



ACHIEVING JUSTICE AT TRIAL: DNA EXPERT TESTIMONY

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Patricia D. Powers

Patti Powers joined AEquitas as the lead Attorney Advisor on the SAKI project after serving as a Senior Deputy Prosecuting Attorney in Washington State for 27 years. She supervised the Sexual Assault—Domestic Violence Unit and prosecuted and tried a high volume of violent crimes—specializing in adult sexual assault, child sexual assault and abuse, sexual exploitation of minors, domestic violence, and related homicides (including complex litigation of high-profile, as well as cold and current cases). Patti served on the domestic violence and child fatality review committees and was a member of the Washington State Technical Assistance Committee for Child Death Review Guidelines. For five years, she was appointed as a Highly Qualified Expert for the United States Army, Criminal Investigation Division; in this role, she provided training for army criminal investigation agents and prosecutors at Fort Leonard Wood, Missouri, and in Germany.



Misty Marra

Misty Marra is a Forensic DNA Analyst and the DNA Laboratory Coordinator at the Marshall University Forensic Science Center (MUFSC) in Huntington, WV. She received a BA in Biology from West Virginia University and a MS in Forensic Science from Marshall University. Misty has performed analysis/review of over 5,000 forensic DNA cases, which have included sexual assaults, homicides, and property crimes. She has been instrumental in coordinating the MUFSC's sexual assault kit testing projects and the technical review of outsourced sexual assault kit projects with agencies and crime laboratories across the U.S.

Ms. Marra has served as a Subject Matter Expert and has conducted instructional webinars and on-site trainings regarding DNA and its use in criminal cases with a focus on sexual assault cases both nationally and internationally for entities such as RTI International, SANE-SART Resource Service, and the Office for Victims of Crime.



Objectives

Prepare and present effective expert testimony on direct and cross examination.

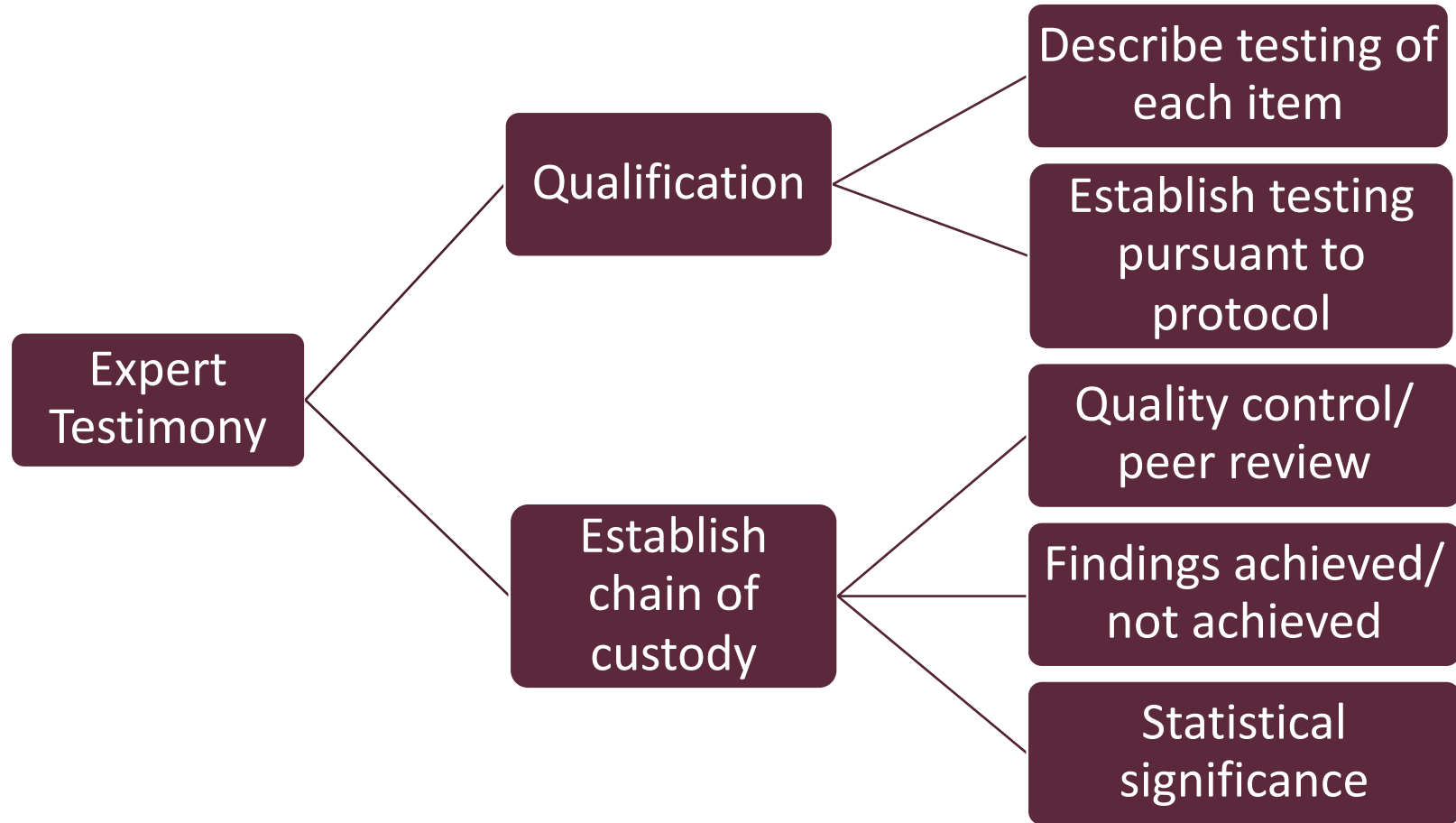
Develop legally sufficient and persuasive foundation questions for the admission of testing results.

