From the Laboratory to the Courtroom:
Forensic Challenges in Drug Testing

Dr. Leo Kadehjian
Palo Alto, California

Any legal issues discussed are presented for informational purposes only, and are not intended to be considered legal advice.
Consult your legal counsel for professional legal guidance.

Forensic Challenges: Specimens, Technologies

- Urine: Adulteration, substitution, dilution, interpretation
- Oral fluid: Adulteration, interpretation
- On-site: Subjectivity, performance
- Hair: Contamination, bias, ADA, standards
- Sweat: Contamination, tampering, standards
- Oculomotor: Science, standards

Forensic Issues for Laboratories / Toxicologists

- Admissibility of evidence
  Legal standards: peer review, known error rate, standards, …
- Evidentiary weight
  Chain of custody, laboratory performance, interpretation, …
- Legal requirements for decisionmaking
  Beyond a reasonable doubt, preponderance, …
- Laboratory liability
  Duty owed, negligence, privacy of records/HIPAA …
- Expert liability
  Peer oversight

History of Science in Legal Proceedings

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>2030 BC</td>
<td>Trial by ordeal (fire, poison, battle)</td>
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<tr>
<td></td>
<td>Parliament did not formally abolish trial by battle until 1819</td>
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<tr>
<td>1000 BC</td>
<td>Forensic psychology</td>
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<tr>
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<td>(King Solomon, threatened to cut baby in half)</td>
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<tr>
<td>287–212 BC</td>
<td>Metallurgy</td>
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<tr>
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<td>(Archimedes detects silver alloying in gold coins by water displacement, &quot;Eureka&quot;)</td>
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<tr>
<td>15 BC–19 AD</td>
<td>Forensic chemistry</td>
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<tr>
<td></td>
<td>(non-combustibility of heart as indication of poisoning in murder of Germanicus; defense claimed prior heart ailment)</td>
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<tr>
<td>1591</td>
<td>Forensic microscopy</td>
</tr>
<tr>
<td>1727</td>
<td>Forensic photographs</td>
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<tr>
<td>1822</td>
<td>Daguerreotypes</td>
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<tr>
<td>1836</td>
<td>Forensic chemistry / toxicology</td>
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<tr>
<td></td>
<td>(English chemist, Marsh, test for arsenic)</td>
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<tr>
<td>1858</td>
<td>Fingerprints</td>
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<tr>
<td>1860</td>
<td>Spectrographic analysis (flame ionization of inorganics)</td>
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<tr>
<td>1895</td>
<td>X-rays (Roentgen)</td>
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<tr>
<td>1900</td>
<td>Forensic immunology (Landsteiner, blood grouping)</td>
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### History of Science in Legal Proceedings

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
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<tbody>
<tr>
<td>1901</td>
<td>Precipitin test for human blood (human or rabbit blood?)</td>
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<tr>
<td>1906</td>
<td>Sound recording</td>
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<tr>
<td>1912</td>
<td>Ballistics, firearms (photos of bullets)</td>
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<tr>
<td>1921</td>
<td>Lie detector</td>
</tr>
<tr>
<td>1931</td>
<td>Drunkometer (blood alcohol)</td>
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<tr>
<td>1945</td>
<td>Radar</td>
</tr>
</tbody>
</table>
| 1948 | Truth serum  
(scopolamine, barbiturates–sodium pentothal, amytal) |
| **Current** | Drug tests: Urine, hair, oral fluid, sweat, oculomotor testing, onsite tests, DNA, brain scans (fMRI), … |

### Standards of Legal Decisionmaking

“… commanded that no punishment be carried out except where there are witnesses who testify that the matter is established in certainty beyond any doubt, …”

“… it is better and more desirable to free a thousand sinners, than to kill one innocent.”

Maimonides, re. Negative Commandment #290, 1135–1204

“… it is better that ten guilty persons escape than one innocent suffer.”


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100%  
Beyond a reasonable doubt

50%  
Preponderance of the evidence

25%  
Probable cause

10%  
Reasonable suspicion

0%  
Mere suspicion

Dowling, 1976
“...the Due Process Clause has never been construed to require that the procedures used to guard against an erroneous deprivation of a protectable ‘property’ or ‘liberty’ interest be so comprehensive as to preclude any possibility of error. The Due Process Clause simply does not mandate that all government decisionmaking comply with standards that assure perfect, error-free determinations.”

