



MAY 2017

NATIONAL INSTITUTE OF JUSTICE

REPORT FORENSIC SCIENCE



Fiscal Year 2016 Funding for DNA Analysis, Capacity Enhancement, and Other Forensic Activities

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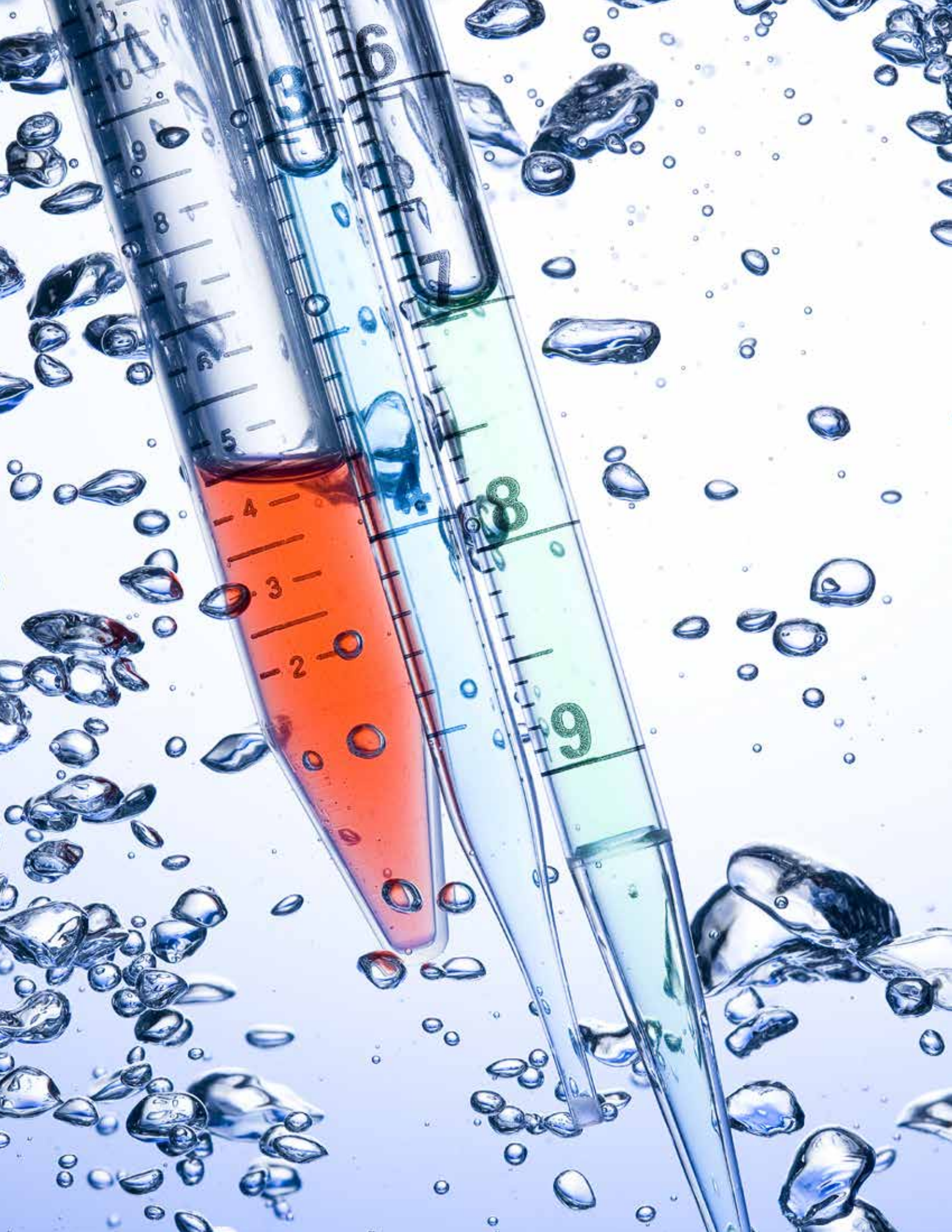
DNA ANALYSIS, CAPACITY ENHANCEMENT, AND OTHER FORENSIC ACTIVITIES

BY GERALD LAPORTE, HEATHER WALTKE, CHARLES HEURICH, AND RUBY J CHASE

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NCJ 250552

NIJ



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Overview

The National Institute of Justice (NIJ)—the research, development, and evaluation arm of the U.S. Department of Justice (DOJ)—is dedicated to improving the understanding of crime and justice issues through science. Annually, NIJ has received funds through the Department of Justice Appropriations Act. In 2016, this appropriation¹ included \$125,000,000 for three purpose areas: (i) \$117,000,000 for DNA-related and forensic programs and activities, including a DNA analysis and capacity enhancement program and other local, state, and federal forensic activities; (ii) \$4,000,000 for the purposes described in the Kirk Bloodsworth Post-Conviction DNA Testing Program;² and (iii) \$4,000,000 for Sexual Assault Forensic Exam Program grants.³ This report will highlight how NIJ invested the \$117,000,000 portion of the appropriation for DNA and other forensic activities, and the impact these efforts have had on the criminal justice system. Of the \$117,000,000 appropriation, NIJ received \$105,027,523 specifically to allocate for these purposes.⁴

Since 2008, NIJ has received funding for similar purposes including, but not limited to, support for DNA analysis and laboratory capacity enhancement; technical assistance through direct funding to state and local law enforcement agencies and forensic laboratories; and support for the only grant program in the nation dedicated to forensic

science research, development, and evaluation. Each year, NIJ considers how to allocate these funds based on the amount of unspent funds remaining in forensic DNA laboratories from previous grant awards, NIJ Technology

The programs described in this report are overseen by NIJ's Office of Investigative and Forensic Sciences (OIFS), the federal government's lead office for forensic science research and development and administration of capacity enhancement and technical assistance programs.

