Expanding Social Science Research to Examine the Impacts of Forensic Science on the Criminal Justice System

November 10, 2020
1:00 – 3:00 p.m.
Expanding Social Science Research to Examine the Impacts of Forensic Science on the Criminal Justice System:

The Next Chapter of the NIJ Social Science Research on Forensic Science Portfolio: Moving from DNA to a Systems Approach to Forensic Science

Co-Chairs:

Jonathan McGrath, PhD
MSFS
Senior Policy Analyst
NIJ Office of Investigative and Forensic Sciences (OIFS)
Washington, DC

Eric Martin
Social Science Analyst
Technology and Standards Division
NIJ Office of Research, Evaluation, and Technology (ORET)
Washington, DC
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National Institute of Justice

The research, development and evaluation agency of the U.S. Department of Justice.

Dedicated to improving knowledge and understanding of crime and justice issues through science. NIJ provides objective and independent knowledge and tools to reduce crime and promote justice.
Expanding Social Science Research to Examine the Impacts of Forensic Science on the Criminal Justice System

**Presenters:**

James Anderson  
Director, Justice Policy Program and Institute for Civil Justice, RAND Corporation

Kevin J. Strom, PhD  
Director, Center for Policing Research & Investigative Science, RTI International

Donia Slack  
Research Forensic Scientist, Associate Director of NIJ Forensic Technology Center of Excellence (FTCoE), RTI International
The Unrealized Promise of Forensic Science

James Anderson, Carl Matthies, Sarah Greathouse & Amalavoyal Chari

November 10, 2020
Forensic Science Very Promising in Theory (I)

- Criminal Justice System as system
- Forensic scientific evidence is additional source of information
Forensic Science Very Promising in Theory (II)

- Objective and scientific – sometimes more accurate
- Independent of other information
- Errors should be uncorrelated with other errors
- Loosely coupled
Forensic Science Very Promising in Theory (III)

- Key assumptions to realize promise
  - Scientific
  - Independent/loosely coupled
How Does it Work in Practice?

• Sparse literature but consistent findings:
  – Used in < 1% of cases (Parker, 1963)
  – Little role despite availability (RAND/Greenwood, 1975)
  – Rarely used (Peterson et al. 1984, 1987)

• Has its use increased, and if so how?
What Did We Do?

• Mixed-method study in five jurisdictions
  – Sacramento County, CA, Sedgwick County, KS, Allegheny County, PA, Bexar County, TX, and King County, WA.
  – Interviews with detectives, forensic labs, prosecutors
  – Collected random sample of 1000 reported crimes in each jurisdiction to determine effect of forensic science (2007-2009)

• Analysis of national crime lab data

• Experimental survey of prosecutors and criminal defense attorneys to understand effect of forensic evidence on plea bargaining process
Five Jurisdiction Study-Interviews

- Interviews revealed that development of forensic evidence was not independent of other evidence
- Case status drove analysis of forensic evidence
- If no other evidence, little forensic analysis
- If case was going to trial, more analysis
<table>
<thead>
<tr>
<th>Site</th>
<th>Homicide Evidence Collected</th>
<th>Homicide Evidence Analyzed</th>
<th>Rape Evidence Collected</th>
<th>Rape Evidence Analyzed</th>
<th>Aggravated Assault Evidence Collected</th>
<th>Aggravated Assault Evidence Analyzed</th>
<th>Robbery Evidence Collected</th>
<th>Robbery Evidence Analyzed</th>
<th>Burglary Evidence Collected</th>
<th>Burglary Evidence Analyzed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacramento</td>
<td>87.1±7.3</td>
<td>91.8±3.4</td>
<td>74.5±13.2</td>
<td>52.4±4.8</td>
<td>9.4±1.2</td>
<td>54.5±2.5</td>
<td>3.5±0.5</td>
<td>30.0±7.8</td>
<td>0.4±0.6</td>
<td></td>
</tr>
<tr>
<td>San Antonio</td>
<td>84.4±9.5</td>
<td>____</td>
<td>____</td>
<td>43.5±16.1</td>
<td>10.7±3.3</td>
<td>15.0±5.8</td>
<td>0.5±0.9</td>
<td>4.6±1.5</td>
<td>0.6±0.9</td>
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<tr>
<td>Seattle</td>
<td>17.1±13.8</td>
<td>60.1±4.0</td>
<td>8.7±3.3</td>
<td>17.4±6.3</td>
<td>0.9±0.9</td>
<td>13.4±0.6</td>
<td>0.7±1.3</td>
<td>18.5±4.3</td>
<td>1.2±1.2</td>
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<tr>
<td>Wichita</td>
<td>65.9±6.3</td>
<td>81.9±9.1</td>
<td>30.2±4.0</td>
<td>80.7±5.8</td>
<td>51.0±7.9</td>
<td>37.9±11.6</td>
<td>1.1±1.0</td>
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</table>
At What Stage Did Forensic Analysis Occur?

