U.S. Department of Justice
Office of Justice Programs
National Institute of Justice

ISSUE NO. 276

NATIONAL INSTITUTE OF JUSTICE JOURNAL

12/2015

Fighting Crime With Science

ALSO IN THIS ISSUE

Looking for the Link: The Impact of Foreclosures on Neighborhood Crime Rates

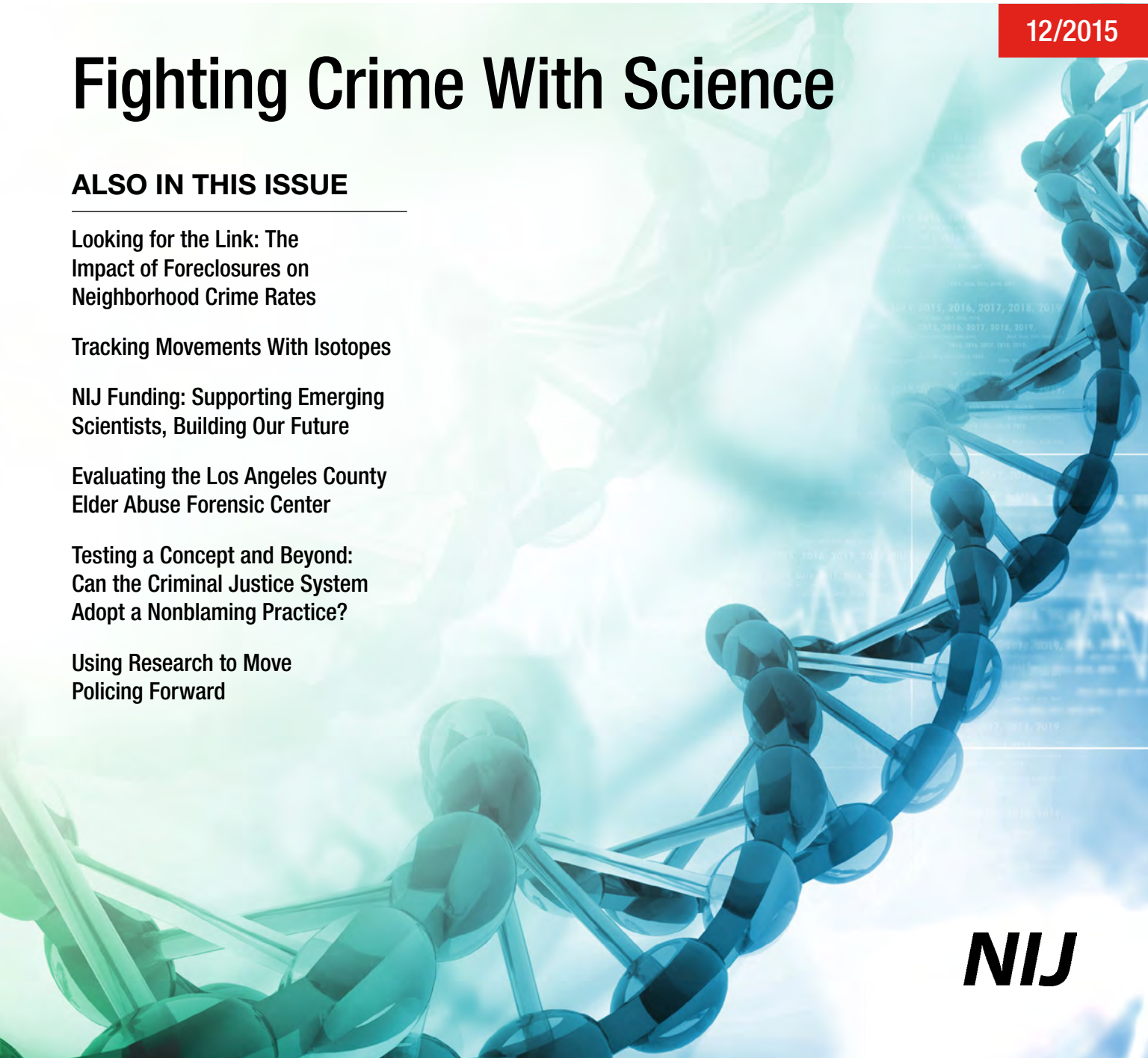
Tracking Movements With Isotopes

NIJ Funding: Supporting Emerging Scientists, Building Our Future

Evaluating the Los Angeles County Elder Abuse Forensic Center

Testing a Concept and Beyond: Can the Criminal Justice System Adopt a Nonblaming Practice?

Using Research to Move Policing Forward



NIJ

U.S. Department of Justice
Office of Justice Programs

810 Seventh St. N.W.
Washington, DC 20531

Loretta E. Lynch
Attorney General

Karol V. Mason
Assistant Attorney General

Nancy Rodriguez, Ph.D.
Director, National Institute of Justice

This and other publications and products of the National Institute of Justice can be found at:

National Institute of Justice
http://www.NIJ.gov

NCJ 249218

Subscribe

Online NIJ.gov, keyword: subscribe
Phone 301-240-7760
800-851-3420
Mail NCJRS
P.O. Box 6000
Rockville, MD 20849-6000

Follow us on facebook.com/OJPNIJ

Follow us on twitter.com/OJPNIJ

Follow us on youtube.com/OJPNIJ

Contact NIJ

National Institute of Justice
810 Seventh St. N.W., Washington, DC 20531, USA
202-307-2942

NIJ

Strengthen science. Advance justice.

National Institute of Justice

Nancy Rodriguez, Ph.D.
Director, National Institute of Justice

The *NIJ Journal* is published by the National Institute of Justice to announce the Institute's policy-relevant research results and initiatives.

Findings and conclusions of the research reported here are those of the authors and do not necessarily reflect the official position or policies of the U.S. Department of Justice.

All products, manufacturers and organizations cited in this publication are presented for informational purposes only, and their discussion does not constitute product approval or endorsement by the U.S. Department of Justice.

NIJ Journal Editorial Board

Thomas E. Feucht, Ph.D.
Lee Mockensturm
Angela Moore, Ph.D.
Marilyn Moses
Nancy Ritter
George Tillery
Cheryl Crawford Watson

Editor-in-Chief

Jolene Hernon

Contact Us

jolene.hernon@usdoj.gov

Production

Palladian Partners, Inc.
Beth Pearsall, *Managing Editor*
Sarah Berson, *Consulting Editor*
Amy Schneider, *Production Editor*
Robert Walker, Jr., *Designer*
Yue Xu, *Designer*

DIRECTOR'S MESSAGE

As this issue goes to press, I am just returning from the annual meeting of the International Association of Chiefs of Police (IACP) and getting ready to attend the annual meeting of the American Society of Criminology. Both of these major events are exciting opportunities to share stories face-to-face about the ways research and development (R&D) are helping practitioners and policymakers make decisions about criminal justice issues. The *NIJ Journal* offers another way — via the written word — to illustrate the impact of R&D.

The cover story for this issue is a great example. It contains several fascinating examples of the ways researchers and practitioners are collaborating to improve forensic science fields and advance justice. We have a related article by John M. Butler, Ph.D., reflecting on his prolific career and the impact of NIJ funding on his forensic science research.

The article about housing foreclosures also shows the benefits of R&D. NIJ scientists working with community groups wanted to confirm or refute the popular notion that houses sitting empty attract criminal activity. We funded three studies that used different rigorous methods in different locations around the country. Each study has limitations, but together they tell us there is no clear link between foreclosures and bank-owned properties and increases in neighborhood crime. The research is proving useful not only for civic leaders and law enforcement officials, but also for the mortgage bankers who live and work in our communities.

The findings about the impact of elder abuse forensic centers are another good example. Social services practitioners have suspected that multidisciplinary teams devoted to ending elder abuse are beneficial, but they did not have evidence about the precise nature of the impact. Through a competitive solicitation process, NIJ invested in studies of one multidisciplinary model, the elder abuse forensic center. The scientists identified evidence that the centers help prosecutors and victims alike and showed that they can help reduce recurrence of abuse. The studies also found that the multidisciplinary team approach carries a higher price tag than the traditional approach, but the scientists noted that the higher cost is modest compared with the health costs associated with continued abuse.

I especially like the story about how a Salt Lake homicide detective started using isotope ratio analysis to solve cold cases. When he learned that scientists were discovering ways to tell where a person is from by analyzing hair, he asked for their help in putting a name to a long-unidentified Jane Doe. Thanks to the latest R&D and his hard work, he was able to get a fix on where Jane Doe was from and, eventually, to identify her. He has not yet found her murderer, but having her name has been a significant event in the case.

