

Conducting Science in a Legal Environment

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Themes

1. Science in the court room
2. Forensic lab environment is different from that of infectious disease and environmental labs
3. Other challenges
4. What is the lab director to do?

I. Science in the Court Room

“Stranger in a Strange Land”

The Judiciary's approach to science differs from that of the scientific community

- **Rules of Evidence govern admissibility of scientific testimony**

RULE 702. TESTIMONY BY EXPERT WITNESSES

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.

(As amended Apr. 17, 2000, eff. Dec. 1, 2000; Apr. 26, 2011, eff. Dec. 1, 2011)

Is it reliable? Is it relevant?

Guidelines for admissibility of scientific testimony

1. Frye (1923):

Frye v. U.S. (polygraph)

- ~5 states
- Standard of “general acceptance” in the relevant field
- Scientific community evaluates
- “battle of experts”

2. Daubert (1993, 1997, 1999):

Daubert v. Merrill Dow Pharmaceutical

- ~34 states
- **Scientific knowledge must be derived by scientific method supported by appropriate validation**
- **Judge is gatekeeper (*inter-court variability*)**
- **Guidelines for judicial consideration led to criteria for assessment of validity of scientific testimony**

Daubert criteria

- Is theory/technique testable, falsifiable, refutable?
- Has it been subjected to peer review and publication?
- Known or potential error rate?
- Acceptance by relevant scientific community?
- Existence of standards and controls?

Scientific Community

- There are no absolutes
- Consensus based upon totality of evidence
- Arrived at by scientific peers
- Scientific conclusions are perpetually revised
- Goal is “scientific truth”

Judiciary

- Reductionist approach- only two opposing sides considered
- Each fact considered in isolation
- Sides “battle” and 1 is chosen
- Conclusion is either “this” or “that”-quick and final
- Not suited to find “scientific truth”
- Judge is the gatekeeper

The Source Code Debate



Does this machine work?

Asking the Gatekeeper

(n=400 state judges)