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Prior to arrest</th>
<th>Prior to plea bargain</th>
<th>Prior to trial</th>
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<tbody>
<tr>
<td></td>
<td>Request</td>
<td>Complete</td>
<td>Probative</td>
</tr>
<tr>
<td>Trace analysis</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Drug analysis</td>
<td>1.0%</td>
<td>0.4%</td>
<td>ND</td>
</tr>
<tr>
<td>DNA analysis</td>
<td>3.5%</td>
<td>2.5%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Firearms/toolmark analysis</td>
<td>3.9%</td>
<td>3.2%</td>
<td>2.5%</td>
</tr>
<tr>
<td>CODIS search</td>
<td>2.2%</td>
<td>2.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>NIBIN searchb</td>
<td>3.2%</td>
<td>3.2%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>
When is Analysis Occurring?

• Forensic evidence is rarely analyzed prior to an arrest (<12% in every category of crime)
  – Detectives not using forensic evidence to identify suspects

• Forensic evidence is often not analyzed until the eve of trial

• Additional information advantage of forensic science not being utilized

• Reduces independence of forensic science if inconsistent result will lead to lost case
### How Long is Analysis Taking?

#### Average Analysis Time in Days

<table>
<thead>
<tr>
<th></th>
<th>Allegheny</th>
<th>King</th>
<th>Sacramento</th>
<th>Bexar</th>
<th>Sedgwick</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hair</td>
<td>237</td>
<td>.</td>
<td>55.5</td>
<td>92.27</td>
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<td>88.82</td>
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<tr>
<td>Fibers</td>
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<td>30</td>
<td>85.88</td>
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<td>FTIR</td>
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<td>55.5</td>
<td>8.56</td>
<td>159.2</td>
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<td>61.5</td>
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<tr>
<td>SEM_EDX</td>
<td>299.11</td>
<td>.</td>
<td>52.44</td>
<td>41.06</td>
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<td>75.7</td>
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<td>Fit match</td>
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<td>.</td>
<td>59</td>
<td>.</td>
<td>52.33</td>
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<tr>
<td>Serology Screen</td>
<td>124.16</td>
<td>108.71</td>
<td>.</td>
<td>22.46</td>
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<td>64.03</td>
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<tr>
<td>Blood pattern interpretation</td>
<td>.</td>
<td>209</td>
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<td>.</td>
<td>209</td>
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<tr>
<td>YSTR</td>
<td>.</td>
<td>39</td>
<td>.</td>
<td>8</td>
<td>.</td>
<td>28.67</td>
</tr>
<tr>
<td>GC_MS</td>
<td>.</td>
<td>55.5</td>
<td>10.66</td>
<td>.</td>
<td>47.69</td>
<td>14.57</td>
</tr>
<tr>
<td>Drug ID</td>
<td>115.57</td>
<td>.</td>
<td>.</td>
<td>3</td>
<td>34.83</td>
<td>71.8</td>
</tr>
<tr>
<td>STR</td>
<td>88.09</td>
<td>105.11</td>
<td>290.24</td>
<td>55.12</td>
<td>66.56</td>
<td>135.2</td>
</tr>
<tr>
<td>Test fire</td>
<td>288</td>
<td>233.75</td>
<td>89.69</td>
<td>244.89</td>
<td>26.72</td>
<td>162.95</td>
</tr>
<tr>
<td>Comparison scope</td>
<td>200.52</td>
<td>247.86</td>
<td>104.5</td>
<td>272.88</td>
<td>44.17</td>
<td>171.37</td>
</tr>
</tbody>
</table>

Notes: Averages are calculated conditional on analysis being completed within the time frame covered by the study.
Why is Analysis Occurring so Late in Criminal Justice Process?

• Shortage of forensic lab resources – required triage

• Forensics were viewed as means of strengthening already strong cases

• Also viewed as means to meet unrealistic jury expectations
Compare to Theory

- Rarely being used to identify suspects
- Rarely being used in charging
- In rare cases where it is used at all, often being used to meet unrealistic jury expectations
- Creates incentives for misconduct
Lawyers Agree that Forensic Evidence Matters to Plea Bargaining

• Experimental survey study showed that strength of forensic evidence affected acceptance of plea bargains in expected way

• Correlations between strong forensic evidence and convictions
Forensic Lab Efficiency

• Fee-based laboratories have higher productivity

• Laboratory management systems also associated with increased productivity
Conclusions

- Theoretical promise of forensic science remains unrealized (still)
- Limited and late use of forensic evidence undermines key theoretical benefits of additional information and independence
- Quicker turnaround is probably a necessary condition for earlier use
- Fee-based labs appeared to have greater productivity
  - Might also lead to more efficient triage system
Sexual Assault Kit Processing as a Challenge and Opportunity in Sexual Assault Reform

Kevin J. Strom, PhD
Background

Sexual Assault Kit (SAK): Set of items used by medical personnel for the preservation of physical evidence collected from a person following an allegation of sexual assault.