I was also pleased to see the article by Captain James Nolette, one of the beneficiaries of the strong partnership between NIJ and IACP. Our shared goal is to infuse research into police work. One way NIJ is doing that is by supporting up-and-coming police leaders and introducing them to the inner workings of IACP and NIJ. In his article "Using Research to Move Policing Forward," Captain Nolette writes about how his department in Fayetteville, North Carolina, is using research to improve criminal investigations. As regular readers know, one of my priorities is helping emerging leaders and scholars. So thank you, Captain Nolette, for contributing to our magazine.

We are happy to share these latest findings with you and hope you find them as interesting as I do.

Nancy Rodriguez, Ph.D.

Director, National Institute of Justice

The National Institute of Justice is the research, development and evaluation agency of the U.S. Department of Justice. NIJ's mission is to advance scientific research, development and evaluation to enhance the administration of justice and public safety.

The National Institute of Justice is a component of the Office of Justice Programs, which also includes the Bureau of Justice Assistance; the Bureau of Justice Statistics; the Office for Victims of Crime; the Office of Juvenile Justice and Delinquency Prevention; and the Office of Sex Offender Sentencing, Monitoring, Apprehending, Registering, and Tracking (SMART).

Photo Sources: Thinkstock; Bigstock; Science Photo Library; Florida International University; Drug Enforcement Administration; Society of Antiquaries of London, Bridgeman Images; Mohamed Mahfouz; Houston Television.

CONTENTS

1 **Director's Message**

4 **NIJ Bulletin**

10 **Fighting Crime With Science**
by Jim Dawson

18 **Looking for the Link: The Impact of Foreclosures on Neighborhood Crime Rates**
by Farhana Qazi, April L. Trotter and Joel Hunt

22 **Tracking Movements With Isotopes**
by Jim Dawson

26 **NIJ Funding: Supporting Emerging Scientists, Building Our Future**
by John M. Butler

32 **Evaluating the Los Angeles County Elder Abuse Forensic Center**
by Terry Taylor and Carrie Mulford

38 **Testing a Concept and Beyond: Can the Criminal Justice System Adopt a Nonblaming Practice?**
by Nancy Ritter

46 **Using Research to Move Policing Forward**
by Captain James Nolette

NIJ BULLETIN

Publications in Brief

Crime and Policing Revisited

The Harvard Executive Session on Policing and Public Safety produced a series of papers that reflect a growing body of research about innovative crime prevention strategies. In the final paper of the series, Anthony A. Braga reviews the effectiveness of these strategies and concludes that law enforcement should adopt a flexible, community problem-solving approach to crime with programs that fit local needs. The goal is to balance effective crime prevention with maintaining positive community perceptions of the quality and appropriateness of law enforcement services.

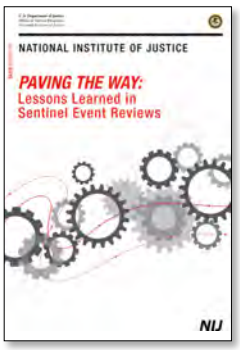
Read the paper at NIJ.gov, keyword: 248888.

Community-Based Responses to Justice-Involved Young Adults

Advances in behavior and neuroscience research confirm that brain development continues well into a person's 20s, meaning that young adults have more psychosocial similarities to children than to older adults. With a foreword by Assistant Attorney General Karol V. Mason, the first paper from the Harvard Executive Session on Community Corrections discusses how this research on brain development affects the justice system's response to young adults.

Read the paper at NIJ.gov, keyword: 248900.

Watch a video in which Attorney General Loretta E. Lynch, Assistant Attorney General Karol V. Mason, and experts from NIJ and the Harvard Kennedy School Program in Criminal Justice discuss the future of justice-involved young adults at NIJ.gov, keywords: justice-involved.



Paving the Way: Lessons Learned From Sentinel Event Reviews

This report summarizes the findings from a beta test of sentinel event reviews (SERs) in three jurisdictions. SERs are all-stakeholder, nonblaming reviews of justice system errors or near misses. NIJ's Sentinel Events Initiative borrows extensively from medicine, aviation and other high-risk fields that have used SERs to improve outcomes. Since 2011, NIJ has been investigating the feasibility of using SERs as a way to learn from errors in the criminal justice system. This publication is a companion piece to *Mending Justice: Sentinel Event Reviews,* published by NIJ in 2014.

Read the paper at NIJ.gov, keyword: 249097.

News & Events

National Academies' Report Makes Recommendations to Improve NIJ's Forensic Science Role

NIJ asked the National Academy of Sciences (NAS) to conduct an independent and rigorous review of NIJ's contributions to forensic science research and development and to monitor NIJ's progress in addressing the challenges faced by the forensic science community. The NAS committee found that NIJ's efforts have "(1) restored authority that is appropriate for a science agency … and (2) contributed to the building of a research infrastructure necessary to develop and sustain research that advances forensic science methods."

Read a statement by NIJ Director Nancy Rodriguez at NIJ.gov, keyword: nrforensics.

NIJ Receives FBI Director's Awards for Excellence

The NIJ-FBI Sexual Assault Kit Partnership was recognized with an Outstanding Scientific Advancement Award during the FBI Director's Awards for Excellence. During the next five years, the partnership is projected to reduce the nation's untested sexual assault kits by thousands of cases, bringing victims a step closer to justice.

Learn more about this partnership at NIJ.gov, keywords: fbi sak.

Rebecca Campbell Receives Awards for Sexual Assault Kit Research

Rebecca Campbell, principal investigator for the NIJ-supported Detroit Sexual Assault Kit Action Research Project, is slated to receive the End Violence Against Women International 2016 Visionary Award for her leadership and groundbreaking research on violence against women, specifically sexual assault and the response of legal, medical and mental health systems to the needs of rape survivors. In addition, the Michigan Coalition to End Domestic and Sexual Violence (MCEDSV) honored Campbell with the 2015 MCEDSV Wave of Change Award for her trailblazing social and systems change efforts in Michigan.

Learn about this action research project at NIJ.gov, keywords: sexual assault kits.

NIJ Receives Two Awards From Challenge.gov

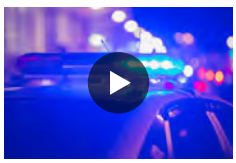
In October 2015, Challenge.gov celebrated five years of innovative challenge and prize competitions. Nancy Merritt of NIJ received an Unsung Hero Award for her work developing and implementing the challenge process at the U.S. Department of Justice. In addition, NIJ's Ultra-High-Speed (UHS) App Challenge received the Best Challenge in Software/Apps Award. The UHS App Challenge encouraged software developers and public safety professionals to develop apps that could improve public safety operations. The winning app, developed by the city of Ammon, Idaho, works with a school's existing camera system and gunshot detection hardware to report gunshot fire and provide live video feed to first responders in real time.

Learn more about how NIJ uses challenges, see past challenges, and find out which challenges are currently open at NIJ.gov, keyword: challenges.

Peter Lichtenberg Receives Judge Edward Sosnick Courage to Lead Award

NIJ grantee Peter Lichtenberg, director of the Institute of Gerontology at Wayne State University in Michigan, was presented with the Judge Edward Sosnick Courage to Lead Award by the Oakland County Serving Adults who are Vulnerable and/or Elderly Task Force. Lichtenberg received the award for his extensive work to create ways of identifying older adults at risk of financial exploitation.

Multimedia



Strengthening Law Enforcement-Community Relations

NIJ produced a *Research for the Real World* seminar that brought together researchers and law enforcement leaders committed to police reform. The discussion centered on how community-minded policies can help improve law enforcement and featured the panelists' contributions to the Harvard Executive Session on Policing and Public Safety.

Watch the video at NIJ.gov, keyword: rfrw.

How Reliable Are Latent Fingerprint Examiners?

Brian Cerchiai discusses an NIJ-supported study conducted by the Miami-Dade Police Department on the accuracy of fingerprint examiners. The study found that fingerprint examiners make few errors. In fact, the examiners studied were remarkably accurate even when they did not get an independent second opinion on their decisions. When independent reviewers did verify decisions, the examiners had a 0 percent false positive (or incorrect identification) rate and a 3 percent false negative (or missed identification) rate.

Watch the video at NIJ.gov, keywords: latent fingerprint.

Using Technology to Protect Wildlife

NIJ, in partnership with the U.S. Department of State's Bureau of Counterterrorism, has announced a new research award to identify and assess cost-effective aircraft to further counter-poaching and counterterrorism. Applying lessons learned from the Kenya Wildlife Services, NIJ-funded research will help rural jurisdictions within the U.S. keep their remote and isolated lands safer.