OIFS has two primary categories of activities: (1) research and development and (2) capacity enhancement and technical assistance.

Research and development efforts provide the discoveries, technologies, innovations, and scientists that will enable future improved tools, methodologies, and best practices for the criminal justice system, while capacity enhancement and technical assistance develop the forensic science workforce and bring innovative tools, technologies, methodologies, and best practices to forensic laboratories and forensic practitioners.

Working Group recommendations,⁵ results from studies and new findings, and NIJ's strategic priorities. All of these programs have been and continue to be a critical support mechanism for the forensic science community and, most critically, they directly support NIJ's strategy to improve the quality and practice of forensic science.

NIJ recognizes that while many forensic science needs require a long-term strategy to fully address them, there are immediate needs that also must be addressed. The immediate needs arise primarily from the state and local forensic laboratories that face the dual challenges of satisfying increasing demand for DNA analysis while keeping up with the latest advances. NIJ remains committed to a sustained effort that recognizes research and development as a long-term solution while providing support to forensic laboratories to address the immediate concerns of DNA capacity enhancement and efficiency improvement.

Office of Investigative and Forensic Sciences

Mission: To advance forensic science through research, resources, and innovation to protect the public and ensure justice for all.

This is a pivotal time for forensic science and the criminal justice system. The need to strengthen forensic science research and practice has been highlighted in many reports. The most recent National Research Council report, *Support for Forensic Science Research: Improving the Scientific Role of the National Institute of Justice* (2015),⁶ emphasized the "unique and critical role" NIJ has to play because it is the only federal agency focused on forensic science specifically in support of state and local agencies while at the same time managing a comprehensive research and development portfolio. Other agencies only serve forensic science issues "indirectly and occasionally."⁷

The Fiscal Year 2016 Forensic Science Programs

Of the \$105 million made available to NIJ in Fiscal Year (FY) 2016 for DNA-related and forensic programs and activities, funding can be generally broken down into three broad categories⁸ (See Table 1).

The distribution of funds for NIJ's forensic programs in FY 2016 is shown in Figure 1. Approximately 65 percent of the available funding went directly to forensic science laboratories, law enforcement agencies, and police departments to process, record, screen, and analyze forensic DNA and/or DNA database samples; to increasing the capacity of forensic laboratories; and to reducing the backlog of samples awaiting DNA analysis. Eight percent of the available funding was allocated to technical assistance to enhance the use of DNA and other forensic sciences in the criminal justice system.⁹ Twenty-four percent of available funding was dedicated to projects that included the development of highly discriminating, accurate, reliable, cost-effective, and rapid methods for the identification, analysis, and interpretation of physical evidence.

Direct Funding for State and Local Forensic Laboratories

NIJ supports the direct funding of state and local forensic laboratories and law enforcement agencies with three important programs: the DNA Capacity Enhancement and Backlog Reduction (CEBR) program, the biggest program OIFS operates; the Research and Evaluation for the Testing and Interpretation of Physical Evidence in Publicly Funded Laboratories program; and a new program, Sexual Assault Forensic Evidence – Inventory, Tracking, and Reporting (SAFE-ITR), to encourage transparency around sexual assault kit tracking and testing. All programs have the overarching purposes of assisting recipients with increasing the capacity to do forensic testing and increasing the quality of the forensic results, as well as ensuring transparency around sexual assault evidence testing.

DNA Capacity Enhancement and Backlog Reduction Program

The goal of the CEBR program is to help increase the throughput of evidence processing at the nation's forensic DNA laboratories and improve the quality of testing. Improvements achieved through increased efficiency come from a variety of innovations such as faster technologies, improvements to DNA kits and supplies, and streamlined workflows. Recipients of funding under the CEBR program