Unsubmitted SAKs that accrue in U.S. law enforcement agencies subject of increasing attention over past decade, as have untested SAKs pending analysis in crime laboratories.
Why Unsubmitted SAKs Accumulated

- DNA testing did not previously exist
- No policy regarding SAK submission and testing
- No funding to test all SAKs
- Benefit to investigations unclear
- Insufficient staffing to investigate and prosecute all cases
- Victim-blaming and misinterpreting signs of trauma

Source: Campbell et al., 2016; Strom and Hickman, 2010
BJA’s National Sexual Assault Kit Initiative (SAKI)

• In FY2015, 20 jurisdictions were selected to receive SAKI funding. BJA funded 12 new jurisdictions in 2016, 9 new in 2017, 13 new in 2018, 10 new in 2019, and 7 new jurisdictions in 2020.

• There are currently 71 SAKI Grantees

  Sites
  • 25 statewide sites
  • 3 multi-county site
  • 13 county-level sites
  • 29 city-level sites

• Total funding awarded to date:
  ~$220 million
National Impact of SAKI

Under SAKI, jurisdictions must:

• Inventory all unsubmitted SAKs
• Conduct an investigative case review associated with each unsubmitted SAK
• Create DNA testing plan
• Track sexual assault evidence
• Provide effective communication with survivors of sexual assault
Why is it important to test unsubmitted SAKs?

- Apprehend violent offenders
- Justice for victims
- Hold offenders accountable
- Populate CODIS
  - Case connectivity
  - Lawfully owed DNA
- Research
  - Serial offenders
  - Cross-over offending
  - Reasons SAKs were not submitted for testing
Cuyahoga County, OH

- Coded 433 sexual assaults between March 1992 and September 2014 – 53% were connected to serial sex offenders
  - 53 kit-to-kit serial sex offenders
  - 192 kit plus criminal history offenders
- Results
  - Most serial sex offenders do not appear to consistently stick to a certain “type” of victim or offending pattern
  - Of the 53 serial sex offenders
    - 56.5% only sexual assaulted strangers
    - 28.3% sexually assaulted at least 1 stranger and at least 1 nonstranger
    - And 15.1% only assaulted nonstrangers

NIJ Sexual Assault Kit Processing Efficiency
Background

NIJ-funded project to determine whether specific policies or characteristics of a jurisdiction result in more efficient processing outcomes.

Goal: Conduct research to identify the most efficient practices for addressing the submission of SAKs in LEA’s and the testing of SAKs in crime laboratories.
Mixed-Methods Study

Study examined intra and interagency dynamics associated with SAK processing efficiency in a linked sample of crime laboratories (n=145) and LEA’s (n=321).
Results: Findings show that backlogs can be explained by the combination of technical inefficiencies and lack of resources.

**Technical Efficiency**

<table>
<thead>
<tr>
<th>LEAs</th>
<th>Crime Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Even if all agency resources (e.g., staff, equipment) were used to their fullest potential, about <strong>75%</strong> of LEAs would still have a backlog.</td>
<td>Even if all laboratory resources (e.g., staff, equipment) were used to their fullest potential, about <strong>50%</strong> of laboratories would still have a SAK testing backlog.</td>
</tr>
</tbody>
</table>
Results:
Jurisdictions cannot create sustainable SAK processing without investing in LEA and crime laboratory staff.
Results: Agency policies directly affect partner agencies and should not be created in a silo.
Recommendations

- Invest in staff hiring and retention
- Develop a system-wide process map
- Develop interagency multidisciplinary policies
Kevin J. Strom, PhD
RTI International
Director – Center for Policing Research &
Investigative Science
919.485.5729
kstrom@rti.org
www.rti.org/policing/


The Impact of Research and Technology Dissemination Through the Forensic Technology Center of Excellence
2016-MU-BX-K110

Donia Slack, M.S., RTI International
November 10, 2020
The Forensic Technology Center of Excellence (FTCoE), led by RTI International, is supported through a Cooperative Agreement from the National Institute of Justice (NIJ), Office of Justice Programs, U.S. Department of Justice (2016-MU-BX-K110). The opinions, findings, and conclusions or recommendations expressed in this presentation are those of the author(s) and do not necessarily reflect those of the Department of Justice. Any products and manufacturers discussed are presented for informational purposes only and do not constitute product approval or endorsement by the U.S. Department of Justice.
The Forensic Technology Center of Excellence and RTI

- The Forensic Technology Center of Excellence is a program of the National Institute of Justice
  - Office of Investigative and Forensic Sciences (OIFS)
- Instituted in 2007 and administered by RTI International since 2011, The FTCoE has reached tens of thousands of criminal justice practitioners by providing unbiased dissemination and evaluation of forensic technologies, best practices, and policies

Dr. Jeri Ropero-Miller; Project Director; Senior Director of the Center for Forensic Sciences

Donia Slack; Associate Project Director; Director of Research, Technology, & Evaluation

Nicole Jones; Associate Project Director; Director of Forensic Science Translation and Implementation
Five goals of the FTCOE

1. To provide scientific and technical support to NIJ’s research and development efforts
2. To facilitate demonstration, transfer, and adoption of appropriate technology into practice by crime laboratories, forensic service providers, law enforcement, and other criminal justice agencies
3. To provide technology assistance, information, and support to law enforcement and other appropriate criminal justice agencies
4. To develop and provide access to resources for research, education, and best practices in the forensic science and criminal justice community
5. To develop and implement strategic plans to evaluate the impact of NIJ’s forensic science investments on the criminal justice system
The FTCoE provides scientific and technical support to the NIJ’s R&D efforts by facilitating transfer and adoption of technology into the criminal justice system.