Watch a video about the partnership at NIJ.gov, keyword: Kenya.

Recent Research Findings

DEFENDING CHILDHOOD
PROTECT HEAL THRIVE

Lessons From the Defending Childhood Demonstration Program

Approximately 60 percent of American children have been exposed to violence, according to a 2009 national survey. In response, the U.S. Department of Justice launched the Defending Childhood Initiative to prevent children's exposure to violence (CEV), mitigate its negative impacts and raise awareness. The initiative funded eight sites across the U.S. to institute comprehensive CEV strategies. To learn from the sites' experiences, the Center for Court Innovation, supported by NIJ, conducted process and outcome evaluations at six of the sites. Despite differences between programs, the lessons provide valuable insight into implementing and sustaining a CEV program.

Read the process evaluation at NIJ.gov, keyword: 248882.

Read the outcome evaluation at NIJ.gov, keyword: 249236.

Lone Wolf Terrorism in America

New research offers a look at the pathways that lone wolf terrorists take on their journey to radicalization. NIJ-supported researchers at Indiana State University developed a model, based on a comprehensive database of lone wolf terrorism in the U.S., showing that radicalization begins with personal and political grievances that form the basis for online sympathizers and enablers. The lone wolf will usually broadcast terrorist intent and experience a triggering event, giving law enforcement time to intervene.

Read the paper at NIJ.gov, keyword: 248691.

Superglue Fuming of Fingerprints at Lower Temperatures Improves Results

University of Tennessee scientists, conducting research to better understand the chemical processes involved in superglue fuming of both recent and aged latent fingerprints, discovered that the fuming process is more efficient when the print temperature is between 10 and 15 degrees Celsius (50 and 59 degrees Fahrenheit). Fuming works because vapors from cyanoacrylate, the adhesive that makes up many types of superglue, adhere to the ridges of fingerprints and harden. This discovery came as part of the scientists' broader NIJ-supported research to better understand the molecular processes in fingerprint fuming in order to establish guidelines.

Read the report at NIJ.gov, keyword: 248637.

Using Future Internet Technologies to Strengthen Criminal Justice

New Internet-based technology may aid criminal justice agencies through such tools as better criminal databases, remotely conducted criminal trials and electronic monitoring of parolees in the community, according to an NIJ-supported RAND Corporation study. Although the technology is promising, many of the developments raise issues related to civil rights, privacy rights and cybersecurity that must be addressed. The report is based on feedback from an expert panel of practitioners and technology experts convened to discuss what upcoming Internet technologies may be valuable and what the technology likely will do for criminal justice efforts.

Read the report at NIJ.gov, keyword: 249118.

Sharing Data to Improve Science

Data Resources Program

Secondary data analysis allows researchers to build on existing findings, replicate results and conduct new analyses. Through NIJ's Data Resources Program, data collected as part of NIJ research are archived in the National Archive of Criminal Justice Data and made available to support new research aimed at reproducing original findings, replicating results and testing new hypotheses.

- Learn about NIJ's Data Resources Program at NIJ.gov, keyword: DRP.

Recent data sets added to the National Archive include the following:

- Crime Hot Spot Forecasting With Data From the Pittsburgh [Pennsylvania] Bureau of Police, 1990-1998
- Custody Evaluators' Beliefs About Domestic Abuse Allegations, 2009-2010 [United States]
- Evaluation of GPS Monitoring Technologies and Domestic Violence in the United States, 2001-2009
- Evaluation of the Gang Resistance Education and Training (GREAT) Program in the United States, 1995-1999
- Examination of South Carolina's Sex Offender Registration and Notification (SORN) Policy in Reducing Sexual Violence, 1990-2005
- Longitudinal Study of Violence Against Women: Victimization and Perpetration Among College Students in a State-Supported University in the United States, 1990-1995
- Polyvictimization Among Girls in the Juvenile Justice System [South Carolina], 2006-2009
- Spatial Configuration of Places Related to Homicide Events in Washington, DC, 1990-2002
- The Kentucky Civil Protective Order Study: A Rural and Urban Multiple Perspective Study of Protective Order Violation Consequences, Responses, and Costs, 2006-2008

Learn about accessing and using research data from NIJ studies at NIJ.gov, keywords: using data resources.

FIGHTING CRIME WITH SCIENCE

BY **JIM DAWSON**

NIJ research and development projects hold promise for significantly improving forensic science disciplines.

In crime laboratories across the country, scientists and technicians spend countless hours analyzing a never-ending flow of evidence. The challenging work involves multiple scientific disciplines, including almost every field of the physical and life sciences and computer science.

For example, while a toxicologist in a crime laboratory is working to identify a complex designer drug that killed a college student, a biotechnician may be trying to identify a murderer by amplifying DNA taken from under the victim's fingernails. A trace evidence expert may be examining carpet fibers on a victim's clothing, while a forensic anthropologist is determining the age, sex and ancestry of human bone fragments discovered in a field and a digital (or computer) forensic analyst is searching for evidence on a computer hard drive.

In addition to the complexity of the scientific work, the demands on crime laboratories to process evidence faster while lowering costs have increased dramatically over the past decade. A key to helping the crime laboratories catch up to and keep pace with these growing demands is the development of better technology and analytical methods based on state-of-the-art research.

The hundreds of projects that NIJ has supported over the past five years cover a wide range of forensic science disciplines, including the following:

- DNA research, which involves basic research directly for forensic purposes and adapting other DNA research to the forensic field
- Trace evidence analysis, which includes examining glass, hairs, fibers, gunshot residue, paint and explosive residues
- Fingerprint comparison, firearm matching and blood spatter pattern interpretation
- Toxicology, which focuses on drug and poison identification in biological fluids and tissues
- Digital forensics, one of the fastest-growing areas of forensic science, which specializes in recovering and analyzing material found in digital devices
- Crime scene investigation, which concentrates on efficient and accurate ways to identify, collect and preserve all relevant evidence at a crime scene

The current projects supported by NIJ represent the cutting edge of forensic research. Much is basic research, such as efforts to construct a near-photographic image of an individual from a strand of DNA. Some research, such as sophisticated software

that assists in the reconstruction of bone fragments from mass graves, is ready for field testing by experts and may soon provide crime laboratories with new forensic tools.

This article highlights several of these ongoing projects that hold promise for significantly improving their fields in forensic science. All are aimed at advancing NIJ's overall goal of strengthening forensic science to improve justice.

Studying Drugs at Electronic Dance Music Festivals

For the last two years, chemist and toxicologist Barry Logan has parked a rented RV as a mobile research station and positioned his team of researchers about 100 yards from the main entrance of the Ultra Music Festival in Miami. The event, which typically sells more than 160,000 tickets, has a longstanding reputation for attracting youth who use designer drugs or, as the *Miami Herald* wrote, "a smorgasbord of psychotropic uppers and downers."

As the concertgoers pass by Logan's RV on their way into the festival, he asks whether they want to contribute to science. Surprisingly, he says, many do and voluntarily offer some combination of oral fluid, urine or blood samples. Those who provide oral fluid and urine samples are rewarded with bottled water and candy. Those willing to be stuck with a needle and donate blood receive a $20 Dunkin' Donuts gift card. Over the past two years, about 400 individuals have provided samples for this NIJ-supported study.

When the 145 volunteers tested during the first sample year were asked whether they had taken medicinal or recreational drugs within the past week, 72 percent said that they had. Scientists at Logan's research organization, the Pennsylvania-based Center for Forensic Science Research and Education, found that 38 of the 66 blood samples taken (58 percent) screened positive for "a common drug of abuse" (primarily cocaine) or a novel psychoactive substance — the term that investigators and researchers use to describe a designer drug.

Synthetic chemists in Asian laboratories primarily manufacture these drugs on a large scale, according to Logan. They are an emerging group of compounds in the designer drug movement that belong to the "bath salts" chemical family and "Molly," slang for "molecular," which originally referred to the stimulant and hallucinogen MDMA, and the proliferating synthetic cannabinoid, or "fake pot," market. "The recreational drug users are at the mercy of the clandestine dealers and manufacturers who supply this market," Logan said.

Many of the volunteers believed that they had purchased a specific designer drug; however, testing their samples revealed that they had ingested a different drug, Logan said. Knowing exactly what drug is being taken is a serious and ongoing problem in the designer drug market, and although most of the concertgoers said that they were aware of the problem, they insisted that the drugs they used were different. "They trusted their dealers," Logan said, some of whom told their customers that the drugs were "Swedish research-grade materials."