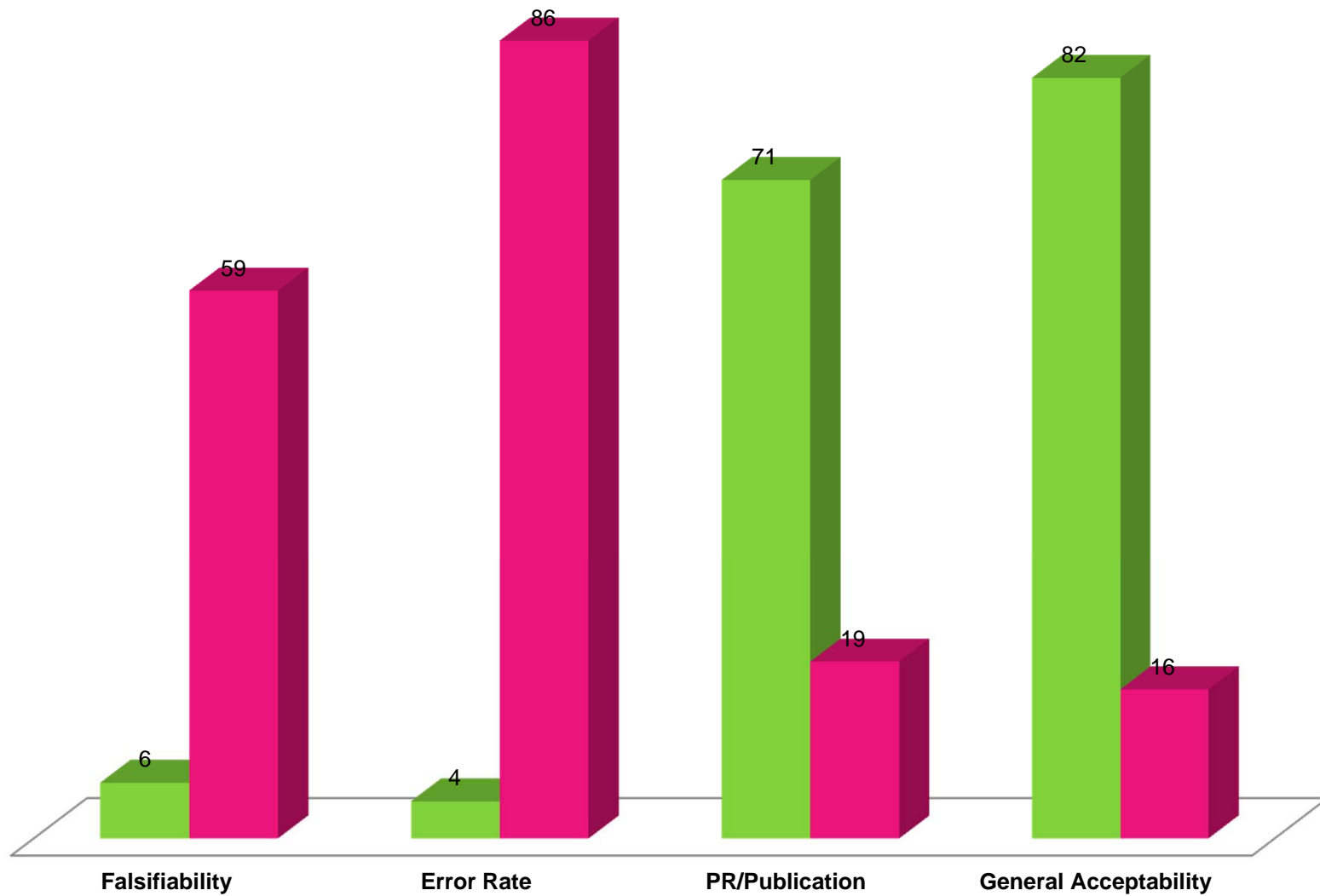
Judge as Gatekeeper is Appropriate 91%

Judge Adequately Prepared by his/her
Science Education 52%

Daubert Criteria is Useful Guideline:

- Falsifiability 88%
- Error Rate 91%
- Peer Review/Publications 92%
- General Acceptance 93%

■ Clearly understand (%) ■ Clearly Do Not Understand (%)



*Asking the Gatekeeper, Gatowski *et al*, Law and Human Behavior 25(5): 433-458 (2001)