Offer expert testimony pursuant to ER 702 and 703, including when the original analyst is unavailable.

Present testimony of the initial analyst and the outsourced analyst, to include changes in technology/interpretation.

Employ strategies to educate juries and explain the importance of forensic analysis and the significance of findings in the context of the case.

Overview of Testimony



Planning Testimony with Expert

Review and discuss report; inquire about bench notes; ensure complete discovery

Preview expert qualification questions

Review foundation questions

Employ strategic reference to jury: “Can you explain to us?”

Plan to offer evidence as exhibit during testimony

Anticipate issues that may be raised in cross examination

Testimony by Expert Witnesses

FRE 702

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a)** the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b)** the testimony is based on sufficient facts or data;
- (c)** the testimony is the product of reliable principles and methods; and
- (d)** the expert has reliably applied the principles and methods to the facts of the case.

Foundation for Expert Testimony

Foundation is necessary for the court and the jury.

Qualifications are critical to foundation.

Present legally sufficient foundation in a persuasive manner.

Assume most jurors do not have expertise in subject matter of expert.

Develop questions to educate jurors on the science: "Can you explain to us.....?"

Establish Expert Qualifications

ACADEMIC

- Degrees achieved, institution, dates.
- Additional courses/ seminars/ additional training/ practicum or clinical.

PROFESSIONAL

- How long have you served as a laboratory analyst?
- What are your responsibilities? Supervisory authority? Provide training? Peer review? Authored publications? Provide training?
- Ongoing professional training? Professional training in familial DNA testing, forensic genetic genealogy?
- Previous testimony as an expert?

General Foundation Questions for Admission of DNA Results

Did you receive evidence from x agency with request for testing?

Date/ time, personnel involved; identify packaging

Mark as identification and offer as appropriate



Where was the evidence maintained prior to testing?

Precautions undertaken to prevent access/ contamination

Responsible personnel



Testing pursuant to approved protocol

Discuss procedure, i.e. Y-STR


“Can you explain to us?”