<table>
<thead>
<tr>
<th>Advancing Technology</th>
<th>Sharing Knowledge</th>
<th>Addressing Challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>The FTCoE places promising technical innovations in the hands of forward-thinking practitioners, stakeholders, and policy makers.</td>
<td>The FTCoE provides knowledge transfer and integration which bridges the gap between the scientific and criminal justice communities.</td>
<td>The FTCoE supports the NIJ’s research and development (R&amp;D) portfolios, and transitions research into the hands of practitioners.</td>
</tr>
</tbody>
</table>
Impact of Research and Technology Dissemination Topics of Interest

- Evaluation of the impact of forensic science investments on the criminal justice system:
  - Advancing DNA Efficiencies
  - Lean Facility Design for Optimizing Space
  - Lean Six Sigma for Laboratory Processes
  - Improvement Grants Return on Investment
  - Rapid DNA Implementation
- Addressing Management Challenges
  - Cost-benefit Analyses
  - Workforce Calculator
- Sharing Knowledge
  - Workforce Resiliency
  - Juror Comprehension
- Current Projects
Expanding Beyond Theory – Advancing DNA Efficiencies (con’t)

Lab Design Efficiencies Implemented

  • Guidance for "Lean Facility Design (LFD)" thinking for lab management, planning, architecture, and engineering for publicly funded forensic facilities
  • The FTCoE worked with the Midwest Forensics Resource Center (Ames Laboratory) and the Brazos Group to develop guidelines, checklists, and evaluate key outcomes of the LFD process
  • The FTCoE also performed a needs assessment at the Broward County Sheriff’s Office (BSO) using the process map and checklist

LFD Needs Assessment Checklist

- When selecting team members consider the following: Champion, Project Mgr., SMEs, Facilities Mgr., EH&S, QA/QC.
- Identify Roles/Responsibilities (White Book, pg. 5).
- Include SMEs as part of review process at all levels.
- Conduct a System Gap Analysis (identify current issues).
- Map key work processes.
- Identify customer satisfaction, productivity & quality metrics methodology. Items per analyst, cases per analyst, turn-around time (TAT), etc. use more statistical terms like “95% completed within xx days.”
- Survey internal & external customer to see if their needs are being met (White Book, pg. 8).
- Visit other labs for ideas; what to do and what not to do.
- Amenities: break room, gym, lactation room, parking, bathrooms, lockers, mock scene room, lobby, displays.
- Establish future projection plan. 5, 10, 20 years out:
  - project the staffing level (White Book, pg. 14)
  - project the case load
  - project the future area demographics
  - project the future goals
  - Identify known future technologies
- Identify funding source(s).
- For designing a new lab, use input from other laboratories and design guidelines (White Book, pg. 16-24).
- Select delivery method (White Book, pg. 44).
- Write RFP using example or input from other labs.
- Consider A&E teams with previous crime lab experience.
- Select A&E team based on qualifications, reputation, past experience, bid & ability to communicate effectively (White Book, pg. 17).
- Check LEAN techniques (Gemba work area), Polyvke (prevention techniques), 5Mila (fetch), Work Flow, Cycle Time reduction & 5S: Sort, Set, Shine, Standardize & Sustain.
- Review design for accuracy and completeness (White Book, pg. 18).
- When make agreements, consider majority or consensus decisions.
- Develop move plan (White Book, pg. 33-40); ensure Certificate of Occupancy is issued prior to move-in.
- Shut down evidence intake ‘x’ days prior to move; consider moving each section sequentially.
- Assign responsible team member to manage move plan; collect post-mv data, compare to pre-mv, and analyze findings; re-assess work processes and correct unproductive or negative impact.

Expanding Beyond Theory – Advancing DNA Efficiencies (con’t)

LFD Needs Assessment Outcome

• BSO completed the LFD assessment using the roadmap and checklist
• Results indicated that issues that were identified were related to available space within the current facility
• LFD led to the realization that a new facility would realize the best return on investment
  • Assessment allowed for BSO to begin the process of procuring bids from architectural firms
• Short-term solutions included:
  • Cloud options implemented for several current programs
  • Interagency communication gaps were improved
  • New management staffing was implemented to improve bottlenecks at the reporting stage

LFD Needs Assessment Methodology

1. SITUATION ANALYSIS
   ▶ Develop an understanding of how evidence flows through the crime laboratory.
   ▶ Assess the value of process flow efficiency.
   ▶ Determine crime laboratory goals and expectations.
   ▶ Conduct a gap analysis to identify process performance concerns.