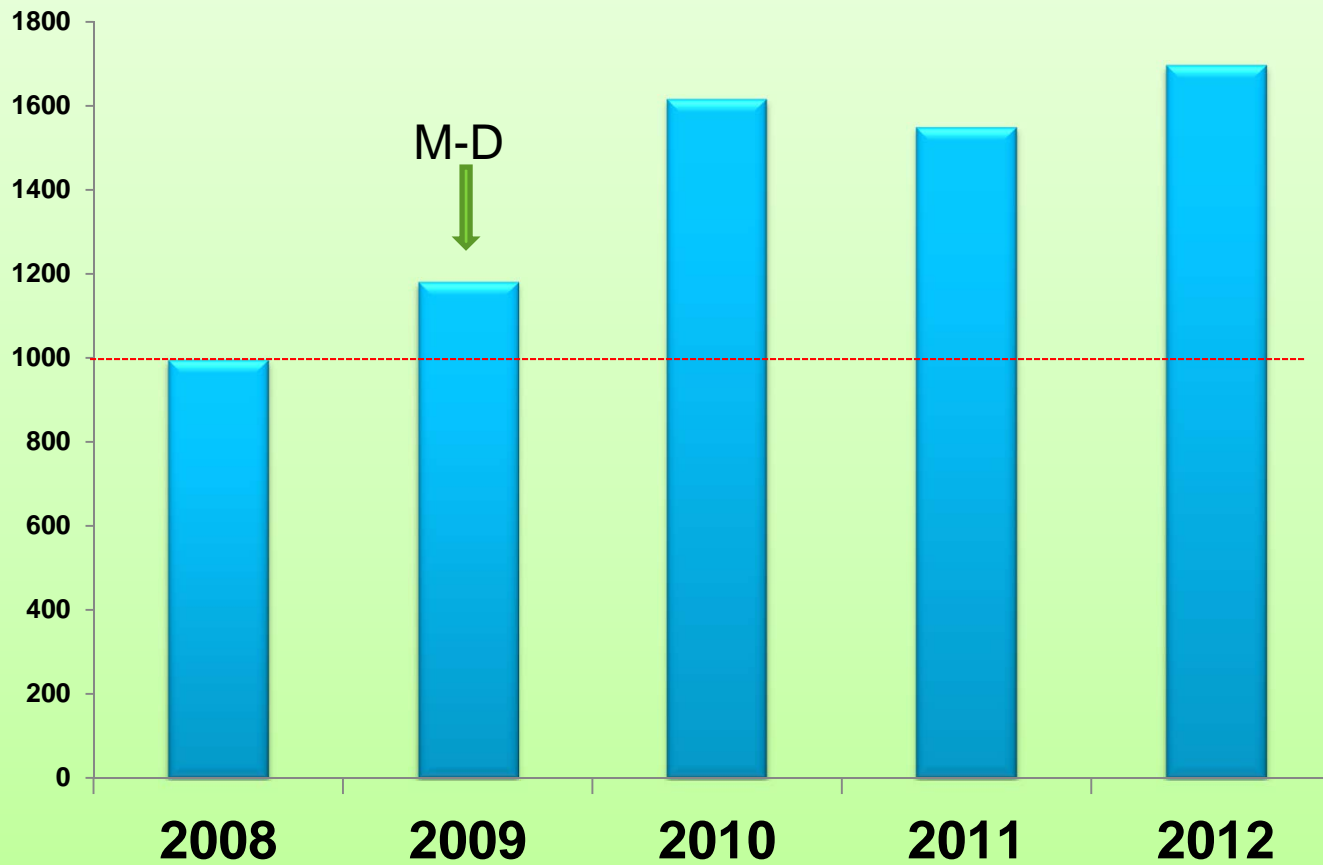
So... what's new in Court?

**Recent rulings by the SCOTUS that
significantly affect the forensic
laboratory**

Melendez-Diaz v Massachusetts (2009)

- Laboratory results are not business records
- Laboratory analyst generating the result is an accuser of the defendant
- Constitution (6th amendment) guarantees right of accused to confront accuser