_Mackey v. Montrym, 1979_

“...there simply is no constitutional guarantee that all executive decisionmaking must comply with standards that assure error-free determinations.”

_Greenholtz v. Nebraska Penal Inmates, 442 U.S. 1 (1979)_

“Of course, it would be unreasonable to conclude that the subject of scientific testimony must be ‘known’ to a certainty; arguably, there are no certainties in science.”

_Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579 (1993)_
## Admissibility of Scientific Evidence

**Federal courts:**

1975  Federal Rules of Evidence  
1993  Daubert v. Merrell Dow Pharmaceuticals, Inc. (509 U.S. 579)

**State courts:**

Follow Federal Rules / Daubert  

*Frye rule (Kelly-Frye in CA)*  


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### Federal Rules of Evidence (1975)

**Evidence / Admissibility**

- Rule 401. Relevant evidence  
- Rule 402. Admissibility of relevant evidence  
- Rule 403. Exclusion of relevant evidence

**Expert opinions**

- Rule 702. Testimony by experts  
- Rule 703. Basis of expert testimony

### Rule 702. Testimony by Experts

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

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### Rule 703. Bases of Opinion Testimony by Experts

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence in order for the opinion or inference to be admitted. Facts or data that are otherwise inadmissible shall not be disclosed to the jury by the proponent of the opinion or inference unless the court determines that their probative value in assisting the jury to evaluate the expert’s opinion substantially outweighs their prejudicial effect.

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### Is the theory or technique scientific knowledge which will assist the trier of fact?

- Testing  
- Peer review or publication  
- Known or potential rate of error  
- Standards controlling operation  
- General acceptance

*Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579 (1993)*
**Drug Tests in Revocation Hearings: 5th Circuit Requirements**

Provide 5 days prior to hearing:
- Test results
- Chain of custody
- Laboratory employee affidavit

Reports made part of record

*U.S. v. Grandlund, 5th Cir. 1995*

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**Specimen Handling and Chain of Custody**

**Chain of Custody**

Prove the identity and integrity of the specimen from receipt until reporting of the result

- Collection
- Transportation
- Analysis
- Reporting

“When it is the barest speculation that there was tampering, it is proper to admit the evidence and let what doubt remains go to its weight.”

*People v. Riser, 1956*

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“The requirement of reasonable certainty is not met when some vital link in the chain of possession is not accounted for, because then it is as likely as not that the evidence analyzed was not the evidence originally received. Left to such speculation, the court must exclude the evidence.”

*People v. Riser, 1956*

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**Specimen Collection**

- Trained collectors
- Adulteration precautions
- Labeling and sealing
- Chain of custody form
  Donor, collector certification statements
- Secure storage
Specimen Transfer

- Secure packaging
- Documentation
- Government mail
- Acknowledged couriers

Corrections Chain of Custody: Federal Cases

- Wykoff v. Resig (D. Ind. 1985)
  3–4 hr delay in unlocked refrigerator before transport: Allowed

- Soto v. Lord (S.D. N.Y. 1988)
  Incomplete COC form: Not allowed

- U.S. v. Burton (8th Cir. 1989)
  Urine in unlocked box in desk for 1 day, 2 week delay in mailing (in locked refrigerator): Allowed

Corrections Chain of Custody: State Cases

  56 day delay in testing, results not challenged: Allowed

- Harrison v. Dahm (8th Cir. 1990)
  No review of evidence log to establish COC: Allowed

- Easton v. U.S. Corrections Corp. (6th Cir. 1994, unpublished)
  Error in time (3 hr storage before collection): Allowed

  Insufficient COC testimony: Not allowed

  Urine left in office and refrigerator without security: Allowed

  Minor deficiencies in COC entries: Allowed

Laboratory Analysis

- Accessioning
- Analysis
- Secure storage
**Scientific Foundations of Laboratory Methods**

*and*

**Demonstration of their Proper Performance**

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**Non-Users**

- **Test +**
  - True +
  - False +

- **Test -**
  - True -
  - False -

**Users**

- **Test +**
  - True +
  - Unconfirmed +

- **Test -**
  - False -

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**Qualitative**

(positive, negative)

vs.