2. CURRENT-STATE PRACTICE
   ▶ Assess the extent of process flow problems.
   ▶ Generate process maps for each forensic discipline to illustrate the flow of work and information.
   ▶ Compile data on process performance using key performance indicators (KPIs).

3. IDEAL-STATE OPERATION
   ▶ Establish strategic goals for forensic work and information process flow.
   ▶ Identify characteristics of the laboratory in an ideal state.

4. FUTURE-STATE PRACTICE
   ▶ Compare the current practices to ideal operation.
   ▶ Assess opportunities for process improvement.
   ▶ Identify process bottlenecks and non-value added activities that are responsible for long cycle times.
   ▶ Utilize lean concepts to streamline process flow.

5. FUTURE-STATE PLANNING
   ▶ Develop a process improvement plan to move from the current-state to the ideal-state operation.
   ▶ Identify solutions for previously identified bottlenecks and non-value added activities.
   ▶ Assess the impact of process changes on overall process performance.
Expanding Beyond Theory – Advancing DNA Efficiencies

Placing processes into crime laboratories

- In collaboration with our partners at West Virginia University College of Business and Economics, their Lean Six Sigma Green Belt Certification Program for Forensic Professionals was evaluated for short and long-term impacts.
- Course was taught by Tim Kuperschmid, LSS Black Belt, Chief of Laboratories at the NYC OCME.
Expanding Beyond Theory – Advancing DNA Efficiencies (con’t)

<table>
<thead>
<tr>
<th>Lab Processes Implemented and Evaluated</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Evaluating the biology system process</td>
</tr>
<tr>
<td>• Toxicology review process</td>
</tr>
<tr>
<td>• Cause of administrative errors in case files</td>
</tr>
<tr>
<td>• Reduce turnaround time for toxicology samples</td>
</tr>
<tr>
<td>• Process for converting paper archives to digital</td>
</tr>
<tr>
<td>• Evaluating review procedure in toxicology</td>
</tr>
<tr>
<td>• Changing timesheets from paper to digital</td>
</tr>
<tr>
<td>• <strong>Decrease turnaround time of DNA Analysis</strong></td>
</tr>
<tr>
<td>• Evaluating technical review process for DNA Analysis</td>
</tr>
<tr>
<td>• Improve the data analysis process of the blood sample testing for alcohol</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Was the project implemented as planned?</td>
</tr>
<tr>
<td>• Did the projects have unexpected/unintended effects, and why?</td>
</tr>
<tr>
<td>• Were the projects expanded to other areas of the lab and were there transferable skills and tools learned?</td>
</tr>
<tr>
<td>• What was the leadership response?</td>
</tr>
<tr>
<td>• What kind of challenges did you have?</td>
</tr>
<tr>
<td>• What was most and least useful about this program?</td>
</tr>
<tr>
<td>• What were the lessons learned from the participants that dropped out?</td>
</tr>
</tbody>
</table>
**West Virginia State Police Crime Laboratory - Reducing Turnaround Time for DNA Analysis**

- Laboratory had two separate units
  - Serology
  - DNA
- LSS principle of DMAIC was implemented
  - Define, measure, analyze, improve, control
- Changes made:
  - Direct sample transfer from serology to DNA section; regular huddle meetings, move to paperless casefiles, outsourced older but still active cases, added 3 additional positions

**Quantitative Results**

- Year 1: the 17% reduction in TAT
- Year 2: Additional TAT reduction for a total of 48%
- Outsource of all SAKs
- Unnecessary tasks were halted
- Began tracking trends for yield lessons learned
- Moved onto a LSS project in the Drug Identification Section
Expanding Beyond Theory – Advancing DNA Unit Efficiencies

Evaluating an NIJ Funded Forensic DNA Unit Efficiency Improvement Program Grant

- In 2009, the NIJ released a solicitation to help agencies to develop and implement programs to improve the capacity and efficiency of DNA units
  - “Forensic DNA Unit Efficiency Improvement”
- The FTCoE performed a program evaluation on the Palm Beach County Sherriff’s Office (PBSO) to demonstrate the ROI (2009-DN-BX-K261)

### Timeline and Milestones for PBSO

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>Location</td>
</tr>
<tr>
<td>2010</td>
<td>Service Agreement</td>
</tr>
<tr>
<td>2011</td>
<td>Laboratory</td>
</tr>
<tr>
<td>2012</td>
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<td>2015</td>
<td>Interlocal Agreement MOU</td>
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<tr>
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<td>Laboratory Standard Operating Procedures</td>
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<tr>
<td>2018</td>
<td>Laboratory Analyst Training</td>
</tr>
<tr>
<td>2019</td>
<td>Laboratory Analyst Conducting Screening at the BPL</td>
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</tbody>
</table>

DNA backlog reduction strategy: Law enforcement agency partnerships for a successful biological screening laboratory

In 2009, the PBSO FBU responded to the concerns of Palm Beach County LEAs regarding TAT.

NIJ funded the creation of the PBSO Biological Processing Lab (BPL), a prescreening laboratory managed by a city police agency independent of the PBSO.