General Foundation Questions

Did you achieve findings? Were your findings peer reviewed? What are your findings?



Can you tell us the frequency that this profile, the defendant's profile, is found in the relevant population?



Depending on testing (i.e. Y-STR) ask about the difference in statistics, from greater to smaller.

Older Lab Technology and Interpretation Guidelines

- Depending on age of case and when DNA testing performed, results and conclusions to be presented in testimony may be based on previous DNA technology and interpretation guidelines.
- Older vs. current DNA amplification kits.
 - Increase in sensitivity and # of loci over time.
- Older lab reports may have more instances where no conclusions were drawn based on previous interpretation guidelines.
 - DNA profile and mixture interpretation has improved with technology and national recommendations.
- If you have an old case, you may want to explore options for any re-testing with current technology with the crime lab expert.

Y-STR Cases – Why Use “Y”

- Y-STR technology only reacts with STRs on Y-chromosome; doesn't react with female DNA.
- Failure to obtain male DNA profile using traditional STR technology or the STR results are minimal or inconclusive, especially in presence of high levels of female DNA.
 - Current DNA quantitation technology provides a ratio that estimates the amount of male DNA vs. total human DNA in a DNA sample.
- Extended time between the crime and evidence collection, especially in sexual assaults.
- Trace amounts of male DNA:
 - Touch DNA.
 - Sexual assault involving digital penetration, sterile or vasectomized male perpetrators, or when there is no ejaculation.
 - Fingernail scrapings from sexual assault victims.
- Resolve male – male mixtures.

Y-STR Cases – 2 Big Differences

- Y-STR profile is **not unique** to one individual.
 - Y-STRs are inherited in full form from the father and will match all patrilineal related male relatives.
- Statistical frequencies are estimated using the counting method.
 - Y-STRs are all on the Y-Chromosome – not inherited independently.
 - Cannot calculate statistics like STRs which are independently inherited.
 - The entire Y-STR profile is searched against a Y-STR database to determine the number of times the Y-STR profile was observed in the database.

Y-STR Testimony

- Example report wording – *The Y-STR profile obtained from the evidence item matches the Y-STR profile from the suspect and would be expected to match all other paternally related males. The Y-STR profile from the evidence item was searched against a known database and would be expected to be observed in 1 in 92,335.*
- Impact - Y-STR did not exclude the suspect.
 - Address the nuances of Y-STR technology and the weight of the conclusion.
 - May rely heavily on other elements of the crime to link the suspect.

Testimony of Laboratory Analyst: Y-STR

- Provide testimony about Y-STR testing and methodology employed.
- Establish acceptance in the scientific community.
- Elicit description of results.
- Ensure that evidence is considered in the context of the crime: ***not everyone in a certain population was present at the scene!***

Familial DNA Searching – Consider State Law

- Each state must determine whether or not to authorize familial DNA searching.
- Arkansas, California, Colorado, Florida, Michigan, Texas, Utah, Virginia, Wisconsin and Wyoming currently perform familial searching.
- Specially-designed software (not CODIS software) is used to perform familial searching of databases.
- Maryland and DC have passed laws prohibiting familial DNA searching.

Frequently asked questions on CODIS and NDIS, FED. BUREAU OF INVESTIGATION,
<https://www.fbi.gov/services/laboratory/biometric-analysis/codis/codis-and-ndis-fact-sheet> (last visited January 5, 2022)

Familial DNA Searching at the Crime Lab

- Routine search of STR profile in CODIS = no match.
- Search of a database (not NDIS) is performed with a previously obtained STR profile using specialized software and validated search criteria.
- A list of candidates is generated from the search and may be ranked using statistical calculations to determine the likelihood of kinship.
- Additional testing will be performed to narrow down the pool of candidates, exclude unrelated individuals and confirm the potential relative.
 - Lineage testing such as Y-STR or Mitochondrial DNA Testing.
- Investigative lead is reported to law enforcement for follow up.
 - Familial DNA Searching is only one piece of the puzzle – still lots of work to do.