Figure 1. Distribution of Funds for NIJ's Forensic Programs in FY 2016

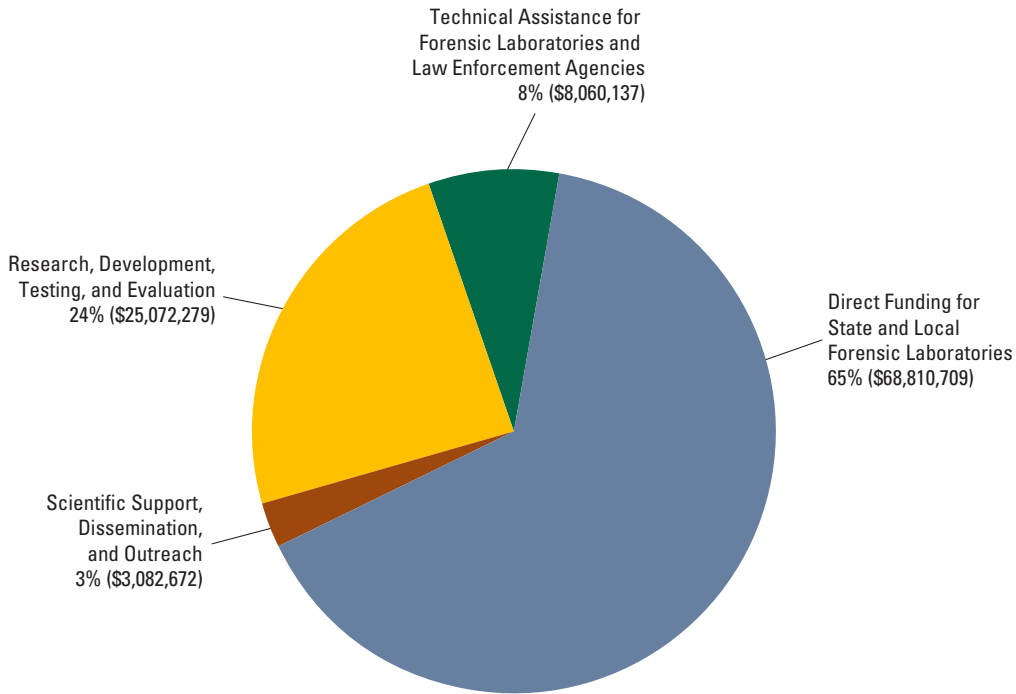


Table 1: Categories of Support for NIJ's Forensic Programs in FY 2016

<p>65%</p> <p>Direct funding for state and local forensic laboratories and law enforcement agencies</p> <ul style="list-style-type: none"> DNA Capacity Enhancement and Backlog Reduction (CEBR) Program Research and Evaluation for the Testing and Interpretation of Physical Evidence in Publicly Funded Forensic Laboratories Sexual Assault Forensic Evidence – Inventory, Tracking, and Reporting (SAFE-ITR) 	<p>8%</p> <p>Technical assistance for forensic laboratories and law enforcement agencies</p> <ul style="list-style-type: none"> National Missing and Unidentified Persons System (NamUs) Forensic Technology Center of Excellence (FTCoE) FBI-NIJ SAK Partnership
<p>24%</p> <p>Research, development, testing, and evaluation</p> <ul style="list-style-type: none"> Research and Development in Forensic Science for Criminal Justice Purposes Reimbursable Interagency Agreements with Federal Partners 	<p>3%</p> <p>Contracts for scientific support, dissemination, and outreach</p> <ul style="list-style-type: none"> Printing and distributing forensic reports and handbooks Support for National Criminal Justice Reference Service (NCJRS)¹⁰ Hosting and maintaining websites Providing assistance to ensure grantee compliance with the National Environmental Policy Act (NEPA).

determine what portion of their funding to use for capacity-building purposes and what portion to use for analysis of forensic DNA and/or DNA database samples. Recipients can use the funding to conduct DNA testing on all evidence that is submitted to the laboratories—including evidence related to sexual assaults, which often includes more than a sexual assault kit.

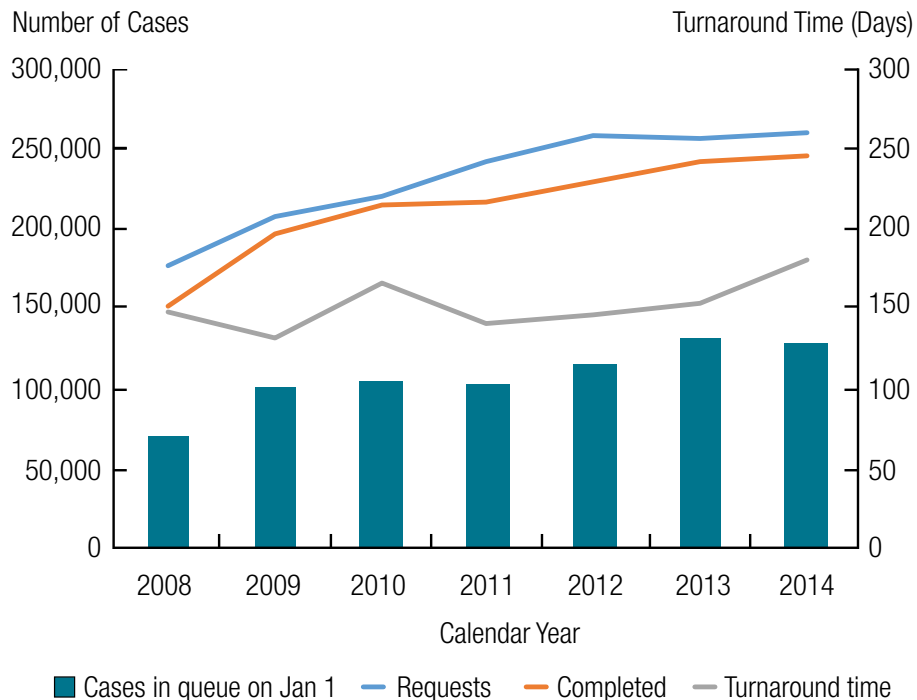
NIJ’s efforts to reduce backlogs of biological evidence in laboratories have resulted in significant improvements in the quantity and quality of DNA testing, but the impact has been tempered by a substantial increase in demand for testing. The increased demand is due in part to NIJ-supported improvements to DNA evidence analysis: as the technology becomes more helpful to law enforcement, the demand for DNA testing goes up. Preliminary results from the FORESIGHT¹¹ project, an NIJ-supported, business-guided self-evaluation for forensic science laboratories, show that for every 1 percent improvement in a laboratory’s time to process the evidence there is a subsequent 1.1 percent increase in demand for analysis.