- Serviced three surrounding LEAs
- Prescreened crime scene evidence

Project completed in 2012, first evaluation performed by RTI in 2009, and re-evaluated by RTI/FTCoE in 2018.

Lessons learned – Laboratories require time to fully implement processes before a thorough evaluation can be completed.

Quantitative Return on NIJ-funded Investment

- 27% TAT reduction
- 9% decrease in analyst caseload
- 54% increase in non-suspect cases
- 8% increase in CODIS entries
- 88% decrease in DNA backlog
- Creation of the Biological Processing Laboratory
- Increase in LEA/Crime Lab Communication

Lessons learned – Laboratories require time to fully implement processes before a thorough evaluation can be completed.
Expanding Beyond Research – Advancing DNA Technologies

Placing promising technical innovations in the hands of practitioners

• In 2017 Richland County Crime Lab expressed a desire to expand their Rapid DNA program into the booking environment

• The FTCoE supported the validation and proof-of-concept study of the RapidHIT ID placed in the Alvin S. Glenn Detention Center

• This study demonstrated that non-scientist operators could produce DNA profiles meeting QAS requirements for CODIS uploads

• Their Rapid DNA program has led to 69 profiles uploaded into CODIS, generating 3 CODIS hits

Tangible criminal justice outcomes
## Addressing Management Challenges – FORESIGHT Evaluation

<table>
<thead>
<tr>
<th>Project FORESIGHT</th>
<th>Seven Key Performance Areas</th>
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<tbody>
<tr>
<td>- Project FORESIGHT is a business-oriented self-evaluation that provides laboratory managers with actionable insights into the performance of their laboratories in comparison to similar labs.</td>
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<tr>
<td>- Developed and managed by FTCoE Partner, Dr. Paul Speaker, WVU College of Business and Economics.</td>
<td></td>
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<tr>
<td>- Synthesizes operational opportunities for improvement in budget, personnel, and/or laboratory management.</td>
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<tr>
<td>- Relative Volume and Activity</td>
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<tr>
<td>- Cost</td>
<td></td>
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<tr>
<td>- Personnel Productivity</td>
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<tr>
<td>- Risk/Quality</td>
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<tr>
<td>- Turnaround Time</td>
<td></td>
</tr>
<tr>
<td>- Backlog</td>
<td></td>
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</tbody>
</table>
Addressing Management Challenges – FORESIGHT Evaluation – ROI from Processing the Backlog of Untested SAKs

- The FTCoE and WVU evaluated the ROI at the jurisdictional level (net benefits to society relative to the investment)
- Previous cost-benefit studies analyze data across multiple jurisdictions across the country
  - Costs range from $23 - $980 per kit
  - FORESIGHT controls for economies of scale
- For smaller jurisdictions, the cost expenditures reach $1,842
- Regardless of expenditures, ROI for these labs is above 5,000%
- With perfect economies of scale, the societal ROI is 64,529% (for jurisdictions able to process 6,250/year)
Addressing Management Challenges – FORESIGHT Evaluation – Hidden Cost of the Opioid Crisis

• Current financial considerations of the impact of the opioid crisis are severely underestimated
  • Cost to the criminal justice system is estimated at $8 billion
    • $270 Million borne by crime labs
• FORESIGHT data indicate costs differ across different analytical processes
• Expenditure rates are not aligned with projected 3% annual rate
Addressing Challenges – Optimizing a Sustainable Workforce

Workforce Calculator

- FTCoE & Project FORESIGHT developed a workforce calculator, now in second-year testing, to determine resources needed (such as full-time equivalents) for laboratories to best serve their communities based on the following inputs:
  - Type of jurisdiction (metro, regional, statewide)
  - Crime Rates (violent and property)
  - Population size served
Sharing Knowledge – Workforce Resiliency

- Seven archived webinars hosted on the FTCoE website
  - Vicarious Trauma Toolkit (OVC)
  - Stress, Vicarious Trauma, and Resiliency for Forensic Science Professionals (NIJ Funded survey)
- Four Just Science Podcast episodes
  - Applied Leadership for Resiliency in CSIs
  - Building Workforce Resiliency
- One Peer-reviewed Literature Review
- More to come in 2021!
Sharing Knowledge – Juror Comprehension

- The community has been striving to institute reforms in the way conclusion testimony is delivered in court.
- The FTCoE performed a comprehensive literature review, taking into account cognitive psychology studies to present recommendations for future research.
- The FTCoE also presented tactics and visual aides proven to help jurors interpret subject matter expert testimony on a Just Science Podcast episode.
### Impact Evaluations

- Field Identification Drug Officer Program
  - FIDO programs in Phoenix and Utah
  - TAT, efficiency, productivity
  - Scalability across other labs
- Mobile Drug Testing to Aid in Substance Abuse Response
  - Evaluation of a mobile drug testing lab in Florida in response to COVID-19
  - Lessons learned will be evaluated for applicability across other jurisdictional needs

### Cost Benefit Analyses

- Cost Benefit of ME/C Outsourcing
  - Cost-benefits of using the approach of outsourcing will be evaluated and field practices will be reviewed
- Direct to DNA Cost Benefit Analysis
  - Direct-to-DNA approaches with respect to testing and analysis will be evaluated. This will be in consideration of recent legislation
- ROI from reducing TAT for processing DUI-Drug Cases
  - The economic impact of the increase in DUI-drug driving and the costs associated with the crime labs will be evaluated
Coming Soon!