Familial DNA Searching Testimony

- Lay foundation of why familial search was performed.
- Explanation of familial search process.
- Emphasize that the familial search generated an investigative lead as opposed to identification of a suspect.
- Provide results of crime lab testing of the confirmation sample collected as a result of the investigative lead.
 - Traditional STR testing and comparison to evidence items.

Forensic Genetic Genealogy - The Basics

- Combination of genetic analysis with traditional historical and genealogical research.
 - Not routinely performed at crime lab.
- DNA from an unknown source is searched in a public genetic genealogy database.
- The genealogy database search can identify close and distant relatives with DNA in common with the unknown source.
 - Can even identify the individual themselves if they are in the database.
- Family trees are developed by genetic genealogists to generate an investigative lead.

Forensic Genetic Genealogy Testimony

- May involve testimony by scientists and genealogists from forensic genetic genealogy company.
- Explanation of Forensic Genetic Genealogy (FGG) process.
- Emphasize that this process generated an investigative lead as opposed to identification of a suspect.
- Crime lab expert testimony will provide results of crime lab testing of the confirmation sample collected as a result of the investigative lead.
 - Traditional STR testing and comparison to evidence items.

Presenting Testimony: Confirmatory Sample

- FGG lead establishes probable cause: sufficiency of genetic and non-genetic information linking suspect to crime.
- Consider whether investigator can ultimately testify to the investigatory lead.
- Collect reference sample from suspect: consent, search warrant, abandoned DNA.
- Testing of confirmatory sample with DNA from victim or crime scene is presented as evidence.

Forensic Genetic Genealogy: Introducing the Match

- Did you receive items of evidence from x agency? Date?
- Admit or ask for confirmation of identifications, referring to laboratory number and exhibit number if admitted.
- What were you requested to do?
- What methodology did you use? Generally accepted within the scientific community?
- Results.

“Reasonable Degree of Scientific Certainty”

- In 2016, the DOJ Office of the Attorney General directed federal laboratories and prosecutors to review their policies and discontinue the use of the phrase “reasonable degree of scientific certainty” based on a publication by the National Commission on Forensic Science.
- This phrase was not used by scientific disciplines outside of the court and is not defined in standard medical or scientific reference materials, but rather was used as a matter of custom.