Examining the performance data collected from CEBR grantees shows that NIJ funding has had a positive impact on increasing throughput and capacity. DNA evidence backlogs arise from insufficient supply¹² coupled with an overflowing demand.¹³ Figure 2 shows that while the demand is still outpacing the supply in national laboratories, the gap is closing. From 2008 to 2014, as requests increased by nearly 50 percent, the number of cases completed rose by over 60 percent. The *Publicly Funded Forensic Crime Laboratories: Resources and Services, 2014* report from the Bureau of Justice Statistics

Backlog Growth Has Slowed

From 2008 to 2014, the turnaround time has remained nearly constant while testing capacity increased by over 60 percent. While the improved throughput has not reduced the number of cases waiting, it has slowed the growth of the queue.

Figure 2: Trends in DNA Testing of Forensic Cases



shows a similar trend: in comparing 2009 with 2014, the requests for DNA testing increased 28 percent while the tests completed increased 24 percent.^{14,15}

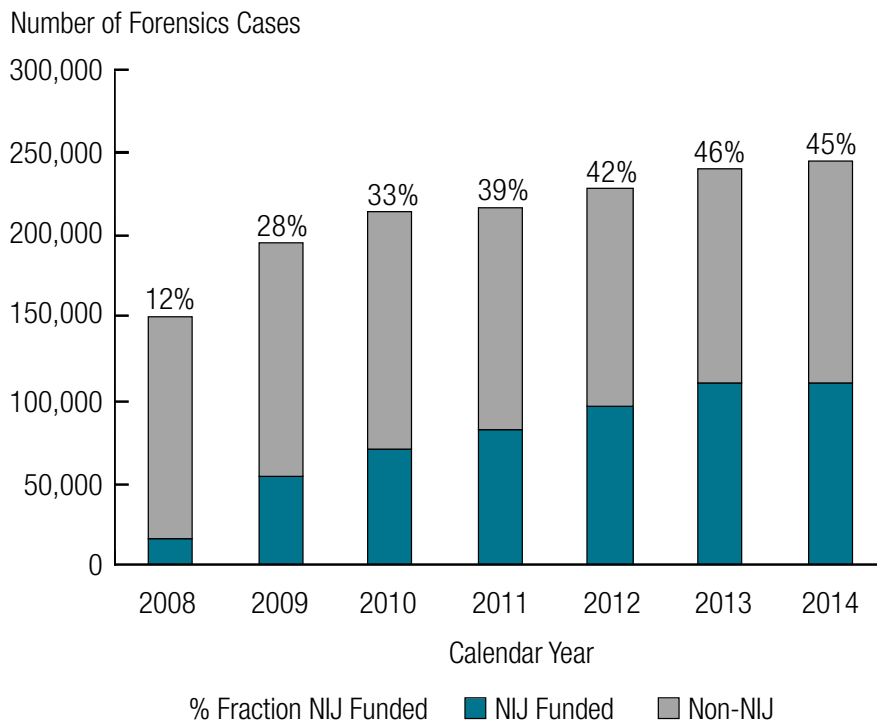
NIJ’s contribution to the increase in capacity of forensic DNA laboratories can be clearly seen in the percentage of cases supported by NIJ each year: this percentage climbed from 28 percent to 45 percent of all cases from 2009 to 2014 (Figure 3). This increase in productivity demonstrates real gains in capacity in the nation’s forensic DNA laboratories and shows NIJ’s efforts in capacity enhancement have paid significant and lasting dividends.

As DNA technology has advanced and improved, there has been a change in how cases are investigated, how forensic evidence is interpreted, and the positive impacts of testing DNA evidence. NIJ’s research and development efforts have made considerable contributions to the technological advancements adopted by laboratories in the last few years. This has led to more and more cases being submitted for analysis, and uploads to the FBI’s

Since FY 2012, funding for the CEBR program has stayed relatively flat but more DNA cases continue to be worked with NIJ support, in part because the cost per case has gone down from an average of \$1,279 in FY 2007 to an estimated \$607 in FY 2014.

Combined DNA Index System (CODIS) have increased 143 percent from 2009 to 2016.¹⁶ For example, more sensitive technologies have allowed a greater number of full DNA profiles to be developed and entered into CODIS from old, degraded, or otherwise unviable samples — samples that previously yielded only a partial profile or no profile at all. Advanced technologies in forensic DNA analysis generated from research and development have repeatedly shown the value in testing all types of evidence from violent crimes, property crimes, unsolved homicides and sexual assaults, potential wrongful convictions, and unidentified human remains.

Figure 3: Trends in NIJ-Supported DNA Testing for Forensic Cases as a Fraction of the Total Cases Processed by Forensic Laboratories



Practical Impact

The practical impact of funds can be measured by the number of DNA profiles obtained from crime scene evidence and from convicted offender and arrestee samples that are uploaded to the National DNA Index System (NDIS). The size of the national database is an important measure, as the likelihood of identifying suspects increases with every profile uploaded. Using these metrics, it becomes clear that efforts supported by NIJ are having a sizeable impact.