Subpoenas Received/yr

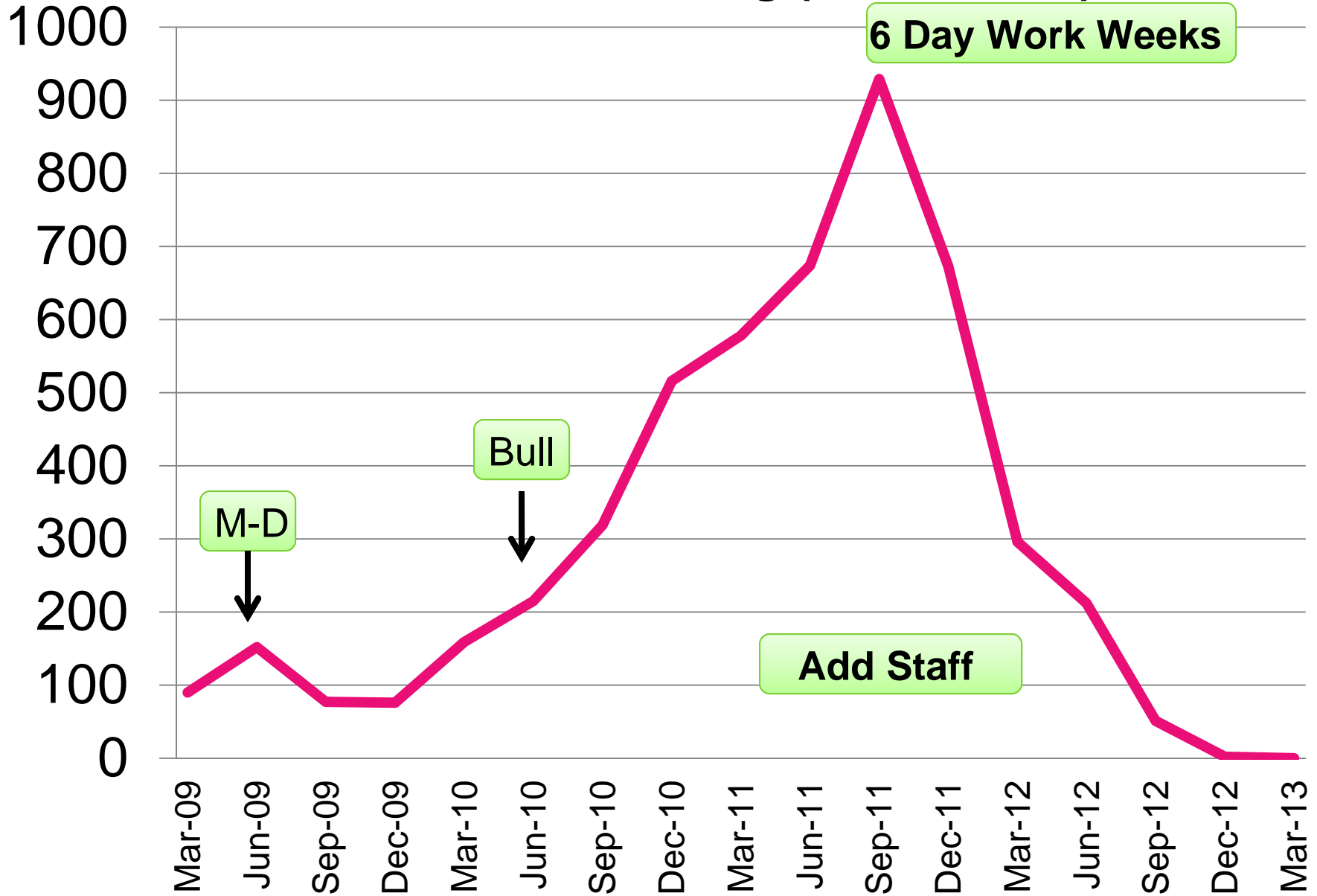


Scientific Laboratory Division, NM Dept. of Health

Bullcoming v New Mexico (2010)

- Individual responsible for generating the lab result must testify if result admitted as evidence
 - 4 drug results by 4 analysts= 4 witnesses
- Notice and Demand allowed
- Independent expert witness can testify to lab results if expert draws own conclusions from review of raw lab data

SLD Case Backlog (TAT > 8 wks)



II. Forensic Lab Environment Is Different from that of Infectious Disease and Environmental Labs

*“Same Planet, Different
Worlds”*

Every test result from lab is aggressively challenged by paid professionals

- Creates a defensive approach to testing
- Any deviation from policy/protocol can invalidate result in court-regardless of significance
- Every sample must have complete chain of custody
- Competency of lab and staff challenged

Scrutiny is of individual as well as of accredited lab as a Whole

- Every action of the analyst is scrutinized
- Analysts (and any others on record of having touched the sample) can be called to court to testify regarding their actions related to the case

Laboratory results are not considered business records

- Every analyst touching the sample and every reviewer involved in the approval and release of a result is, by law, an “accuser” of the defendant
- All laboratory records can be (and are!) subpoenaed for court
 - Testing records
 - Maintenance records
 - Emails
 - Policies
 - ...

Subpoenas

Received February 4...

YOU ARE COMMANDED to ~~bring with you~~ or provide certified copies of the following documents(s) or objects(s):

The Following Items Concerning General Matters:

1. A copy of any accreditation certificates for the laboratory that were in effect at the time of the analysis.
2. The laboratory's overall policies as to testing and calibration.
3. The laboratory's overall protocols as to testing and calibration.
4. The policies that applies to the section of the laboratory where this particular testing or calibration event occurred.
5. The procedures that applies to the section of the laboratory where this particular testing or calibration event occurred.