Designer drugs typically come packaged as incense, potpourri or bath salts and are often labeled "not for human consumption." (Photo credit: Drug Enforcement Administration)

Of the 104 urine samples taken, more than 70 samples showed metabolites, or byproducts, of an array of drugs, including cocaine and several designer drugs. Metabolite identification is important because researchers have yet to link many of the metabolites directly to the parent designer drug; as a result, urine samples used in drug tests are inconclusive in determining specifically what a person has taken.

"With this research, we know what the parent drug is [because of the blood and oral samples], and then we can find the metabolites, which helps us develop better tests and drug screening approaches for death investigations, drug-facilitated sexual assault and impaired driving cases," Logan said. The research also "provides better information to emergency responders and medical toxicologists."

Logan's group is currently examining data from the second Miami sampling, which involved 250 participants, and is planning to return to the next Miami Ultra Music Festival. The researchers also want to investigate regional differences in drug use patterns and planned to take samples at the TomorrowWorld electronic dance festival in Chattahoochee Hills, Georgia. The researchers have built a library that links parent drugs to metabolites and that will eventually be available to the medical and forensic toxicology communities.

Detecting Explosives With Microfluidics

In an age of terrorism, the ability to detect improvised explosive devices or trace chemical elements from the explosives is critical. Explosive-detecting dogs and costly technology, such as ion mobility spectrometers, now form the front line for detecting explosives. Yet both the dogs and the technology are limited in their ability and require extensive training for those who use them.

Starting with the idea that a simple, small, inexpensive detector would be a more useful way to detect and identify explosives in the field, Florida International University chemist Bruce McCord and graduate student Kelley Peters developed a paper "chip" that, through capillary action, can test for five types of explosives. The postage stamp-sized chip consists of chromatography paper printed with wax-based ink in a design that looks like a child's outline drawing of a tree.

The chip, developed with NIJ support, is designed not only to confirm that an unknown substance is an explosive but also to indicate the exact type of explosive. The tree has five branches, each impregnated with a reagent that reacts to a particular explosive, McCord said. An investigator confronted with a suspected explosive can take a small sample, place it in a vial filled with liquid — Peters used diluted nail polish remover — and then place the "root" of the paper chip into the liquid through a slot in the cap.

A key to helping crime laboratories catch up to and keep pace with growing demands is the development of better technology and analytical methods based on state-of-the-art research.

The liquid flows up the paper, McCord said, and the appropriate reagent reacts to the explosive and shows the reaction as a colored dot on one of the branches of the tree. The chip can detect both inorganic and organic explosives, including RDX, TNT, nitrites and nitrates. McCord said that he is developing a chip that identifies metallic powders found in metallic explosive fuels, as well as primer and gunshot residues.

Scientist Kelley Peters demonstrates the microfluidic chip during a TEDx talk at Florida International University. (Photo credit: Florida International University)

The idea for the paper chip came from more sophisticated medical microfluidic devices used as biosensors, McCord said. First responders, soldiers and others who might deal with explosives can easily carry the chip in their pocket. The chip can be used with minimal training, and because it consists primarily of paper, waxed ink and a reagent, it costs only pennies.

Working under another NIJ grant, McCord is developing a similar chip that could allow law enforcement officers to identify a variety of drugs in the field.

Reconstructing Fragmentary Skeletal Remains

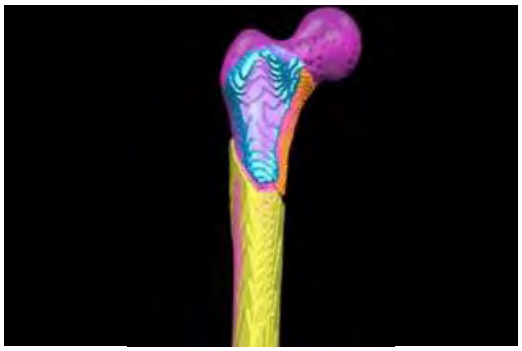
When mass graves are unearthed, the bones are often commingled, presenting forensic anthropologists with the daunting problem of sorting and matching hundreds, sometimes thousands, of bone fragments in an effort to determine the number of dead, as well as their age and sex.

The current method of piecing together fragmented bones from multiple people relies on a geographical information system designed to store, analyze and manipulate spatial geographical data. The system is not specifically designed to analyze bone fragments and is not very efficient at doing so, said Mohamed Mahfouz, a biomedical and systems engineer with the University of Tennessee.

Mahfouz has been working for several years to develop software that will aid in the reconstruction of fragmented bones, with a particular focus on mixed fragments from multiple individuals. The first iteration of the software, developed with NIJ support, is ready for testing by the forensic and anthropologic communities, he said.

"Our goal is to make [skeletal reconstruction] easier for law enforcement and paleoanthropology — anyone, really — who is trying to reconstruct bones," Mahfouz said. "It is intended to help the anthropologist sort out and combine bone fragments and determine how a bone should look."

Mahfouz and his team designed the software to work on fragments of four skeletal elements: the femur, humerus, pelvis and skull. Fragments from a mass grave, for example, undergo CT or laser scanning, and then features are taken from each bone fragment by measuring surface roughness. Those features are matched to corresponding features on a "template" bone. The templates are derived from a database of 2,061 scanned bone fragments from the Morton Shell Mound, an ancient ossuary in Louisiana that has yielded about 24,900 human bone fragments.



Software guides investigators by matching fragments to a template, in this case a human femur. (Photo credit: Mohamed Mahfouz)

A newly scanned fragment can be visualized and then compared to template bones until a match is found. Currently, the software compares fragments to the templates and suggests which bone the fragment is from (left or right femur, for example). The ultimate goal, Mahfouz said, is improving the software so that it can automatically scan, score and reconstruct fragments from commingled bones. The data involved in such a comprehensive analysis are enormous, and the process is too time-consuming to be practical at the moment, he said.

As Mahfouz works toward automation, he is making the current version of the software available "so people can use it, play with it and suggest improvements."

Finding Your Face in DNA

"We are not even at the end of the beginning," geneticist Richard Spritz said, as he described his progress toward identifying and understanding the genes that determine what a human face looks like. What you see when you look in the mirror, he said, "involves multiple genes, environmental factors and chance."

Spritz, program director of the University of Colorado's Human Medical and Genetics Program, is one of several NIJ-supported researchers at a number of institutions who are investigating different aspects of the human phenotype and trying to determine what segments in a person's DNA are responsible for physical appearance, including hair, eye and skin pigmentation, as well as facial features. Although the genetic determinants are enormously complex, the link between genes and appearance "is what your grandmother is responding to when she says you look like your father," Spritz said.

The forensic importance of being able to determine what a person looks like based on a strand of DNA is clear: A physical portrait of a suspect could be developed from DNA left at a crime scene; in the aftermath of fires or other destructive events, DNA from unidentifiable human remains could make them recognizable; and DNA from bone fragments could help identify individuals in mass graves.

Research to understand the underpinnings of phenotypes has progressed significantly in the past decade. Scientists can now use DNA to determine, with more than 75 percent probability, an individual's eye and hair color and heritage. But, as Spritz noted, while recreating a person's face may be the ultimate goal, getting there is far from ensured.

"There are some genetics that are relatively simple, like a disease," he said. "There are some that are intermediate, like height, and some that are unimaginably complex, like determining your facial shape [and features]."

At a research laboratory at Indiana University-Purdue University Indianapolis, geneticist Susan Walsh is refining DNA phenotyping to predict the quantitative (precise) color of eyes, hair and skin. Earlier work by Walsh and others identified the pieces of DNA known as single-nucleotide polymorphisms (SNPs), which drive pigmentation. "That is categorical identification: brown versus blue eyes, blond versus brown hair," she said. "Our goal now is real color definition, like the RGB value on Adobe Photoshop."

What spurred Walsh to try to identify real color from DNA was a request from molecular geneticist Turi King, who asked her to determine the eye and hair color of Richard III, whose remains were found under a parking lot in England in 2012. King used mitochondrial DNA to confirm that the remains were Richard III's and then turned to Walsh to determine which of the portraits of the king — all painted after he was killed in battle in 1485 — was the most accurate. Based on Walsh's phenotype analysis, King determined that one of the earliest paintings of Richard III, the 1510 "Arched-Frame Portrait," best matches the genetic information.

Geneticist Susan Walsh determined that Richard III's DNA phenotype information most closely matched this 1510 portrait of the king. (Photo credit: *Richard III,* c.1510-40 (oil on panel), English School (16th century)/Society of Antiquaries of London, Bridgeman Images)

"We were still dealing with categories [of color], because we're not at the quantitative level yet," Walsh said of her determination of Richard III's hair and eye color. "But [King] wanted something physical to see, and that's what spurred me to move toward

"There are some genetics that are relatively simple, like a disease. There are some that are intermediate, like height, and some that are unimaginably complex, like determining your facial shape [and features]."

quantitative so strongly, because I could always say to someone 'blue' or 'blonde,' and they would say, 'I need to see this physically.' So that is what I'm working on now. I want to produce that result."