NIJ has played a significant role in achieving the gains demonstrated in this section, but more is needed. Until laboratory capacity outpaces the demand for DNA analysis, backlogs will continue to increase in laboratories. The CEBR program is only part of the solution, and continued investments in research, technology, and innovative solutions is critical to improve capacity and efficiency.

In FY 2016, NIJ made 132 awards totaling \$63,399,849.

- The FY 2016 solicitation for *DNA Capacity Enhancement and Backlog Reduction* program can be found at: <http://nij.gov/funding/Documents/solicitations/NIJ-2016-9089.pdf> (PDF, 36 pages).
- Information about DNA backlogs, including a list of all awards made under this program, can be found at: <http://www.nij.gov/topics/forensics/lab-operations/evidence-backlogs/pages/backlog-reduction-program.aspx>.

Research and Evaluation for the Testing and Interpretation of Physical Evidence in Publicly Funded Laboratories

In 2015, NIJ introduced the “R&E for Public Labs” program to support and encourage research, evaluation, and validation studies directly within publicly funded forensic science laboratories to improve laboratory efficiency and assist in making laboratory policy decisions. Many forensic science laboratories are

struggling to address significant casework backlogs and do not have the extra resources to devote to new methods and technologies that could ultimately increase efficiency in the laboratory. This program addresses a specific and immediate need for laboratories to research and evaluate accurate and efficient ways to process evidence in response to their own unique challenges, and then to publicly transfer that knowledge to other forensic laboratories, providing a lasting benefit for laboratories that do not have the resources to complete such studies. The program is of particular benefit since it provides direct support to forensic science laboratories to design more specific, tailored research and evaluation studies to investigate more accurate, efficient, reliable, and cost-effective methods to process physical evidence.

Examples of funded projects include two separate studies that seek to increase the efficiency and reliability of analyses in the area of impression and pattern evidence. One project seeks to evaluate the potential benefits of an advanced comparison microscope that utilizes digital image processing features and whether firearms and toolmark examiners will embrace the enhanced capabilities to share class characteristics among themselves and casework data with peers from their units for verification of conclusions. Another project in latent prints examination will study the performance of a new technology that utilizes a ridge-skeleton-matching

PERFORMANCE DATA FROM CEBR GRANTEES

Since FY05:

- Over 725,000 cases completed.
- Over 327,000 forensic profiles uploaded to CODIS.
- Over 2.95 million database samples completed.
- Over 3.01 million database profiles uploaded.
- Over 165,000 CODIS “hits.”

algorithm in comparison with that of a traditional minutiae-based approach. The study will assess the accuracy and reliability of the technology as well as the effect of integrating the technology into current complex comparison workflow.

In FY 2016, NIJ supported six projects totaling \$2,075,248.

- The solicitation for the FY 2016 Research and Evaluation for the Testing and Interpretation of Physical Evidence in Publicly Funded Forensic Laboratories program can be found at: <http://nij.gov/funding/Documents/solicitations/NIJ-2016-9011.pdf> (PDF, 31 pages).

In FY 2016, funds were awarded for a project that will assess massively parallel sequencing (MPS), also known as next generation sequencing (NGS), for mitochondrial DNA. The study will compare sequence data from mitochondrial DNA from MPS technology to previously generated data to assess sequence completeness, quality, and accuracy.

Sexual Assault Forensic Evidence – Inventory, Tracking, and Reporting Program

The SAFE-ITR program, a new funding opportunity, in support of the objectives noted in the SAFER Act of 2013,¹⁷ assists law enforcement agencies in the inventorying, tracking, and reporting of all untested and unsubmitted sexual assault kits (SAKs), ensuring accountability and transparency in the collection, processing, and testing of SAKs. For this unique program, NIJ requires all award recipients to use their own websites to publicly report information such as the cumulative number of SAKs in their possession, the number of SAKs they have determined will not undergo testing, the number of SAKs that have been submitted to their laboratory, and the number of SAKs that have already been tested. Having this information posted publicly every 60 days will bring a high measure of transparency to the agency's SAK processing.

Sexual Assault Evidence

Evidence from sexual assaults is not limited to a sexual assault kit. Evidence such as weapons, bedding, clothing, and toxicology samples can be used to corroborate that a crime occurred, identify a perpetrator, eliminate a suspect, and ascertain through a CODIS search whether a suspect may have been involved in other crimes.

While all evidence related to sexual assaults is important, this program focuses specifically on SAKs, which may be stored in a number of places including crime laboratories, police department evidence storage units, hospitals, and clinics. Many law enforcement agencies do not have computerized systems to track the processing of SAKs. The program complements the Bureau of Justice Assistance's *Sexual Assault Kit Initiative* (SAKI), which supports a multidisciplinary approach to the issue of unsubmitted sexual assault kits.¹⁸ For example, the SAFE-ITR program offers additional assistance by providing the inventorying, tracking, and reporting technology that can link information to all interested parties within multidisciplinary teams as well as those agencies who are not designated SAKI sites but still need resources in this area.

In 2016, NIJ made 4 awards totaling over \$3.3 million under this program.