Criminal Justice Related Reports

• Lawfully Owed DNA
  • The challenges of the CODIS database not being inclusive of DNA profiles obtained from convicted offenders, and in relevant states, arrestees will be discussed. Barriers and successful case studies will be presented.

• Forensic Genetic Genealogy Report
  • The technology of FGGS will be reviewed, and detailed guidance will be provided based on individual state laws concerning third-party doctrine. Best practices in relation to working collaboratively with crime labs and LEAs will be presented.

Community Outreach

• Just Science Podcast Seasons
  • IAI Case Studies
    • Psychopathy and Criminal Behavior
    • Jodi Arias Case
    • Grim Sleeper Serial Killer

• Webinars
  • New Mexico Decedent Image Database Series
    • Accessing, utilizing, and measuring database data

• Apps
  • SAFER Recommendation App
  • Trace Evidence Collection App

• Events
  • NIJ’s R&D Symposium and Poster Session (Virtual)
Community Engagement and Collaboration

OPPORTUNITIES FOR NIJ GRANTEE COMMUNITY SUPPORT

Driving forensic research to practice is a community effort. Support from practitioners, vendors, and other stakeholders help researchers develop value-adding innovation. Please consider how you may be able to assist NIJ grantees with specific needs to advance their work.

Partnerships between laboratories and researchers help drive new technologies and processes into practice. Additional resources to connect to partners include:

NIJ’s “Connecting Researchers with Forensic Laboratories” Page: this is a list of forensic laboratories who are open to working with forensic research grantees. If you are an operational forensic laboratory who is interested in connecting with and supporting researchers, please contact grants@ncjrs.gov to be added to the list.

The Laboratories and Educators Alliance Program (LEAP) is a joint effort between the American Society of Crime Lab Directors (ASCLD) and the Council of Forensic Science Educators (COFSE). The goal of this effort is to facilitate collaborative research between academia and forensic science laboratories. Please check the LEAP map for participating universities and forensic laboratories, or to add yourself to the list.

<table>
<thead>
<tr>
<th>GRANT</th>
<th>AFFILIATION</th>
<th>DISCIPLINE</th>
<th>CONTACT</th>
<th>NEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-05-0164/2019-DU-BX-0023</td>
<td>George Washington University</td>
<td>DNA</td>
<td><a href="mailto:lihanna@rti.org">lihanna@rti.org</a></td>
<td>Seeking to connect with different academic and industry stakeholders to gain consensus on their needs, requirements, and decision-making parameters for several technological aspects of a DNA diagnostic kit.</td>
</tr>
<tr>
<td>2013-DN-BX-0003</td>
<td>Virginia Commonwealth University</td>
<td>DNA</td>
<td><a href="mailto:lihanna@rti.org">lihanna@rti.org</a></td>
<td>Seeking to connect and form strategic partnerships and alliances with interested academic and/or clinical lab to help fix community needs.</td>
</tr>
</tbody>
</table>

https://forensiccoe.org/grantee-needs/
Thank you!

Donia Slack
dslack@rti.org
Expanding Social Science Research to Examine the Impacts of Forensic Science on the Criminal Justice System:

The Next Chapter of the NIJ Social Science Research on Forensic Science Portfolio: Moving from DNA to a Systems Approach to Forensic Science

Presenters:

Jonathan McGrath, PhD
MSFS
Senior Policy Analyst
NIJ Office of Investigative and Forensic Sciences (OIFS)
Washington, DC

Eric Martin
Social Science Analyst
Technology and Standards Division NIJ Office of Research, Evaluation, and Technology (ORET)
Washington, DC
NIJ Office of Investigative and Forensic Sciences (OIFS)

• **Lead** federal agency for forensic science research and development and administration of programs to improve laboratory efficiency, reduce backlogs, and provide technical assistance.

• **MISSION:** Improve the quality and practice of forensic science through innovative solutions that support research and development, testing and evaluation, technology, information exchange for the criminal justice community.

https://www.nij.gov/about/Pages/oifs.aspx
NIJ Office of Research, Evaluation and Technology (ORET)

• Encourages and supports, research, development and evaluation to further the understanding of:
  – Causes and correlates of crime and violence
  – Methods of crime prevention and control
  – Criminal justice system responses to crime and violence

• Contributes to the improvement of the criminal and juvenile justice systems

• Three major programs:
  – Social science research and evaluation
  – Technology solutions to criminal justice challenges
  – Performance standards and testing equipment
SSRFS Portfolio