Walsh has gathered DNA phenotype data from 2,000 people in Ireland, Greece and the United States and is currently collecting data from another 3,000 people from the same countries to create a phenotype-genotype database and prediction model. For forensic purposes, she would like to be able to start with a "blank person" and, using DNA, determine the quantitative eye, hair and skin pigmentation.

Yale University geneticist Kenneth Kidd, another NIJ-supported researcher, is focused on using DNA to determine an individual's ancestry. Kidd has developed a panel of 55 "ancestry informative SNPs" (AISNPs), which divide people into eight geographical regions, such as Europe, East Asia and the Pacific. DNA from a bone fragment found in Vietnam, for example, could be screened against the AISNP panel to determine whether the person was Asian or a white North American. If that person were African-American, however, the results could come back as Ethiopian because that is a mix of European and African genes, Kidd said.

Kidd is currently expanding the AISNP panel to include two more geographical regions, and he expects the work to continue far into the future. Like Spritz, Kidd noted, "With the sort of research I'm doing, I'll never be finished."

About the Author

Jim Dawson is a forensic science writer with Palladian Partners, Inc.

For More Information

To read more about NIJ's forensic science research and development projects, go to NIJ.gov, keywords: forensic science.

This article discusses the following grants:

- "Computerized Reconstruction of Fragmentary Skeletal Remains for Purposes of Extracting Osteometric Measurements and Estimating MNI," grant number 2011-DN-BX-K537.
- "Paper Microfluidic Systems for Rapid and Inexpensive Presumptive Detection of Drugs and Explosives," grant number 2012-DN-BX-K048.
- "Aptamer-Based, Exonuclease-Amplified, Paper Device for Point of Collection Screening of Cocaine and Methamphetamine in Oral Fluid," grant number 2013-DN-BX-K032.
- "Identification and Prevalence Determination of Novel Recreational Drugs and Discovery of Their Metabolites in Blood, Urine and Oral Fluid," grant number 2013-DN-BX-K018.
- "Genetic Analysis of Facial Shape and Appearance," grant number 2013-DN-BX-K005.
- "High Resolution SNP Panels for Forensic Identification of Ancestry, Family, and Phenotype," grant number 2013-DN-BX-K023.
- "Improving the Prediction of Human Quantitative Pigmentation Traits Such as Eye, Hair and Skin Color Using a Worldwide Representation Panel of US and European Individuals," grant number 2014-DN-BX-K031.
- "Continued Development of FROG-kb: A Forensic Resource/Reference on Genetics Knowledge Base," grant number 2014-DN-BX-K030.

NCJ 249219

NOW AVAILABLE: NIJ'S ANNUAL REPORT ON DNA FUNDING

Research and development is the driving force behind enhancing laboratory capacity, solving crimes, exonerating the innocent and strengthening forensic science.

NIJ's strategic approach recognizes the role of research and development in improving the quality and practice of forensic science in the long term, while also addressing the immediate needs of the forensic science community.

Fiscal Year 2014 Funding for DNA Analysis, Capacity Enhancement and Other Forensic Activities describes how NIJ spent $104 million in appropriations received in FY14 for various DNA analysis, laboratory enhancement and forensic science activities.

The report describes the programs in NIJ's DNA and forensic science portfolio and links to solicitations issued and awards made. It updates *Funding for Fiscal Year 2013: DNA Analysis, Capacity Enhancement and Other Forensic Activities*, released in February 2015.

Read the report at NIJ.gov, keyword: 249146.

LOOKING FOR THE LINK: THE IMPACT OF FORECLOSURES ON NEIGHBORHOOD CRIME RATES

BY **FARHANA QAZI, APRIL L. TROTTER** AND **JOEL HUNT**

Three NIJ-funded studies can help community stakeholders better understand the complex relationship between foreclosures and crime levels in neighborhoods.

Over the past decade, millions of homes across the country have slipped into foreclosure. National media outlets have reported anecdotal evidence suggesting that foreclosed properties attract drug dealers, gang members, prostitutes, squatters and copper thieves. But research to support those claims has been lacking, and disagreement continues about whether foreclosures and bank-owned properties increase neighborhood crime.

Three recently completed studies, funded by NIJ, offer some clarity to the discussion. The bottom line: The three studies, which used different methods, seem to agree that foreclosures and bank-owned properties do not increase criminal activity, except in certain sections of specific U.S. cities.

A Complex Relationship

The prevalence of violent and public-order offenses in some neighborhoods with high foreclosure rates has left many wondering about the relationship between foreclosures and crime. Do foreclosures and bank-owned properties affect the levels of crime in a neighborhood? The answer is not simple.

With support from NIJ, Meagan Cahill of the Urban Institute and her colleagues examined approximately 500 census tracts in Washington, D.C., and Miami between 2003 and 2011. The researchers aggregated crimes (measured as the number of violent crimes, property crimes or both) and foreclosures (measured by the number of foreclosure sales or the number of housing units in the foreclosure process). They found no statistically significant connection between foreclosure sales and crime in Washington. In Miami, they found only one statistically significant effect: A 1 percent increase in foreclosures resulted in a 0.0157 percent increase in violent crime. The researchers noted, however, that although this effect was significant enough to measure, the increase in violent crime was not substantively significant — that is, it was "small enough to be considered non-existent."[1]

The researchers concluded that any observed relationship between foreclosures and crime occurs only because both can be found in disadvantaged neighborhoods. In their final report, they noted that "there is no reason to conclude that concentrated foreclosures … led to significant increases in crime on their own."[2]

To read more about the Urban Institute study, go to NIJ.gov, keyword: 248652.

Not a National Trend

Studies that point to a possible link between foreclosures and crime rates do not necessarily indicate an emerging national trend. For example, Eric Baumer of Florida State University's College of Criminology and Criminal Justice and his colleagues looked at foreclosure data from RealtyTrac and robbery and burglary data from local police agencies. The data covered more than 60 cities across 29 states from 2007 to 2009. The NIJ-supported researchers identified a positive correlation of foreclosures with robbery or burglary — or both — in a handful of cities.

However, they found that the influence of neighborhood foreclosure rates on neighborhood crime was "highly contingent on the city under investigation."[3] Because the cities had no economic similarities, the researchers could not draw general conclusions. Ultimately, they surmised, the relationship between foreclosure and crime in one city does not necessarily reflect what is happening in the next town over or in a similar town across the country.

Read the final report at NIJ.gov, keyword: 248336.

Other Factors at Play

Ingrid Gould Ellen of the New York University Furman Center for Real Estate and Urban Policy led a study that zoomed in further on the relationship between foreclosures and crime. The researchers mapped foreclosures and crime to "blockfaces"[4] in New York, Chicago, Miami, Atlanta and Philadelphia from 2004 to 2011. By examining micro-place units, they were able to show a small but statistically significant effect of multiple foreclosures on crime rates: Each additional bank-owned, foreclosed property corresponded to an additional 0.063 crimes overall.

However, the data also showed that factors other than foreclosures, such as the presence of empty homes, might have been at play. The researchers found that the impact of bank-owned properties — those that had already been foreclosed on and sold at auction — on local crime rates was less severe than that of properties that were on their way to auction. In fact, the researchers noted, it might actually be the side effects of entering the foreclosure process that lead to any increase in violent and public-order offenses. They found that the real culprits may be the reductions in maintenance and investment in a property that precede a foreclosure, stemming from the property falling into "ownership limbo" (meaning the homeowner is no longer invested in the property's future), and the presence of empty, unmonitored homes that can be used to conceal criminal activity.[5]

To learn more about the study, go to NIJ.gov, keyword: 248653.

Being Proactive

Researchers from both the Urban Institute and the New York University studies suggest that city leaders take steps to prevent crime in neighborhoods affected by high rates of foreclosures:

- Change policies to reduce the amount of time properties spend in "ownership limbo."
- Push for coordination between local law enforcement, courts and housing agencies to identify properties entering foreclosure, so they can be monitored.
- Introduce ordinances requiring homeowners to register their homes as vacant and to hold them accountable for securing and maintaining the properties.
- Address the larger community problems that likely lead to higher foreclosure and crime rates.

Using the evidence provided by these three studies, bankers, police, city planners, civic leaders and other community stakeholders can better understand the relationship between foreclosure (and its accompanying property effects) and crime, and they can explore how helping community members stay in their homes can affect the overall crime rate.