- The FY 2016 Solicitation for the SAFE-ITR program can be found at: <http://nij.gov/funding/Documents/solicitations/NIJ-2016-9088.pdf> (PDF, 33 pages).

Technical Assistance for Forensic Laboratories and Law Enforcement Agencies

This funding category includes a nationally used database for missing persons, the Forensic Technology Center of Excellence (FTCoE), and a partnership between NIJ and the FBI to tackle the issue of SAKs. Programs under this category are designed to be large projects with the aim of addressing criminal justice and forensic science issues throughout the nation at all levels of law enforcement.

National Missing and Unidentified Persons System

The National Missing and Unidentified Persons System (NamUs) is a national centralized repository and resource center for locating and identifying missing persons and unidentified human remains, and repatriating unclaimed persons. NamUs is a web-based system, provided free of charge to medical examiners, coroners, law enforcement officials, allied forensic professionals, families of lost loved ones, and members of the general public who are trying to resolve cases. With users in all 50 states, NamUs is a collaborative system that bridges the communication gap among stakeholder communities, fostering enhanced information sharing and case support. NamUs currently has records for 12,551 missing persons and 11,194 unidentified persons. NamUs also has 2,582 cases in the Unclaimed Persons database; these are decedents who have been identified but whose bodies have yet to be claimed. Since its development in 2007, NamUs has helped to resolve over 800 unidentified person cases and over 1,400 missing person cases.

For more information about NamUs, please visit:
<http://namus.gov/>

Forensic Technology Center of Excellence

To improve and advance the practice of forensic science, it is imperative that technologies and methodologies be adopted in forensic testing. One strategy NIJ has taken to address this need is through its support of the FTCoE. NIJ's FTCoE is charged with facilitating the transfer of technology, methodology, and best practices into forensic laboratories in order to improve the practice of forensic science. The FTCoE manages the testing and evaluation of emerging technologies applicable to forensic science. By identifying and removing the potential barriers that often derail the implementation and acceptance of new and innovative technologies, the FTCoE places promising technical innovations in the hands of forward-thinking practitioners, stakeholders, and policymakers. NIJ's FTCoE is managed through RTI International and its collaborative academic partners Duquesne University, Virginia Commonwealth University, and the University of North Texas Health Science Center.

Mountain Jane Doe

Karen Stipes wasn't even a year old when her mother, Sonja Kaye Blair Adams, disappeared in 1969. That same year, a set of remains were found on a mountain in Harlan County, Kentucky, but no one linked the disappearance with the remains until 47 years later.

Ms. Stipes had heard the story about the "Mountain Jane Doe" and wondered if it could be her mother. In 2009, details of the remains had been entered into NamUs, which is where one of Ms. Stipes' children read them. They seemed to match Ms. Blair Adams.

Authorities in Harlan County exhumed Mountain Jane Doe's body from a pauper's grave with a headstone marked "unidentified female." DNA samples taken from the body were compared with samples from Ms. Stipes and, in 2016, Mountain Jane Doe was confirmed as Ms. Blair Adams.

In FY 2016, the FTCoE engaged in numerous multidisciplinary efforts that directly benefited the forensic research, practitioner, and criminal justice communities. These efforts provide concrete positive impacts to the forensic science community. NIJ's FTCoE is addressing the nation's continuing needs surrounding the issue of sexual assault response, especially with concern to victims, the collection of sexual assault evidence, and the need for multidisciplinary teams. For example, the FTCoE helped in the planning and implementation of *Looking Ahead: The National Sexual Assault Policy Symposium*. NIJ, through the FTCoE, hosted the event, with nearly 300 in-person and over 700 online attendees from the United States and beyond, including national leaders and elected officials. The occasion served to highlight the strides made on sexual assault evidence policy, technology advancement, efficiency, and practice—and also as a forum for discussion on opportunities for moving

forward. The symposium was the first of its kind to address every stage of sexual assault cases, starting with understanding and responding to victims' trauma in addition to maintaining a victim-centered approach. The agenda also included promising practices in investigating sexual assault cases, and how to best collect the needed evidence. It also focused on how laboratories test forensic evidence, and why in some jurisdictions many sexual assault kits remain untested. In addition, the symposium dedicated time to addressing state and local policy reform, available resources, and the need for multidisciplinary collaboration.

Additional FY 2016 projects in the area of sexual assault included an interactive glossary that has been developed to better inform the community of the most common and useful terms associated with sexual assault and response. The FTCoE also led a comprehensive effort dedicated to compiling, transferring, and supporting access to valuable information, resources, and best practices for those active in the sexual assault community through the development of a sexual assault application for mobile devices (commonly referred to as an "app"). The goal is to inform sexual assault nurse examiners, first responders, law enforcement, investigators, and other practitioners and stakeholders who contribute to the nation's response to sexual assault about existing research, information, knowledge, and methodologies to improve the outcomes of sexual assault investigations.

Since 2011, the FTCoE delivered over 112,000 hours of content through 428 live online and on-demand events to forensic science professionals, law enforcement, researchers, lawyers, sexual assault nurse examiners, and policy-related professionals. There have been over 68,000 attendees from 126 countries, including 54,000 attendees from the United States. In addition to this comprehensive online collection, assistance and knowledge-sharing through more than 605,000 website views, 7,400 downloaded evaluation and guidance reports, 2,100 presentations and publications, 800 technology transition workshops, 172,000 database queries, 90 R&D projects supported for technology transfer, a list of 29,000 newsletter recipients, and other information and educational opportunities can be found at: <http://www.forensiccoe.org>.