**Quantitative**

(ng/mL, immunoreactive equivalents, rate units)

vs.

"**Semi-quantitative**"

(no such thing?!)
“Indeed, the two studies involving the largest sample sizes place the Emit test at a level of certainty even higher than the reasonable doubt standard.”


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**Center for Disease Control**

**Studies on Emit®**

97 – 99% Accuracy


96% Accuracy, Survey of 64 labs


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**NY Department of Correctional Services**

**AAB Proficiency Survey**

40 Sites, 4 years

99.7% Accuracy, 3067 Samples

98.7% Accuracy, 730 Positives


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“**The Package Insert is your Friend**”

*(but may also be your enemy!)*

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**Reporting**

- Completeness:
  - Specimen id, collection date, lab receipt date, testing date
  - Methods, calibration, controls, cutoffs, results
  - Personnel performing, reviewing, authenticating

- Clarity

- Confidentiality

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**Recordkeeping**

- Sufficient records for thorough scientific and chain of custody review

- Calibration and control data

- Specimen test data

- Evidence of review
**Challenges to Interpretation of Test Results**

*Melendez-Diaz v. Massachusetts, 129 S.Ct. 2527, 6/25/09*

Do laboratory reports satisfy 6th Amendment rights to confrontation?

6th Amendment:

“In all criminal prosecutions, the accused shall enjoy the right … to be confronted with the witnesses against him; …”

- Are laboratory analysts “witnesses” against the accused?
- Are crime laboratory reports “testimonial”?

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**Melendez-Diaz v. Massachusetts: Case Facts**

- Confiscated drugs analyzed by State Laboratory Institute of the Massachusetts Department of Public Health
- Test results reported in notarized certificate: “… drugs found to contain: cocaine.”
- No data provided regarding methods, analyst qualifications

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**Melendez-Diaz v. Massachusetts: Majority**

Defendant:

- Knew well in advance of introduction of test results
- Made no effort to mount a defense against test results
- Did not challenge test results
- Had opportunity but did not request independent testing
- Did not challenge test reliability: methods, analyst qualifications

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**Melendez-Diaz v. Massachusetts: Majority (5–4)**

- Notarized laboratory reports were affidavits = “testimonial”
- Reports were not public or business records granted exception to hearsay rule
- Reports were created for sole the purpose of providing evidence against defendant
- Medical reports created for treatment purposes are not “testimonial”
- Laboratory analysts are “witnesses against”
- Defense power to subpoena is no substitute for right of confrontation
- Confrontation Clause may not be relaxed because of burden to the government
- Thus, violation of 6th Amendment right to confrontation, remanded

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**6th Amendment: Right to Confrontation**

Hearsay exception:

- Public records
  - Police reports, birth certificates, …
- Business records
  - Lab reports
    - U.S. v. Grandlund (5th Cir. 1995)
      - Must provide:
        - Test results
        - Chain of custody
        - Lab employee affidavit
- Indicia of reliability
Evidence with particularized guarantees of trustworthiness admissible without confrontation

6th Amendment requires testimony by witness to crime

Overturned

Ohio v. Roberts

2006

Davis v. Washington, 547 U.S. 813

6th Amendment requires testimony by witness to crime

Evidence with particularized guarantees of trustworthiness admissible without confrontation

6th Amendment requires testimony by witness to crime

Overturned

Ohio v. Roberts

1980

Ohio v. Roberts, 448 U.S. 56

Evidence with particularized guarantees of trustworthiness admissible without confrontation

6th Amendment requires testimony by witness to crime

Overturned

Ohio v. Roberts

2004

Crawford v. Washington, 541 U.S. 36

6th Amendment requires testimony by witness to crime

Overturned

Ohio v. Roberts

2006

Davis v. Washington, 547 U.S. 813

6th Amendment requires testimony by witness to crime

Forensic evidence not as neutral or as reliable as respondent suggests

Cite 2009 report:

“Strengthening Forensic Science in the United States: A Path Forward”

National Research Council, National Academy of Sciences

Analyzers who swore the affidavits provided testimony against the defendant and are therefore subject to confrontation

“We would reach the same conclusion if all the analysts always possessed the scientific acumen of Mme. Curie and the veracity of Mother Theresa.”