About the Authors

Farhana Qazi is a senior project manager for the National Criminal Justice Reference Service. **April L. Trotter** is a writer/editor for the National Criminal Justice Reference Service. **Joel Hunt** is a senior computer scientist in NIJ's Office of Science and Technology.

This article discusses the following grants:

- "Foreclosures and Crime: A Space-Time Analysis," grant number 2010-IJ-CX-0029.
- "Assessing the Link Between Foreclosure and Crime Rates: A Multilevel Analysis of Neighborhoods Across Large U.S. Cities," grant number 2009-IJ-CX-0020.
- "The Impact of Foreclosures on Neighborhood Crime," grant number 2010-IJ-CX-0028.

Notes

1. Cahill, Meagan, Kathy Pettit, Avi Bhati, Mitch Downey, Leah Hendey, Dwight Pope, and Sophie Litschwartz, "Foreclosures and Crime: A Space-Time Analysis," Final report to the National Institute of Justice, grant number 2010-IJ-CX-0029, February 2015, NCJ 248652, available at https://www.ncjrs.gov/pdffiles1/nij/grants/248652.pdf.
2. Ibid.
3. Baumer, Eric P., Kevin T. Wolff, Ashley N. Arnio, and Joseph K. Chiapputo, "Assessing the Link Between Foreclosure and Crime Rates: A Multi-Level Analysis of Neighborhoods Across Large U.S. Cities," Final report to the National Institute of Justice, grant number 2009-IJ-CX-0020, September 2014, NCJ 248336, available at https://www.ncjrs.gov/pdffiles1/nij/grants/248336.pdf.
4. Blockfaces are street segments bounded by their closest cross streets and include buildings on both sides of the street.
5. Ellen, Ingrid Gould, and Johanna Lacoe, "The Impact of Foreclosures on Neighborhood Crime," Final report to the National Institute of Justice, grant number 2010-IJ-CX-0028, February 2015, NCJ 248653, available at https://www.ncjrs.gov/pdffiles1/nij/grants/248653.pdf.

NCJ 249221

TRACKING MOVEMENTS WITH ISOTOPES

BY **JIM DAWSON**

NIJ-supported researchers are using oxygen and strontium isotopes to help law enforcement identify victims.

Salt Lake County homicide detective Todd Park was in Reno, Nevada, for a conference about serial killers in 2007 when he first heard about what he calls "the isotope stuff." A colleague at the meeting described the forensic potential of isotope research being done by IsoForensics, a Salt Lake City company, and Park quickly realized that the science might help identify the victim in a homicide case he had worked on seven years earlier.

Park, a cold case specialist with the Unified Police Department of Greater Salt Lake, called Jim Ehleringer, a University of Utah biology professor and IsoForensics' senior scientist, and told him about the case of "Saltair Sally." In October 2000, duck hunters found the woman's remains — a cranium, teeth, about two dozen bones and a scalp of hair — in desolate brushland near Saltair, a resort area on the banks of the Great Salt Lake. Her body had been there for at least a year, maybe two.

It was the first case of its kind for IsoForensics. The firm's scientists conducted isotope ratio analysis on 26 centimeters of the woman's hair provided by the Utah State Office of the Medical Examiner. The length of the hair was important, said IsoForensics research scientist Brett Tipple, because it acts "like a filmstrip." Measuring changes in the oxygen isotope ratios along the length of hair, he said, creates a chronology that "helps investigators when they are trying to put together a person's travel history."

The science behind the measurements is based on the naturally occurring isotopes of oxygen and strontium. The ratio between two oxygen isotopes, ^{18}O and ^{16}O, reflects the water supply in the region where a person lived. Because the ratio differs slightly in different geographic regions based on geologic, climatic and environmental factors, isotopes can be linked to where a person originated. Comparisons of the ratios of two strontium isotopes work in much the same way.

Water is the key in creating a "travel history" from an individual's hair because isotopes found in hair are a reflection of the water that people drink (ingested, in the case of oxygen) and the water in which they bathe or shower (deposited, in the case of strontium). "We are pretty wet animals," Tipple said. "We, as humans, typically get in the shower every day or every evening." Because water isotope ratios are stored in an individual's hair based on the specific geographic region where the person lives, hair analysis can reveal a history of the person's location and movements.

An Isotope Database

Tipple, whose research has been supported by NIJ since 2011, is developing databases and models to help accurately link isotope ratios to the geographical region from which they come. His current work is focused on developing strontium ratio comparisons that "more precisely describe the recent region of origin of humans through

chemical analysis of scalp hair." Strontium ratios reflect water that is associated with rock in a region and can provide more specific location information when coupled with oxygen isotopes.

Tipple also is developing a database and model to better predict region-of-origin information based on oxygen isotope ratios. Because oxygen isotopes come mainly from precipitation, Tipple said, it is possible to model regional differences by knowing where precipitation comes from in the regions. Although that holds true for rural areas where people drink local water, he noted, it is not necessarily true for big cities, where most people live.

"Most humans live in cities," he said, "and in cities, we manage water supplies. So if you lived in a rural area and drank from a well, then the initial model [of making predictions from precipitation sources] would work well. But in cities, the water may not be from that local area. We've been focusing on the western United States because out here, water can be transported very long distances to feed the cities."

If the tap water that people in cities use does not reflect the local geology, then the isotopic geolocation process becomes problematic. To overcome that issue, Tipple is creating water and hair isotope landscapes, or "isoscapes," by taking hundreds of water and hair samples from six major metropolitan areas in the western U.S., including Los Angeles, San Francisco and Phoenix.

The forensic reason for developing a database on isotope ratios that reflect specific metropolitan area water supplies is clear, he said: "If you find somebody on the side of the road, the odds are they are going to be from a major city." If water for that city is transported in from a long distance away, the isotope ratio location will not be of much help to a forensic investigator.

"Our ultimate goal is to get all of the metropolitan isotope information into a database, and when an analysis is done, the database comes back with information of where the person has been," Tipple said. "We are at the very early stages of that right now."

Identifying the Victims

As Tipple works to increase the specificity of isotope ratio information, IsoForensics continues to help law enforcement officials identify victims. "We have cases in Nevada and Georgia," Tipple said. "A lot of times, it is detectives at the end of their careers, and they come to us with the cases that are haunting them. They want to do something to try to solve these cases."

The oxygen isotope data from Saltair Sally's hair proved to be the lead that Park needed to finally identify the woman. The isotope ratio analysis revealed that she had moved in and out of the Salt Lake City area at least two times in the 22 months prior to her death. The analysis also showed that when she left Utah, she had traveled to an area that matched the water of the Northwest region of the country.

Park focused his attention on missing persons reports from that region of the country that matched the time when Saltair Sally disappeared, and he soon found one that fit. With further DNA testing and dental comparisons, he identified the woman as 20-year-old Nikole Bakoles, who was originally from the Tacoma, Washington, area. She had moved to Utah with her boyfriend and, in the 22 months prior to her death, returned to Washington on two occasions. Although she has been identified, her homicide case remains open.

Park used IsoForensics again to identify a homicide victim who had been found rolled in a carpet near Salt Lake City in 1978. The isotope ratio analysis showed that she had resided in a region south of Utah prior to her death, and that enabled Park to find a 34-year-old missing persons report from Texas that matched the remains. The woman was identified as Patricia Barrett, and her homicide case is still open.

"I've referred several cases to them [IsoForensics], and people have utilized them," Park said. "It doesn't get you a match to a person, like DNA can, but it's

great science, and for unidentified remains, it's vital that people get to know about this isotope stuff and utilize it more, because it really helps."

About the Author

Jim Dawson is a forensic science writer with Palladian Partners, Inc.

For More Information

To read more about Tipple's research, go to NIJ.gov, keyword: 248977.

This article discusses the following grant:

- "Isotope Analyses of Hair as a Trace Evidence Tool to Reconstruct Human Movements: Establishing the Effects of the 'Human Ecosystem' on Strontium and Oxygen Isotope Ratios," grant number 2013-DN-BX-K009.

NCJ 249225

NAMUS: HELPING RESOLVE MISSING AND UNIDENTIFIED PERSON CASES

For nearly a decade, NIJ's National Missing and Unidentified Persons System (NamUs) has brought together and assisted families, law enforcement, forensic experts, coroners and medical examiners to help reunite families and find the missing.

NamUs is a national centralized repository and resource center for missing persons cases, unidentified decedent records and unclaimed decedents. Medical examiners, coroners, law enforcement officials and the general public from all over the country can search the free online system in hopes of resolving these cases. Learn more at http://namus.gov.