The NIJ-FBI Sexual Assault Kit Partnership

Sexual assault is one of the most complex issues currently facing our nation and, to compound the problem, law enforcement agencies are finding thousands of SAKs that were never submitted for DNA analysis. NIJ's past action research has indicated a demonstrated need to not only process sexual assault kit evidence, but also to develop and analyze data about the nature and processing of sexual assault evidence in order to improve future methods and procedures.

PARTNERSHIP IMPACT

- Over 1,400 SAKs processed.
- Nearly 750 CODIS entries.
- Over 280 investigative leads (hits).

In 2016, information and recommendations stemming from the Partnership became incorporated into an upcoming national best practices publication for the collection and processing of sexual assault evidence that can be used not only to prevent this problem from occurring again but also to apprehend violent criminals and reduce sexual violence.

In order to address this need, NIJ and the FBI Laboratory formed a unique partnership: the NIJ-FBI Sexual Assault Kit Partnership (the Partnership), a unified and collaborative team within DOJ to extend federal support to state and local law enforcement agencies. Through this collaboration, the Partnership has dedicated immense resources to improve and inform the quality and practice of sexual assault evidence processing.

An Interagency Agreement (IAA) between NIJ and the FBI DNA Casework Unit was signed on August 22, 2013, and the Partnership started officially accepting kits from law enforcement agencies and laboratories on August 14, 2014. Agencies from across the nation have been submitting a limited number of sexual assault kits to the program since September 2014.

In FY 2016, NIJ renewed the agreement with another \$1,000,000 given to the FBI to continue this valuable project, bringing the total funding to \$5.8 million. For more information on the NIJ-FBI Sexual Assault Kit Partnership, please visit: <http://www.nij.gov/topics/law-enforcement/investigations/sexual-assault/Pages/nij-fbi-sak-initiative.aspx>.

Forensic Science Research, Development, Testing, and Evaluation

NIJ's forensic science research, development, testing, and evaluation program includes the *Research and Development in Forensic Science for Criminal Justice Purposes* solicitation and reimbursable agreements, such as IAAs, where NIJ leverages the strengths and resources of our federal partners to address the needs of its stakeholders.

Research and Development in Forensic Science for Criminal Justice Purposes Program

The *Research and Development in Forensic Science for Criminal Justice Purposes* program (the R&D program) provides a significant benefit beyond advancing knowledge and technology relevant to the forensic sciences: it builds and maintains the forensic science research infrastructure. The National Research Council, in its 2010 and 2015 reports on NIJ, cited building research infrastructure as central to NIJ's mission. This infrastructure consists of the physical and intellectual capital that provides the foundation for research and development in the forensic sciences. Physical capital includes academic and forensic laboratories, as well as the instrumentation contained therein. Intellectual capital includes human capital (e.g., professors, post-doctoral research assistants, students, technicians, and industry researchers) and structural capital (e.g., information structures, databases, and scientific literature). The R&D program enhances the development of physical and intellectual capital by funding activities such as acquiring and developing instrumentation, supporting research that is disseminated in professional journals and forensic laboratories, and helping to support laboratories that provide learning and training experiences for scientists at all stages.

STUDENTS IN TRAINING

NIJ's research and development program also contributes to the training of students in multiple forensic science disciplines, which ultimately results in future forensic scientists with both research and hands-on experience with relevant and state-of-the-art laboratory technologies, instruments, and analytical techniques. Of the 54 projects funded under the program this fiscal year, NIJ will support some percentage of wages for approximately 216 individuals. Of these, at least 55 will be student researchers at the Ph.D., master's, or undergraduate level, and 10 will be at the post-doctoral level.

To expand the engagement of the scientific community with the forensic sciences, the R&D program gives special consideration to new investigators who are in the early years of their careers. Additionally, NIJ supports research and development activities that align with current national research initiatives but are still relevant to forensic science focus areas. The strategic intent is to leverage investments in these research areas to develop better forensic technologies. Currently, NIJ supports the following three national research initiatives because they present the best opportunities for innovation in the forensic sciences: the National Nanotechnology Initiative,¹⁹ the National Microbiome Initiative,²⁰ and the BRAIN Initiative²¹ for fatal head trauma.

Through its funding of forensic science research and development, NIJ will continue to improve the speed, accuracy, and scope of forensic evidence analysis and ultimately bolster the administration of justice. NIJ affirms that scientific advancements and technological breakthroughs are essential to the continued growth and strengthening of the forensic sciences. Since 2009, NIJ has supported more than 400 research and development awards related to forensic science totaling over \$175 million. In April 2015, NIJ published *The Impact of Forensic Science Research and Development*,²² which highlights some of the recent successes of the program.

