing
- Incorrect interpretation
- Expectancy bias
- Confirmation bias
- Contextual bias
- Frame of referral question
- Overconfidence in science

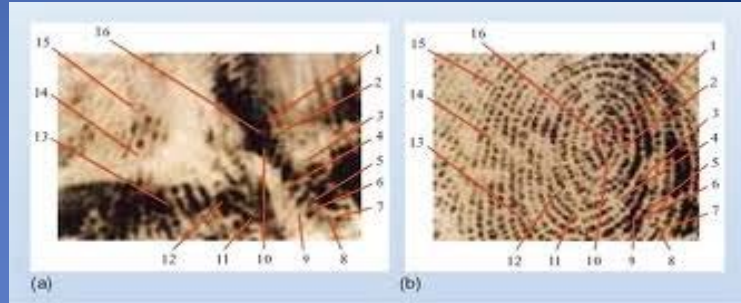
Evidentiary

- Expert not competent
- Exclude background (how samples obtained)
- Exclude error rates, contamination rates
- Erroneous jury directions
- Improper weight to evidence
- Little challenge to evidence

HM Advocate v McKie (1999), Scotland



Policewoman Shirley McKie



David Asbury's latent and inked prints, showing 16 points of similarity

- McKie and Asbury's prints found at murder scene.
- Asbury convicted and sentenced to life.
- McKie, a policewoman investigating crime denied being at the scene, and was tried for perjury.
- McKie was acquitted after defence experts discredited prosecution fingerprint identification evidence.
- Asbury's conviction was then overturned.

R v Jama (2009), Victoria, Australia

- Female had GHB symptoms at club, and 4 swabs to test for sexual assault.
- Cold hit match to Jama, whose alibi was being at home with ailing father. RMP 1 in 45 billion “rock solid.” Sample 800 billion times more likely from Jama than random.
- Convicted, six year sentence for lack of remorse.
- DNA sample provided by Jama’s sexual partner in same hospital room 28 hours before M. Standard of cleaning inadequate to remove DNA traces on medical trolley, contaminated samples.



Farah Jama and lawyer who appealed his conviction

Investigative errors in *McKie* and *Jama*

Features	McKie	Jama
Ambiguous samples	✓	✗
Contaminated samples	✗	✓
Cold hit in database	✓	✓
Tests link to accused	✗	✓
Single theory of culpability	✓	✓
Flawed theory overlooked	✓	✓
Exonerating facts ignored	✓	✓
Negative stereotype of accused	✗	✓
Unskilled expert	✗	✓
Error rates (false +ve) ignored	✗	✓

Evidentiary errors in McKie and Jama

Features	McKie	Jama
Circumstantial evidence only	✓	✓
No pre-trial disclosure by prosecution	✗	✓
No independent tests by defence	✗	✓
Poor communication	✓	✓
Facts about origin of samples excluded	✓	✓
No report on error/contamination rates	✓	✓
Expert competence untested	✗	✓
Presumption of reliable science	✓	✓
Test results overstated	✓	✓
Factfinder questions unanswered	✗	✓

Unconscious bias in *McKie* and *Jama*

Cognitive biases	McKie	Jama
Expectancy bias	✓	✓
Confirmation bias	✓	✓
Contextual bias	✗	✓
Commitment bias	✓	✗
Overconfidence	✓	✓

Strengthening forensic science

Procedures to minimize scientific errors (Thompson, 2011)

- CSI model vs Blind service lab shield from information that suspect is perpetrator and source of sample
- Case management model sequential unmasked testing (Krane et al., 2008)
- Signal detection to assess false –ve and false +ve rates; d' : how well matches distinguished from nonmatches; beta: threshold for a match decision

(NSF Workshop ,2010)

- International standards and regulations

Advice to scientists expressing a match

(Koehler & Meixner Report to NSF 2011)

- Never say there is/is not a match.
- Likelihood of results if defendant is source/is not the source.
- Strength of evidence independent of other case facts – avoid “double-counting”
- Confidence estimate of match strength.
- No ultimate opinion as to which hypothesis is true; no comments about source samples.

What legal professionals need to know

- DNA knowledge, CSI effects, prosecution bias.
- Lawyers and judges make scientific errors.
- All scientific evidence can be challenged.
- *Daubert* tests inadequate.
- Gatekeeper effects and single experts.
- Cross-examination exposes weaknesses.
- Status of “DNA-only” cases.
- Scientific education for lawyers.

Traditional legal safeguards on reliability of scientific evidence

Adversarial legal systems

- Prosecution discloses exculpatory evidence
- Parties exchange expert information before trial
- Rules of evidence on experts (FRE 702)
- Judicial gate-keeping
- Cross-examination
- Concurrent experts
- Judicial directions
- Deliberation

Inquisitorial legal systems:

- Neutrality of prosecutor and judge
- Judge receives complete dossier of all case decisions
- Comprehensive review
- Judge actively questions witnesses
- Independent expert

Primacy of fact-finding in law

- 90% of cases resolved based on facts
- Relevance, reliability and fairness
- *“Task of fact finding for courts is to identify the truth, subject to the principles of a fair trial and to specific rules of law and discretions designed to protect other public values which, on occasions, are entitled to recognition in a way which constrains the fact finding process”*
- The public will never accept that justice can be attained by a *“forensic game”* (Spigelman, 2011)

Truth and justice in adversary proceedings

Relationship between truth and adversarial system:

- The adversarial system is not concerned with truth, but with “procedural truth” or “legal truth”, not substantive fact.
- The adversarial system is the most effective mechanism for the discovery of truth using the Socratic dialogue.
- The adversarial system seeks truth, but that search is qualified when the pursuit of truth conflicts with other values

(Spigelman, 2011)

Which system produces fewer wrongful convictions?

- Data on this unavailable, difficult to obtain
- Few experimental studies, e.g., discrediting information outcomes vary by accessibility:
 - by one party: inquisitorial more likely to expose information and more accurate
 - by both parties: adversarial more accurate
- Evidence more thoroughly tested by cross-examination, dossier reviews confirm not test
- Independent fact finders more accurate

New safeguards: Towards a hybrid inquisitorial and adversarial model

(Findley, 2011)

- Prosecution and defence counsel work for single office
- Individual criminal lawyers rotate duties: sometime prosecution, sometimes defence
- Lawyers have equal power to seek scientific information on behalf of clients
- Scientists independent of police
- Scientists report to all legal counsel
- Scientists are “blind” to clients (state/accused)
- Cross-examination of forensic scientist
- Independent, actively engaged fact finder
- Deliberation by community promotes legitimacy