Throughout the coming year, NIJ will be upgrading NamUs to provide additional features and make it easier for everyone to use — from the input of new cases to searches across the databases. Read about a solution for reuniting families during critical incidents, one of the planned upgrades, at http://namus.gov/new-features.htm.

NIJ FUNDING: SUPPORTING EMERGING SCIENTISTS, BUILDING OUR FUTURE

BY **JOHN M. BUTLER**

One influential scientist reflects on the pivotal role that NIJ funding has played during his prolific career in forensic science.

Science involves ideas, people and money. With the proper mix of these ingredients, today's research ideas can become tomorrow's reality. Groups that fund research, such as NIJ, the National Institutes of Health and the National Science Foundation, bet on people and their ideas based on proposals, submitted in the form of grant applications. Some bets succeed, and some fail. Since resources are limited, assessing the impact of funded research efforts over time is important. But what are the appropriate metrics of success? And what lessons can we learn from reviewing past funding?

John M. Butler, Special Assistant to the Director for Forensic Science in the National Institute of Standards and Technology's (NIST's) Special Programs Office, discusses his experiences over the last 20 years and how NIJ support has made a difference in his life and in forensic science.

NIJ: Take us back to the beginning. What was your first experience with NIJ funding support?

John M. Butler (JMB): A $70,000 NIJ grant awarded to the University of Virginia (UVA) in 1993 literally changed the world of forensic DNA testing — and began my journey into the field of forensic science.

John M. Butler

National Institute of Standards and Technology (NIST) Fellow and Special Assistant to the Director for Forensic Science in NIST's Special Programs Office

Ralph Allen at UVA and Bruce McCord at the FBI Academy's Forensic Science Research and Training Center in Quantico, Virginia, were looking to apply a new analytical separation technique called capillary electrophoresis (CE) to speed up and automate DNA testing of short tandem repeats (STRs). The NIJ grant allowed the two analytical chemists to bring a graduate student on board to work on the new forensic method. The grant covered some supplies, travel from Charlottesville to Quantico and tuition for two years.[1]

I had just completed my first year of graduate coursework at UVA, and on May 18, 1993, thanks to the NIJ grant, I began working at the FBI Laboratory

"[T]o fully understand the problems that need to be solved, you must visit forensic laboratories and speak with the scientists about challenges they face. … Regular communication between researchers and practitioners is essential to move fields forward."

under the guidance of Drs. Allen and McCord. The FBI supplied the instruments and the samples. I was the labor force in developing new methods involving CE. Little did I know that my work in this NIJ-UVA-FBI experiment would help pioneer the DNA analysis technique that is used worldwide today.

While working in Quantico, I volunteered to help on another project, which was looking for a rapid method to accurately determine the amount of DNA sample to put into mitochondrial DNA (mtDNA) sequencing reactions. I was able to use my CE instrument to actively analyze mtDNA polymerase chain reaction (PCR) products. Our team collaborated with the FBI's Forensic Science Research Unit, and by the end of that first summer, our hard work had paid off: We had a working method for extracting, amplifying and sequencing mtDNA from human hair.[2]

Things did not slow down. In fall 1993, I began developing new methods and exploring optimal conditions for rapid CE separation of STR markers. I presented my work at a CE conference and drafted my first article, which was published the following year.[3]

In February 1994, NIJ held a review of its grantees at the annual meeting of the American Academy of Forensic Sciences. I presented my research findings and reviewed the mtDNA quantitation technique I had developed in Quantico. But what really got everyone's attention was that, using the CE method, I performed the world's fastest separation of an STR allelic ladder at the time — a mere five minutes.[4] This was revolutionary because the separation method used at that time (slab gel electrophoresis) was labor-intensive, was not automated and provided poorly quantifiable results in two to three hours.

Back in Quantico, I continued my graduate research. I also had the opportunity to attend early meetings of the Technical Working Group on DNA Analysis Methods (TWGDAM), where I shared my research results, learned about the problems facing the community and got to know leaders in the forensic DNA community. Later, following the TWGDAM meeting in July 1995, I learned that Applied Biosystems, a primary supplier of forensic DNA reagents and instrumentation, was releasing a new CE instrument (the ABI 310 Genetic Analyzer[5]) and STR kits (AmpFlSTR Blue, Green I and Profiler). My graduate work — and that initial NIJ research grant — helped pioneer the technique that soon became the primary workhorse for DNA testing worldwide.

NIJ: Since that initial grant, what role has NIJ funding played in your career?

JMB: Over the years, NIJ funding has continued to make my research possible. After I served as a National Research Council postdoctoral fellow at NIST and the Armed Forces DNA Identification Laboratory (AFDIL),[6] an NIJ grant took me to the West Coast. Chris Becker, the president and CEO of a start-up company named GeneTrace Systems, Inc., based in Menlo Park, California, recruited me to work on rapid analysis of STRs using time-of-flight mass spectrometry. The NIJ-funded work[7] involved collaborating with the California Department of

Justice, then located across the San Francisco Bay in Berkeley. I visited the department, which helped me better understand the challenges facing forensic laboratories and thus ensure that the DNA methods I developed would improve the capabilities of crime-solving laboratories.

When GeneTrace Systems decided to no longer pursue forensic DNA analysis, NIJ funding once again made it possible for me to change coasts. I returned to NIST to continue with my forensic science interests.[8] Annual funding provided through an interagency agreement between NIJ and NIST's Office of Law Enforcement Standards helped us create a world-class research group during the first decade of the 21st century.[9]

Throughout my career, NIJ funding has allowed me to conduct meaningful research, write books that have influenced the field, and interact with the scientific and legal communities. Hopefully, the funds that NIJ has invested in me have made, and will continue to make, a difference for good.

NIJ: How important has collaboration been in your research?

JMB: To lengthen the reach of our work, our NIST research team often collaborated with other NIJ grantees; many of these joint efforts took root during conversations at the annual NIJ DNA grantees meetings held in the early 2000s. Over the years, our NIST research team has published with my former advisor Bruce McCord (when he was at Ohio University and Florida International University) on miniSTRs and DNA recovery from damaged samples, with Marilyn Raymond from the National Cancer Institute on cat DNA assays, with Mike Hammer from the University of Arizona on Y-chromosome assays, and with Tom Parsons from AFDIL on mtDNA assays. More recently, we participated in DNA mixture training workshops with Catherine Grgicak and Robin Cotton from Boston University. Combining efforts with other NIJ-funded projects creates an important synergy and helps increase our collective impact on the forensic DNA community.

NIJ: Are there any particular lessons learned over the years that you would like to share with fellow scientists?

JMB: I've learned many things over the last 20 years. One of the most important is that to fully understand the problems that need to be solved, you must visit forensic laboratories and speak with the scientists about challenges they face. It is always best to understand the problem before producing a meaningless solution, which can sometimes happen with undirected research efforts. Once you complete your research, conduct training workshops in the laboratories and online to help translate research results into practice. Regular communication between researchers and practitioners is essential to move fields forward.

Hard work toward specific goals makes a difference. I try to think long-term but work as though everything depends on success in the short term. I always work to complete tasks that I agreed to do, such as providing regular reports on projects. This helps program planning and progress.

NIJ: You talked earlier about your graduate research experience. Do you have any specific advice for graduate students who are just starting out in the field or for their professors?

JMB: I would encourage university professors to give graduate students an opportunity to present their work at major conferences and help prepare them to succeed. As for students, collect and read everything available in the scientific literature about the problems you are trying to solve. Then write, rewrite and rewrite again until you can produce polished publications. The currency of scientific research is getting your results published in a peer-reviewed journal.

I have found that ideas for new research projects come as you pay attention to details in the articles you read, especially if you are reading more broadly than just in your area of focus. As Isaac Newton famously shared with a colleague, "If I have seen further it is by standing on the shoulders of giants."[10] Innovative research ideas come from connecting dots that, in

many cases, earlier scientific research has already defined. Knowing the literature in your field and in complementary ones helps you move your field forward.[11] Perhaps one day future researchers will view your work as a "giant," from which they will be able to see further.

About the Author

John M. Butler is a National Institute of Standards and Technology (NIST) Fellow and Special Assistant to the Director for Forensic Science in NIST's Special Programs Office, where he assists with strategic planning and policy development. He also serves as vice chair of the National Commission on Forensic Science, a federal advisory committee to the Department of Justice that is working to improve the interface between science and the law. Thanks to NIJ funding throughout his career, Butler has written five textbooks defining the field of forensic DNA analysis, published more than 150 peer-reviewed articles and invited book chapters, and given more than 300 invited talks and training workshops.