In FY 2016, NIJ made 54 awards totaling \$24,260,996²³ under the R&D program, with over \$2.4 million of those funds supporting six innovative projects that have the potential to improve the analysis of sexual assault evidence. These projects include novel methods to identify and differentiate forensically relevant biological fluids, improve the ability to separate cells and interpret mixtures of biological material from multiple individuals (e.g., perpetrator from victim), and classify unknown lubricant samples collected in sexual assault cases in the absence of a known lubricant sample. With the increased demand to process sexual assault evidence, it is not enough for forensic laboratories to only expand capacity using existing technology, equipment, and procedures. The long-term solution will require innovation and new technologies that increase efficiency and productivity. The aforementioned investments will reduce sexual assault kit processing time, increase automation (thus minimizing variability associated with manual or “hands-on” procedures), and shift analysts’ efforts to the traditional downstream processes such as data analysis and technical review that require both examiner time and extensive training. Through its R&D program, NIJ is making the investments today that will yield technological innovations in the future.

- The FY 2016 solicitation for *Research and Development in Forensic Sciences for Criminal Justice Purposes* can be found at: <http://nij.gov/funding/Documents/solicitations/nij-2016-4305.pdf> (PDF, 38 pages).
- Information about forensic science research and development, including a listing of all awards made under this program, can be found at: <http://nij.gov/topics/forensics/Pages/research-development-projects.aspx>.

Interagency Agreements

IAAs are agreements or contracts which NIJ enters into with one or more of its federal partners in order to leverage the existing resources of the partner to benefit state and local forensic laboratories and law enforcement agencies. Currently, OIFS has active IAAs with several federal partners, including the FBI, the National Institute

for Standards and Technology, the Defense Forensic Science Center, and the Department of Energy. Projects include the development of a national footwear database, further development of a ballistics and toolmark research database, and a study that will assess the feasibility of a one-pot effluent characterization and standoff detection for clandestine laboratories. For more information on OIFS and its federal partners, visit <https://www.nij.gov/about/pages/oifs.aspx>.

Summary

This report demonstrates the continuing impact NIJ’s programs are having on the criminal justice community. In FY 2016, NIJ continued its commitment to a strategy that couples rigorous research and development with capacity enhancement and technical assistance in order to serve the law enforcement and forensic science communities.

The need for this assistance has never been greater because our forensic science laboratories continue to be overwhelmed with unprecedented demands to process and test evidence. Through capacity building, technical assistance, research, development, evaluation, and dissemination, NIJ is working to address the challenges experienced by forensic laboratories. Thanks to its efforts, the capacity in forensic science laboratories is continuing to increase; innovative technologies are allowing the community to solve cold cases, reunite missing persons with their families, identify previously unidentified decedents, and help exonerate the innocent; and advancements in research and development are leading to more cost-efficient, accurate, and reliable techniques. This strategy promotes long-term success, ultimately improving public safety.

Endnotes

1. Public Law 114-113: <https://www.congress.gov/bill/114th-congress/house-bill/2029/text?q=%7B%3A%5B%22114-113%22%5D%7D&r=1&overview=closed>.
2. Public Law 108-405, Section 412: <https://www.gpo.gov/fdsys/pkg/PLAW-108publ405/pdf/PLAW-108publ405.pdf>.
3. Public Law 108-405, Section 304: <https://www.gpo.gov/fdsys/pkg/PLAW-108publ405/pdf/PLAW-108publ405.pdf>.

4. The total amount available to NIJ for obligation for programs was reduced by assessments for management and administration and for costs such as peer review of grant applications.
5. Learn more about NIJ Technology Working Groups at: <https://www.nij.gov/topics/forensics/Pages/forensic-operational-requirements.aspx>.
6. The report can be downloaded at: <https://www.nap.edu/catalog/21772/support-for-forensic-science-research-improving-the-scientific-role-of>.
7. Ibid., at page 32.
8. Research, development, technology, and evaluation programs received an additional \$3.6 million from other funding sources within NIJ to supplement projects directly related to research and development in forensic science.
9. In addition, NIJ also received \$12,049,348 for Paul Coverdell Forensic Sciences Improvement Grants under part BB of Title I of the 1968 Act.
10. NCJRS is a federally funded resource offering justice and drug-related information to support research, policy, and program development worldwide. On its website, NCJRS hosts final technical reports for NIJ's research and development awards as well as final reports for many of NIJ's different research programs.
11. <http://www.be.wvu.edu/forensic/foresight.htm>.
12. "Supply" includes accredited laboratories, trained analysts, operational instrumentation, validated methods, laboratory supplies, etc.
13. "Demand" is defined as requests for DNA evidence testing in an accredited laboratory.
14. <https://www.bjs.gov/content/pub/pdf/pffclrs14.pdf>.
15. This survey included federal laboratories.
16. Data from FBI's NDIS Statistics page are at: <https://www.fbi.gov/services/laboratory/biometric-analysis/codis/ndis-statistics> coupled with NIJ staff calculations.
17. <https://www.congress.gov/113/plaws/publ4/PLAW-113publ4.pdf> (Title X, page 78).
18. https://www.bja.gov/ProgramDetails.aspx?Program_ID=117.
19. <http://www.nano.gov>.
20. <https://www.whitehouse.gov/the-press-office/2016/05/12/fact-sheet-announcing-national-microbiome-initiative>.
21. <https://obamawhitehouse.archives.gov/the-press-office/2013/04/02/fact-sheet-brain-initiative>.
22. <https://www.ncjrs.gov/pdffiles1/nij/248572.pdf>.
23. Funding for research and development was supplemented from other NIJ resources in addition to the appropriation for DNA and other forensics mentioned earlier in this report.

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