NIJ Journal Article (2015)
http://www.nij.gov/journals/Pages/welcome.aspx

• Wave 1 (2005-2007) Basic questions
• Wave 2 (2007-2009) Emerging issues
• Wave 3 (2010-2013) Focused on findings of the NAS report Strengthening Forensic Science in the United States: A Path Forward
SSRFS Meeting

- Meeting convened to take stock of what the research portfolio has found and where it should go
- Consensus of participants was that:
  - Look beyond DNA
  - Ballistics
  - Cyber
  - Digital
  - Also look at forensic processing between police and crime labs
Major Findings from the SSRFS Portfolio

- DNA is most impactful in criminal cases:
  - Can identify more prolific offenders in property crimes
  - Many states starting to expand familial and partial match searches but many still lack definitive authorizations
  - Relationships between crime lab and police matter when it comes to reducing backlogs

- Potential of forensic evidence may not be fully realized
  - Often used to confirm suspects instead of identify them
  - Other types of forensics (ballistics) has major investigative potential that is underutilized

- In the court room, the expertise of the forensic tech matters in juror judgements
NIJ Strategic Research Plans

NIJ Strategic Research Plan
Safety, Health, and Wellness
Strategic Research Plan
2016-2021

NIJ Strategic Research Plan
Policing
Strategic Research Plan
2017-2022

NIJ Strategic Research Plan
Courts
Strategic Research Plan
2020-2024
Recent Solicitations/Awards – FY 2017 to FY 2020

- Research and Evaluation on *Drugs and Crime* (FY 2017 – FY 2020)
  
  - Case Western Reserve University - Cuyahoga County, Ohio, Heroin and Crime Initiative: Informing the investigation and prosecution of heroin-related overdose
  
  - U. of Pittsburgh - Novel Quantitation Workflow for Improved Drug Surveillance
  
  - U. of Alabama – Birmingham - What You Can't Buy, Can't Kill You
  
  - RTI - Prevalence of Fentanyl and Its Analogues in a Court-Ordered Mandatory Drug Testing Population
  
  - U. of Kentucky - Wastewater Epidemiology To Examine Stimulant Trends (weTEST)
Recent Solicitations/Awards – FY 2017 to FY 2020

• Research and Evaluation on the Administration of Justice (FY 2019)
  FIU - Improving Juror Comprehension of Forensic Testimony and Its Effects on Decision-Making and Evidence Evaluation

• Research and Evaluation in Safety, Health, and Wellness in the Criminal Justice System (FY 2019)
  U. of New Hampshire - A Study of Trauma and Resiliency Among Forensic Examiners Investigating Child Pornography
  RTI - Understanding Work-Related Stress among Medicolegal Death Investigators: A National Survey and Mixed-Methods Impact Study

• Research and Evaluation on Policing (FY 2019, FY 2020)

https://nij.ojp.gov/funding/opportunities/nij-2019-15283
https://nij.ojp.gov/funding/opportunities/nij-2020-17297
https://nij.ojp.gov/funding/opportunities/nij-2019-15645
“Integrating forensic evidence into the intelligence process is an evolutionary next step in reducing, disrupting, and preventing serial and organized violent crimes,” said NIJ Director David Muhlhausen.

“NIJ is committed to examining and communicating the potential of forensic intelligence tools and models for law enforcement agencies across the United States.”
Key Findings:

- Sufficient and consistent funding
- Strategic planning
- Address fluctuations driven by supply/demand of services
- Strengthen the workforce
- Increasing systems-based approaches and communications
Future Ideas:

- Systems-based Approaches and Coordination
- Standardization and Best Practices
- Workforce, Resources, Court Operations
- Organizational Structure or Approach
- Knowledge and Data Transfer and Info Sharing
- Technology Adoption
- Increased Research Participation
Make connections to improve research

Connecting Researchers with Forensic Laboratories

April 27, 2020

NIJ encourages researchers to seek guidance from, or partner with, forensic practitioners. Such associations foster a greater understanding of the issues unique to the field of forensic science, and may strengthen the scope of the proposed research plan.

We encourage prospective research grant applicants to reach out to these labs to discuss preparing an application for open or future research solicitations.¹

Current forensic research grantees may work with these labs to fine tune and ensure that their research products are well-suited for practitioner needs, or to build relationships in anticipation of transitioning research products to the field — potentially under the annual Research and Evaluation in Publicly Funded Forensic Laboratories solicitation.

The labs listed in the table below have expressed an interest in connecting with researchers:

Note, there are no guarantees of placement or projects until awards are made.

Links:
- [Connecting Researchers with Forensic Laboratories](https://nij.ojp.gov/topics/forensics/connecting-researchers-forensic-laboratories)
Thank you!

Q & A

Jonathan McGrath, PhD MSFS
Senior Policy Analyst
NIJ Office of Investigative and Forensic Sciences
Washington, DC
jonathan.mcgrath@ojp.usdoj.gov

Eric Martin
Social Science Analyst
Technology and Standards Division
NIJ Office of Research, Evaluation, and Technology
Washington, DC
eric.d.martin@ojp.usdoj.gov