The Following Items Concerning Pre-analytical Matters:

6. Validation studies (both internal and external) that prove the validation of the method and instructions used.
7. The policy that applies to the assay performed in this particular test or calibration event that covers the calibration or the achieving of a calibration curve.
8. The procedure that applies to the assay performed in this particular test or calibration event that covers the calibration or the achieving of a calibration curve.
9. The instructions that apply to the assay performed in this particular test or calibration event that covers the calibration or the achieving of a calibration curve.
10. The calibration curves and all chromatograms generated on the batch on the machine on which the sample in this case was tested.
11. The identification and source of all internal standards, standards, mixed standards (separation matrix), verifiers, blanks, and controls that were run within the batch in which the sample in this case was run.
12. All records reflecting internal testing or quality control testing of all solutions, reagents, or standard mixtures used as, as part of, or in relation to internal standards, controls, standard mixtures, or standards in the batch in which the sample in this case was run.

13. All refrigeration logs, reports, or other documents in whatever form, for all refrigerated compartments in which this sample, other unknowns within the run, internal standards, controls, standard mixtures, standards, and reagents used in or in relation to the analysis in this case were stored or kept at any time.

14. All proficiency testing results for the section of the laboratory testing the sample in this case as well as for the person who conducted the testing in this case --- since the last date of accreditation inspection preceding the test, and for any such testing since the testing in this case. This specifically includes the summary report of expected results for the proficiency testing (and the manufacturer's information sheet) against which the proficiency test results are judged.

15. Quarterly balance quality control records on any balance instrument related to the calibration of the EtOH standard solution or the preparation of knowns or unknowns used in the blood alcohol testing of the samples in this case. The records reflecting the calibration of weights on any balance or instrument related to this case as well as the control charts kept.

The Following Items Concerning Analytical Matters:

16. The instructions that apply to the assay that was used in this particular testing or calibration event occurred.

17. The employee training record, curriculum vitae, and resume for any person listed on chain of custody documents in this case or who performed the analysis.

18. Identify the make, model, and brand/manufacturer of the instruments and other supporting instruments (i.e. balance, pipette, etc.) used during the analysis and/or preparation of the samples in this case and the variables used in its installation and operation.

19. The policy concerning the sample selection criteria used in this particular case.
20. The procedure concerning the sample selection criteria used in this particular case.
21. The instructions concerning the sample selection criteria used in this particular case.
22. The source and type of all consumables used in collection, preparation, and analysis of the samples run in the batch.
23. If a Gas or Liquid Chromatograph is used, the reporting of t_0 time according to the method.

The Following Items Concerning Reporting Matters:

24. The particular records for this testing or calibration event.
25. The quality control policy and protocol for the laboratory, the section, and the assay performed.
26. The quality assurance policy and protocol for the laboratory, the section, and the assay performed.
27. The full reporting and the underlying validation of the valuation of the uncertainty measurement (UM) in the ultimate reported result.
28. If a Mass Spectrometer is used, then the following additional materials should be provided:
 - 28.1 If a spectral library is used to examine spectra and elucidate spectra, the source of the library spectra.
 - 28.2 The hit list, and the hit histogram for the testing.
 - 28.3 All "tune" reports run within one year if a MS detector was used

and finally...

To be produced by February 15, 2013 .

IF YOU DO NOT COMPLY WITH THIS SUBPOENA you may be held in contempt of court and punished by fine or imprisonment.

Analysts and reviewers have additional role as expert witness

- Will be subpoenaed to testify as expert in criminal proceedings as either:
 - Fact witness
 - Interpretive witness
- Interpretive witnesses require additional training:
 - Pharmacokinetics of alcohol and drug metabolism
 - Incl. retrograde extrapolation
 - Alcohol/drugs and human performance
 - Error analysis
 - State statutes and regulations concerning drugs/DWI/DUID
 - DRE methods and training
 - FST methods and background

