Forensic Science in the 21st Century: A Role for Proficiency Testing

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Goals of Forensic Science

- To reliably examine & interpret physical clues
  - Identification
  - Reconstruction
  - Individualization
- Crime Labs - 80% are units of law enforcement
- Examiners are ethically bound to examine evidence objectively and to report their findings
- Rapid expansion of labs (4X) since 1968
- Labs chronically under funded, plagued by backlogs, and unregulated before 1980
Very Slow Growth of Standards

- Police/courts oversaw methods & expertise
- Labs resisted standards ('every case is unique doctrine')
- LEAA proficiency testing study - mid 1970s
- ASCLD accreditation (1982)
- Criminalistics certification began in (1990)
- NBS/NIST standards have had little impact
- Profession remained fiercely independent
LEAA Proficiency Testing Results 1978

- Major problems revealed in many areas
- DOJ/LEAA funding support terminated
- Profession insisted on anonymity
- Test samples declared (not blind)
- Very limited dissemination of results
- Samples/scenarios lacked sophistication, realism, and detailed interpretation
Impact of DNA Testing/Daubert on Standards and Proficiency Testing

- TWGDAM Standards - 1988
- DNA Advisory Board and CODIS (1998)
- TWG and SWG Methods Advisory Groups
- Mandated standards/proficiency testing for DNA, but not for other areas of evidence testing
- Daubert introduced review of hypothesis testing, detailed methods, error rates, and standards
NRC 2009 Report and Proficiency Testing

- Rec 5 - Research on sources of human observer bias and measurement error
- Rec 6 - Protocols, standards and proficiency testing should be advanced
- Rec 7 - Mandatory accreditation and certification with proficiency testing
- Rec 8 - Routine quality assurance and quality control procedures
## Crime Lab Proficiency Test Results (CTS) 2000-2005*

<table>
<thead>
<tr>
<th>Evidence Category</th>
<th>Correct</th>
<th>Incorrect</th>
<th>Inconclusive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biol Fluids (N = 36,000)</td>
<td>99.4%</td>
<td>0.1%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Latent Prints (N = 31,000)</td>
<td>98.5%</td>
<td>0.4% Type I</td>
<td>1.1% Type II</td>
</tr>
<tr>
<td>Fibers (N = 2,222)</td>
<td>99%</td>
<td>0.8%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Drugs** (N = 5,777)</td>
<td>97%</td>
<td>0.6%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>
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</tr>
</thead>
<tbody>
<tr>
<td>Glass (N = 1,376)</td>
<td>96%</td>
<td>1.7%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Handwriting (N = 6,562)</td>
<td>92%</td>
<td>0.7%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Firearms (N = 5,963)</td>
<td>89%</td>
<td>0.7%</td>
<td>10.3%</td>
</tr>
<tr>
<td>Toolmarks (N = 4,533)</td>
<td>77%</td>
<td>1.3%</td>
<td>21.9%</td>
</tr>
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<tr>
<td>Paint (N = 2,392)</td>
<td>95%</td>
<td>3.6%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Arson* (N = 1,824)</td>
<td>89%</td>
<td>9%*</td>
<td>2%</td>
</tr>
</tbody>
</table>
Proficiency Testing is Critical but Must be Improved and be Made Mandatory

- Accepted by field, but NIJ and other entities have failed to provide guidance and resources
- Results posted (CTS) but remain anonymous
- Test samples not always realistic, innovative, and do not address legal/contextual problems
- Proficiency testing not mandatory (except for accreditation) and laboratories not identified
- Blind testing & random reanalysis not adequately evaluated
Mandatory Proficiency Testing is Needed Now

- Tremendous amount of fundamental forensic research needed
- Basic research may take years, but what is to be done in the short term?
- Immediate need to improve, expand and mandate proficiency testing for forensic experts
- Error rates can provide important indicators to courts if a method should be admitted
- PT can address scientific and bias questions