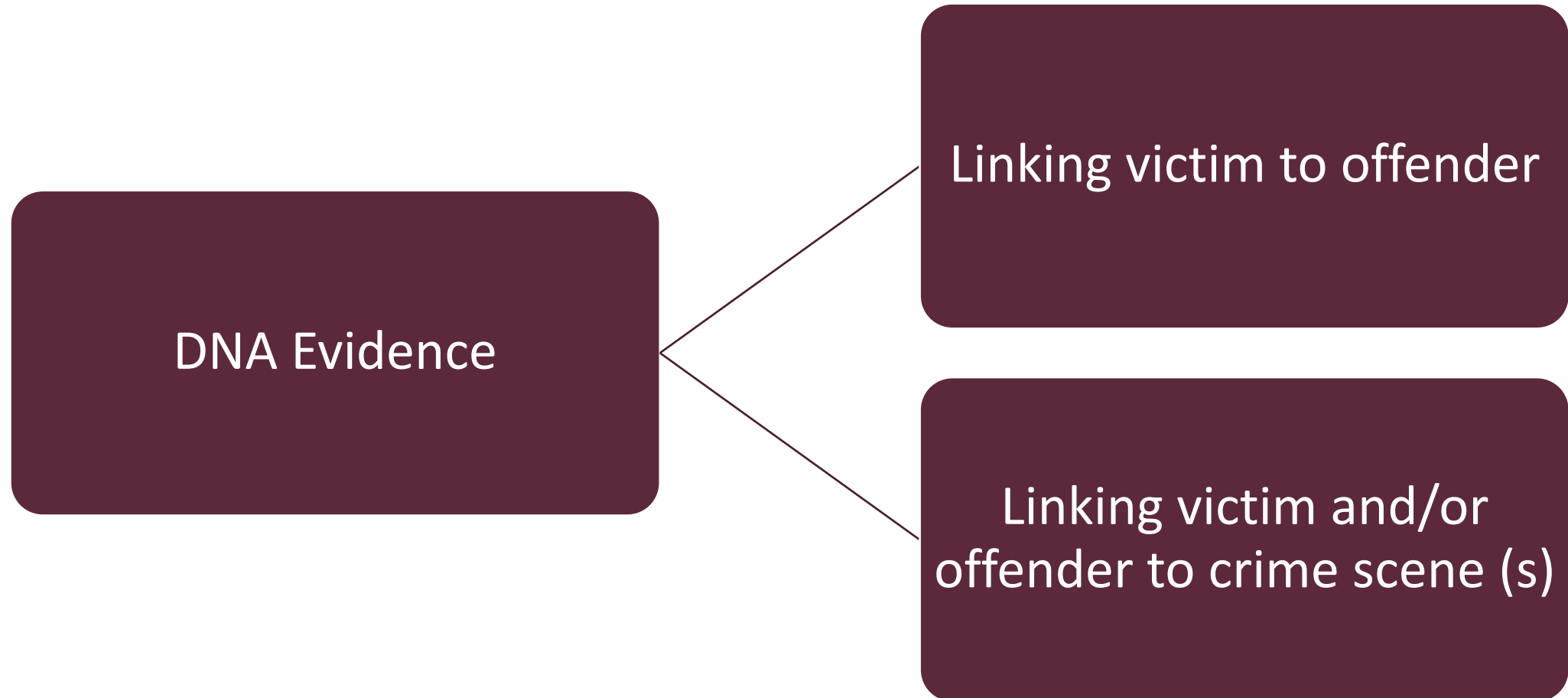
“Reasonable Degree of Scientific Certainty”, cont’d

- Neither Daubert or Federal Rules of Evidence require such language.
- No common scientific definition of what threshold established certainty.
- Can be confusing when presented with probabilistic evidence (statistical statements).
 - Want to avoid implying a stronger degree of probability.
- An expert’s complete explanation of the findings in language that laypersons can understand is critical to the jury’s understanding of the expert’s conclusions.

Practice Tips

- Have identifications pre-marked if acceptable to the Court.
- Prepare to admit identification with appropriate witness and use exhibit as reference for other witnesses.
- In cold case, ensure witness has had opportunity to see exhibit and view earlier packaging, change in protocol, or handwriting.
- When possible, personalize the contents, *i.e.* swabs obtained from the victim, the victim's DNA profile.

Keep Linkage in Perspective throughout Questioning



Evidence-Based Hypotheticals: FRE 703

Bases of an Expert:

An expert may base an opinion on **facts or data in the case** that the expert has been made aware of or personally observed. If experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion on the subject, they need not be admissible for the opinion to be admitted. But if the facts or data would otherwise be inadmissible, the proponent of the opinion may disclose them to the jury only if their probative value in helping the jury evaluate the opinion substantially outweighs their prejudicial effect.

Evidence-Based Hypotheticals, cont'd

- Help make the **connection** to critical points.
- Assist in translating science to practical examples.
- May be based upon the evidence in the case: may/may not be admissible.
- Must be reasonably relied upon by experts in the field.

Anticipating the Issues

Have you overcome challenges with missing evidence, when the original analyst is unavailable, when evidence is outsourced, or when a laboratory report is amended?

“What if” evidence is lost/ destroyed?