Many states have already adopted the constitutional rule we announce today:

Colorado

District of Columbia

Florida

Georgia

Illinois

Minnesota

Mississippi

Missouri

Nevada

Oregon

Sweeps away 90 years of established rule across 35 states and 6 Federal Courts of Appeal

Real differences between laboratory analysts and conventional “witnesses”

The word “testimonial” does not appear in the text of the Confrontation Clause

Vast potential to disrupt criminal procedures

“… the Court has, for all practical purposes, forbidden the use of scientific tests in criminal trials.”

“… transforms the Confrontation Clause from a sensible procedural protection into a distortion of the criminal justice system.”

No accepted definition of analyst:

One person prepares sample, places in analyzer, retrieves printout

Another person interprets test printout

Another person calibrates analyzer (perhaps independent contractor?)

Laboratory director certifies that proper procedures were followed

Not at all evident which is the analyst to be confronted; all four?
Melendez-Diaz v. Massachusetts: Dissent

- All 6 Federal Courts of Appeal who have considered the issue (1st, 2nd, 4th, 5th, 8th, 10th) agree that analysts are not required to testify
- 24 State Courts and the Armed Forces Court of Appeals
- 16 States' Rules of Evidence allow scientific tests without testimony
- 6 State courts' hearsay rules require analysts to testify
- "The Confrontation Clause is not designed, and does not serve, to detect errors in scientific tests."

Melendez-Diaz v. Massachusetts: Dissent

- "Laboratory analysts are not "witnesses against" the defendant as those words would have been understood at the framing."
- Witnesses recall events in the past in response to questions under interrogation, but analysts provide near contemporaneous observations
- Analysts don't observe crime or any human activities related to it; analysts often don't know the defendant's identity
- Scientific tests are conducted according to scientific protocols, not dependent nor controlled by interrogation
- There was no indication that analysts were adversarial nor that adversarial officers played a role in formulating the analysts' certificates


Vacated Va. S. Ct. decision which had upheld admission of state forensic lab certificate in cocaine conviction because statute allows the accused the right to call the analyst thus fulfilling 6th Amendment confrontation rights and defendant failed to utilize statutory procedure and thereby waived challenge

Remanded for proceedings not inconsistent with Melendez-Diaz

Bullcoming v. New Mexico, U.S. Supreme Court, 6/23/11

DUI conviction (BAC = 0.21 g/100 mL)
Laboratory reported admitted, but without live testimony from the analyst who performed the test
Analyst's associate testified
Associate was qualified as an expert on gas chromatography and the laboratory's procedures
BUT,
Associate did not participate in nor observe the testing
Associate's testimony held as insufficient
Violation of 6th Amendment right to confrontation
Reversed conviction and remanded

Georgia: Statutes, Case Law

Admission of drug analyst affidavit violated right of confrontation
Struck down statute requiring good cause to call analyst

Georgia Forensic Sciences Act of 1997
Burden-shifting statute ("Notice and Demand")
O.C.G.A. §35-3-16
Prosecution gives notice of intent to use analyst report
Defense may object, at least 10 days prior to trial, demand analyst testimony
**Georgia Forensic Sciences Act of 1997**

Georgia Bureau of Investigation, Forensic Sciences Division

O.C.G.A. §35-3-16

- Lab employee prepares certificate, signs under oath
- Certificate will be admissible evidence
- Notice of intent to proffer and provision of report must be made at least 10 days prior to 1st proceeding
- Opposing party may object, but must do so at least 10 days prior to trial

**Georgia Laboratory Analyst Testimony Cases**

1996 Miller v. State, 472 S.E.2d 74 (Ga.S.Ct.)
- Admission of drug analyst affidavit violated right of confrontation

2008 Dunn v. State, 665 S.E.2d 377 (Ga.App.)
- PA lab supervisor expert testimony admissible
- Technician report not introduced