III. Other Challenges

*“Lions and Tigers and Bears,
Oh My!”*

Mistakes, misdeeds and failure to perform

- Situation blows up fast, public and goes straight to the top
 - Media, Governor get involved fast
- Reaction from outside the lab tends to be hostile
 - Trust in lab seriously damaged, slow to recover
- Consequences serious:
 - The innocent may go to jail
 - The guilty may avoid jail or get out of jail
 - Families and victims traumatized
 - The laboratory may get sued

Locus of control is often external to the lab

- Subpoenas
- Testimony
- Pre-trial interviews with attorneys
- Travel- time away from lab
 - Competes with analytical duties
 - Hardship for staff and their families
- Analyses conducted (at times)
- Performance targets
 - Court rules (*e.g. time limits*)
 - Certification requirements of clients (*e.g. NAME*)

Public Health forensic lab at certain disadvantages relative to law enforcement forensic lab

- Salaries may not be competitive
- Privacy protections for active cases may not apply
 - IPRA issues on sensitive cases
- Lack of understanding can make competition for resources difficult
 - Legislature
 - Grant programs
- Resources do not keep pace with lab work requirements

IV. What is the Lab Director to Do?

“Trust, but Verify...”

Within the laboratory...

- Strong Quality Assurance program
 - multiple levels of review prior to release of results
- Orient new employees to the culture
 - High quality, ethical science
 - Public service
 - Good place to work
- Strong training program
 - Technical
 - Ethics
 - Expert testimony
 - Drugs and human performance
 - Laws and regulations relating to the work
 - Accreditation requirements

- Stay in touch with staff and programs
 - Reduce distance between bench and management
 - Make yourself “real” to them
 - Let your actions mirror the culture you want to create in the lab
 - Know your staff
- Monitor performance and give staff feedback
 - TATs
 - Staff work loads and productivity
 - Subpoenas
 - Challenges and legal issues that arise- prominent cases
 - Educate yourself on laws and regulations facing your forensic lab
- Accredit your lab (ASCLD, ABFT, ISO ...)

Example of a weekly monitor...

Date of Query	2/8	2/15	2/22
0-4 Weeks	77	87	73
5-8 Weeks	19	10	7
9-12 Weeks	3	0	0
13-16 Weeks	0	0	0
17 Week Plus	0	0	0
%<4 wks	78	90	91
%<8 wks	97	100	100
%<12 wks	100	100	100
Pending Printing Only	28	36	47

Outside the laboratory...

- Befriend your attorney
 - Overly burdensome subpoenas and discovery orders
 - Unreasonable attorneys (DAs, defense)
 - Pre-trial conferences
 - Scheduling conflicts
 - Judges
- Educate the community and those you serve
 - Attorneys
 - Law enforcement
 - Judges-science for judges (orientation, NM Supreme Court)



New Magistrate Judges Orientation

November 15 – November 20 and November 30 – December 4, 2010
Hotel Albuquerque, Franciscan Room

Friday, Nov. 19 @ New Mexico Scientific Laboratory

7:00 – 7:30 **Travel to NM Scientific Laboratory**

7:30 – 8:00 **Continental Breakfast**

8:00 – 9:00 **DWI: Overview**

- Hon. Conrad Perea, Doña Ana County Magistrate Court
- Hon. Russell Martin, Lea County Magistrate Court

9:10 – 10:40 **DWI: Initial Stop & Field Sobriety Tests**

- Sgt. Kevin Bruno, Ofc. Curtis Ward, Ofc. Curtis Curran, New Mexico State Police

10:50 – 12:20 **DWI: Chemical Tests**

- Gerasimos Razatos, Drug Screening Section Supervisor, NM Department of Health Scientific Laboratory Division
- Jason Avery, Breath Alcohol Line Supervisor, NM Department of Health Scientific Laboratory Division

12:20 – 12:50 **Lunch at NM Scientific Laboratories**

12:50 – 1:35 **Tour of NM Scientific Laboratories**

And last but not least...

- Remain unabashedly neutral and impartial
 - This is an advantage of being located in a Health Department
 - You want that reputation in the community
 - You support the evidence- whichever way it points
 - This will strengthen the credibility of your staff and the community trust for the work they perform