- Advise the Court and defense of loss as well as all known circumstances.
- Rely on extant laboratory reports and consult with expert if original analyst is no longer available.
- Laboratory reports will specify evidence tag numbers and associated laboratory numbers that are important references.
- Reports will also describe evidence that can also be verified through other witnesses.

“What if” original analyst is no longer available?

- If previous witness unavailable, consider FRE 702, *Williams v. Illinois*, 567 U.S. 50 (2012), *Crawford v. Washington*, 541 U.S. 36 (2004).
- Consider retesting if there is a sufficient quantity.
- If consumption requested, provide defense with notice of request.
- If there is a stipulation to results, ensure completeness of agreed information.

Unavailability of Original Analyst– Lab Perspective

- Who performed technical review of the case?
 - An evaluation of DNA data, results and conclusions, checking consistency, accuracy and completeness to ensure there is an appropriate and sufficient basis for the scientific conclusion.
 - Must be conducted by a current or previously qualified analyst in the methodology being reviewed who is not an author of the applicable report/case file or its contents.
 - DNA Technical Leader is also an option – oversees technical operations of the lab.
- Re-test the evidence:
 - Is the remaining evidence of sufficient quantity?
 - Is there other evidence to test?
- Consult with laboratory personnel to determine best path forward.

“What if”evidence has been outsourced to another laboratory?

- Call analyst in referring laboratory who did any initial testing of evidence.
- Ask for explanation of limitations upon capacity or resources.
- Describe process of outsourcing.
- Ask about changes in technology.
- Establish chain of custody at all points.

Outsourcing– Lab Perspective

- Requires on-site visit to outsourcing lab prior to onset of testing.
 - Assess outsourcing lab's ability to perform the requested analysis.
 - Annually if contract/agreement extends beyond one year.
- Ownership review the outsourcing laboratory's DNA data.
 - To verify the integrity of the DNA data received for the purpose of taking ownership of the data.
 - Must be performed by an analyst or technical reviewer who is qualified in the technology, platform and typing test kit used to generate the data and must participate in the lab's proficiency testing program.
 - Technology – type of forensic DNA analysis (STR, YSTR, etc.).
 - Platform – type of analytical system used to generate DNA profiles (capillary electrophoresis).
 - Typing test kit – set of chemical reagents used to generate DNA profiles.

Outsourcing – Lab Perspective

Equipment

- Various laboratory equipment can be used for the same technology and platform.
 - Extraction chemistry and robots, real-time quantitation instruments, thermal cyclers, genetic analyzers.

Interpretation

- Outsourcing lab will use its own validated interpretation protocols and provide these protocols to the crime lab.
- Ownership review will verify these protocols were followed.
- Crime lab can then use their discretion when taking ownership of a profile for CODIS.

“What if”the laboratory report is amended?

- Provide all laboratory reports in discovery.
- Speak with laboratory analyst to determine reasons for amendment.
- Determine if pre-trial is necessary to address potential issues with testimony.
- Absorb issues into direct examination to establish integrity of the process and quality assurance.

Forensic Laboratory Quality System

- Forensic laboratory accreditation requires compliance with certain quality standards (Quality Assurance Standards for Forensic DNA Testing Laboratories, ISO/IEC 17025).
- Processes, procedures and resources to ensure product consistency.
 - Analytical controls to monitor contamination and ensure DNA typing is accurate.
 - Equipment calibration and maintenance.
 - Interpretation guidelines.
 - Proficiency testing.
- Administrative and technical review of the case file and report prior to issuing the report – want to catch errors before they leave the building.

Types of Case-Specific Issues To Address on Direct

- Amended Reports
 - Correct typographical or technical error on original report.
- Negative Control or Sample Contamination
- Instrument failure
- Sample Switch
- Statistical Database Errors

Corrective Action

- Laboratories should have a system for documenting any non-conformities.
- Non-conformities are evaluated to determine the potential significance by quality management.
- Root cause analysis and determine effect of the non-conformity.
- Corrective action to include preventative measure to minimize reoccurrence:
 - Procedure change
 - Re-training

Disclosing and Addressing Corrective Action

- Laboratory should inform the prosecution of any non-conformity associated with **the specific case** where they are asked to provide expert testimony.
 - Could be notation on the laboratory report, a case note in the case file, or some other form of documentation (*i.e.*, letter from manufacturer regarding contaminated reagents).
- Be transparent to address the issue up front during direct exam.