2009 Carter v. State, 677 S.E.2d 792 (Ga.App.)
- Lab supervisor testimony admissible

- Lab supervisor expert testimony admissible

**Georgia Laboratory Analyst Testimony Cases**

2009 Rector v. State, 681 S.E.2d 157 (Ga.S.Ct.)
- Admitted state toxicologist testimony about another’s report
- Even if error in admission, error was harmless

2010 Carolina v. State (Ga.App.)
- Lab supervisor testimony admissible
- Data/report prepared by non-testifying technician was not admitted into evidence
- Expert interpreting data did testify and was subject to cross-examination

11/1/10 Herrera v. State, Ga.S.Ct., 288 Ga. 231
- Admission of hospital lab report harmless
- Expert toxicologist supervisor testified

10/1/12 Leger v. State, Ga.S.Ct., 291 Ga. 584
- DNA testing, allowed testimony by supervisor

- “consistently held that the Confrontation Clause does not require the analyst who actually completed the forensic testing used against a defendant to testify at trial.”


Admission of report from state crime laboratory

- Analyst report under oath of methods and findings is prima facie evidence
- Report shall have the effect as if the analyst personally testified
  - Analyst certification to perform test
  - Experience as analyst and as expert witness
  - Conducted tests using approved procedures and report accurately reflects opinion
- Prosecution shall serve report prior to first proceeding
- Report shall contain notice of right to demand testimony of person signing report
- Defendant may object but at least 10 days prior to trial

“Nor is a machine a “witness against” anyone. If the readings are “statements” by a “witness against” the defendants, then the machine must be the declarant. Yet how could one cross-examine a gas chromatograph?”

2008 Dunn v. State, 665 S.E.2d 377 (Ga.App.)
**Georgia Cases**

1983  *Smith v. State, 298 S.E.2d 482*
Automated immunoassay reliable (EMIT)

1993  *Hubbard v. State, 429 S.E.2d 123 (Ga.App.)*
Reversed conviction
No evidence of test reliability (NIDT)
Test not widely recognized
No expert opinion provided

2001  *Cheatwood v. State, 548 S.E.2d 384 (Ga.App.)*
Upheld probation revocation (NIDT)
Sufficient expert testimony on reliability

2004  *Grinstead v. State, 605 S.E.2d 417 (Ga.App.)*
Reversed probation revocation
Insufficient support
No expert testimony
Meth/morphine case vs. previous THC/cocaine case

**Laboratory Liable**

10/91  *Elliot v. Laboratory Specialists (LA Appl.)*
$25K damages for inadequate procedures

11/91  *Lewis v. Aluminum Co. of America (LA Appl.)*
Laboratory owes a duty to the employee

10/91  *Dick v. Koch Gathering Systems and Roche Biomedical Laboratories (KS Dist. Ct.) (appealed)*
$675K damages, $3.4m punitive award for improper procedures and invalid results

2/95  *Stinson v. Physicians Immediate Care (IL Appl.)*
Lab owes duty to employee to use reasonable care

**Laboratory Not Liable**

9/93  *Santagada v. Lifedata Medical (SDNY)*
Lab not liable for collection service errors

3/94  *Caputo v. CampusChem (3rd Cir.)*
No duty for lab to serve as MRO, unless in contract

6/95  *Devine v. Roche (ME S. Ct.)*
Employee not a beneficiary to lab/employer contract
Lab owes a tort duty to employee

8/95  *Willis v. Roche Biomedical Laboratories (5th Cir.)*
Lab owes no duty to employee to use reasonable care

12/95  *Salomon v. Roche Compuchem (EDNY)*
No private action for lab not providing certification

**Laboratory May Be Liable**

1/94  *Devine v. Roche Biomedical Laboratories (ME S. Ct.)*
Contract unclear regarding duty to interpret results

7/95  *Smith-Kline Beecham v. Doe (TX S. Ct.)*
Possible interference with employment contract
Lab owed no duty to employee to interpret results

- Know what you know and present with confidence!
- Know and accept what you don’t know!
- Know and acknowledge what you are uncertain about and why.

Credibility