Direct: Amended Laboratory Report

Strategies for Direct and Cross Examination

Pre-Trial Litigation

- Address anticipated issues with the Court:
 - Expert qualifications.
 - Challenges to the science that have been addressed by *Frye/Daubert* cases or new issues that require a hearing.
 - Objections to admission of evidence based upon chain of custody.
 - Anticipated defense expert testimony.

Practice Tips

- Ensure a complete direct examination absorbing questions/ issues that you anticipate after any necessary pre-trial.
- Offer expert an opportunity to explain issues on direct rather than respond to leading questions on cross-examination.
- Remember re-direct may be limited based upon cross-examination.
- Have CV and reports available at witness stand.

Preparing for Cross Examination of State's Expert

Review defense expert's report or interview: When there is not a defense expert, focus on defense theory of the case and evidence

Review CV, consult with other prosecutors and organizations

Determine information that expert is relying upon/ defense theory

Review report/
interview with State's
experts

Determine viability of
issues raised

Incorporate into direct
exam of State's expert



Direct: Mixtures

Possible Defense Expert Scenario

- Crime lab analyst deemed a DNA mixture as inconclusive, and the defense expert is prepared to testify that the mixture can be interpreted and contains DNA from the victim and another unknown individual – not the defendant.
- Crime lab analyst relies on standard operating procedures and approved interpretation guidelines based on national recommendations.
 - DNA results must meet certain interpretation thresholds.
 - Interpretation and profile comparisons are technically reviewed by another qualified analyst.

TRIAL: Re-Creating the Reality of the Crime

Have you developed effective practices for presentation of DNA expert testimony?

Presenting Impactful Evidence

- Photograph evidence and project to screen or to iPads of jury.
- Use software that enables projecting crime scene and placement of evidence.
- Consider use of demonstrative evidence to illustrate aspects of testimony, *i.e.*, testing, findings.
- Use software to enable immediate reference to report or transcription.

Presenting Testimonial Evidence

- Consider that virtual testimony may be necessary for witnesses in some instances: *Maryland v Craig*, 497 U.S. 836 (1990).
- Counsel may stipulate, but Defendant must also personally stipulate since this is a confrontation right.

Where does DNA evidence fit in?

Forensic evidence: crime scene, victim: video, measurements, analysis: ballistics, blood spatter, fingerprint experts, DNA analysts

Answering potential defenses: Denial, alibi, self defense (homicide), consent, denial (sexual assault)

**Elements of Crime/
Context and Linkage**

Testimonial evidence: Victim/Witness statements; possible res gestae statements by victim, statements/admissions of suspect

Behavioral evidence: impact of psychological trauma, FRE 404(b) "other acts" evidence, behavioral patterns

Overview of Trial with DNA

DNA Evidence : An Eloquent Witness

Connection

Culpability

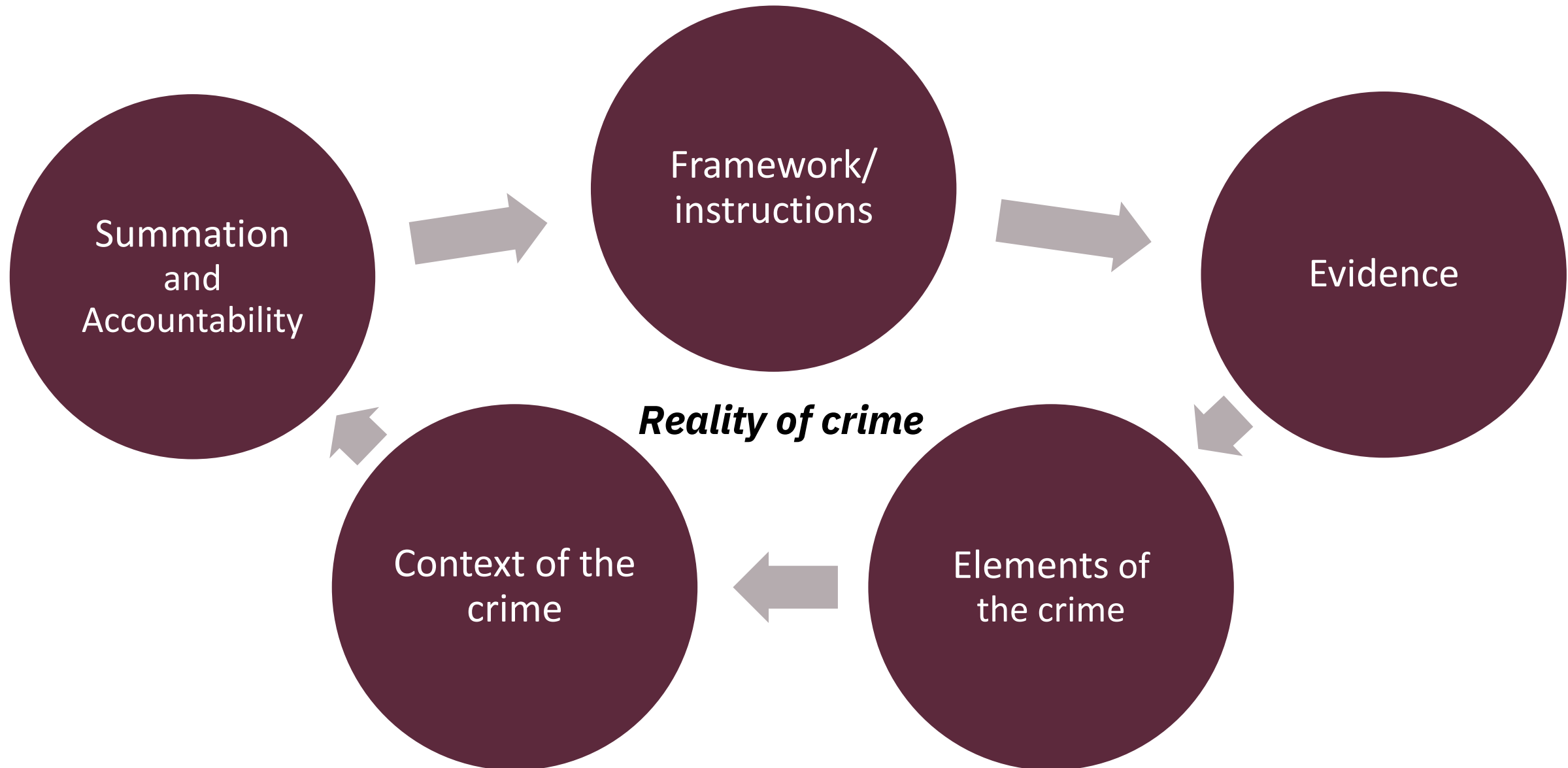
Explore expert testimony during jury selection

Build the case with DNA emphasizing linkage

Allow the science to speak
for itself

Ensure presentation of
evidence is understandable
to jury

Closing Argument and Justice



Going Forward

Anticipate issues and present effective expert testimony on direct and cross examination.

Advance legally sufficient and persuasive foundation questions.

Offer expert testimony pursuant to ER 702 and 703, including when the original analyst is unavailable.

Present testimony of initial analyst and outsourced analyst, to include changes in technology/interpretation.

Develop strategies to educate juries and explain the importance of forensic analysis and significance of findings in the context of the case.

Contact Information



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