Author's note: I am grateful to NIJ program managers Richard Rau, Lisa Forman, Lois Tully and Minh Nguyen as well as others in NIJ leadership positions who enabled and supported funding for my research over the years. I have been blessed to have had wonderful mentors throughout my career; chief among them are Bruce McCord, Ralph Allen and Dennis Reeder. My NIST research efforts would not have been possible without supportive and hard-working colleagues, including Margaret Kline, Pete Vallone, Mike Coble, Jan Redman, Becky Hill Steffen, Amy Decker Hazelwood, Richard Schoske, Dave Duewer and Susan Ballou.

This article discusses the following grants:

- "Development of Capillary Electrophoresis for Application in Forensic DNA Testing Procedures," grant number 93-IJ-CX-0030.
- "Improved Analysis of DNA Short Tandem Repeats With Time-of-Flight Mass Spectrometry," grant number 97-LB-VX-0003.

It also discusses several interagency agreements between NIJ and NIST.

Notes

1. NIJ grant 93-IJ-CX-0030 not only started Butler's work in forensic science; it also funded a portion of research by Alice Isenberg, who also earned her Ph.D. from UVA in Bruce McCord's laboratory. Isenberg is now the FBI Laboratory's Deputy Director.
2. This method was published in April 1995: Wilson, M.R., D. Polanskey, J. Butler, J.A. DiZinno, J. Replogle, and B. Budowle, "Extraction, PCR Amplification and Sequencing of Mitochondrial DNA From Human Hair Shafts," *BioTechniques* 18 (4) (1995): 662-669.
3. Butler, John M., Bruce R. McCord, Janet M. Jung, Mark R. Wilson, Bruce Budowle, and Ralph O. Allen, "Quantitation of Polymerase Chain Reaction Products by Capillary Electrophoresis Using Laser Fluorescence," *Journal of Chromatography B* 658 (2) (1994): 271-280.
4. Most STR separations today require about 30 minutes, because a longer capillary is used.
5. Certain commercial equipment, instruments and materials are identified to specify experimental procedures as completely as possible. In no case does such identification imply a recommendation or endorsement by NIJ or NIST; nor does it imply that any of the materials, instruments or equipment identified are necessarily the best available for the purpose.
6. Butler's postdoctoral research at NIST and AFDIL (1995-1997) involved CE, time-of-flight mass spectrometry, peptide nucleic acids and the development of the STRBase website (http://www.cstl.nist.gov/strbase).

7. Butler's research at GeneTrace Systems, Inc. (1997-1999, Menlo Park and Alameda, California), involved rapid STR analysis by mass spectrometry, and a supplemental grant extension involved single nucleotide polymorphism analysis. See Butler, John M., and Christopher H. Becker, "Improved Analysis of DNA Short Tandem Repeats With Time-of-Flight Mass Spectrometry," Final report to the National Institute of Justice, grant number 97-LB-VX-0003, October 2001, NCJ 188292, available at https://www.ncjrs.gov/pdffiles1/nij/188292.pdf.

8. Butler returned to NIST to perform research (1999-2001) involving mass spectrometry, PCR primer sequencing and Y-chromosome assays. He also completed his first *Forensic DNA Typing* book.

9. Butler's expanded research efforts from 2001 to 2013 involved developing miniSTR and cat DNA testing assays, performing extensive Y-STR testing, examining STR kit concordance, organizing DNA mixture interlaboratory studies, creating new certified reference materials and conducting training workshops for laboratories and at conferences. He also assisted the World Trade Center Kinship and Data Analysis Panel, which led to a lessons learned document in September 2006 (https://www.ncjrs.gov/pdffiles1/nij/214781.pdf), and completed the second edition of *Forensic DNA Typing, Fundamentals of Forensic DNA Typing* and *Advanced Topics in Forensic DNA Typing: Methodology.*

10. Chen, Chaomei, *Mapping Scientific Frontiers: The Quest for Knowledge Visualization,* 2nd ed., London: Springer, 2013: 163, available at http://link.springer.com/book/10.1007%2F978-1-4471-5128-9.

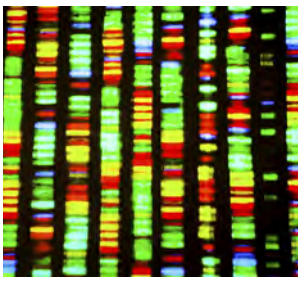
11. See a recent presentation that Butler gave on reviewing scientific literature at http://www.cstl.nist.gov/strbase/pub_pres/ISFG2015-LiteratureReview.pdf.

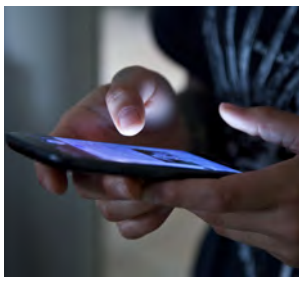
NCJ 249224

NIJ'S INNOVATIVE RESEARCH PROJECTS GENERATE PATENTS

Research and development projects have produced innovative technologies and tools that support and improve the criminal justice system. NIJ-supported work that has produced patents includes inventions in DNA analysis, digital forensics, mobile communications and video surveillance. The processes and technologies covered by these patents are helping law enforcement, corrections and forensic science communities — but they can also be applied in a wide array of other fields.

See a list of the more than 50 patents developed from NIJ-supported research at NIJ.gov, keyword: patents.





EVALUATING THE LOS ANGELES COUNTY ELDER ABUSE FORENSIC CENTER

BY **TERRY TAYLOR** AND **CARRIE MULFORD**

NIJ-funded evaluations show that the multidisciplinary model refers more elder abuse cases to the district attorney and the Office of the Public Guardian.

More than 1 in 10 elders (11.4 percent) reported experiencing some type of abuse or potential neglect in the previous year, according to an NIJ-funded study. The study participants, all aged 60 years or older, cited instances of potential neglect, financial exploitation, emotional mistreatment, physical abuse and sexual abuse.[1]

The human and financial costs of elder abuse are enormous. Elder abuse triples the risk of premature death and causes illness and injury. Victims of elder abuse are more than four times as likely to be admitted to a nursing home and more than three times as likely to be admitted to a hospital. Estimates are that more than 5 million people are affected, with costs in the billions of dollars.[2]

Despite its wide prevalence and enormous costs to both individuals and society, however, elder abuse has not been recognized as an urgent social problem. It lags behind child mistreatment and intimate partner violence, for example, in both legislation and preventive and remedial funding.[3]

Elder abuse can take a variety of forms. The National Center on Elder Abuse defines it as "intentional actions that cause harm or create a serious risk of harm (whether or not harm is intended) to a vulnerable elder by a caregiver or other person who stands in a trust relationship to the elder. This includes failure by a caregiver to satisfy the elder's basic needs or protect the elder from harm."[4] Elder abuse can be physical, sexual, financial or emotional, and a single case can have more than one component; for example, a case may involve financial exploitation and neglect.

The result is a complex social problem, difficult to prosecute and perhaps even more difficult to solve through policy changes. Professionals from a variety of sectors — including law enforcement officers, physicians, social services and mental health professionals, and others — may be working on the same case of abuse without knowing of each other's efforts. Even when these groups attempt to work together, they can be stymied by not knowing each other's methods or language.

One proposed solution to this is a team involving professionals from different disciplines who regularly meet to review cases of elder abuse and address system problems that the cases reveal. Examples of such teams include Forensic Centers, Fiduciary Abuse Specialist Teams, Vulnerable Adult Specialist Teams, fatality review teams and elder abuse task forces. These models vary in size, composition and activity, even though they seek to solve similar problems.[5] Their diversity — as well as the lack of rigorous evaluation of the models — may be a barrier to policy solutions and funding.

To help gauge the effectiveness of the multidisciplinary approach, NIJ funded evaluations of one model: the Elder Abuse Forensic Center.

Researchers found that the Elder Abuse Forensic Center was effective in bringing cases to the district attorney and to the Office of the Public Guardian and in reducing recurring cases of abuse.[6]

The Elder Abuse Forensic Center

The Elder Abuse Forensic Center was first implemented in 2003 at the University of California, Irvine, in Orange County.[7] It provided an actual structure, with a full-time staff, that enabled regular meetings between members of the various professional disciplines required to resolve complex elder abuse cases. This helped to bridge the gaps between these disciplines and facilitated their ability to learn each other's language and methodology.

A second center, the Los Angeles County Elder Abuse Forensic Center, was created in January 2006.[8] In addition to its geriatrician director, the center's core membership includes representatives of the Los Angeles County Adult Protective Services (APS); the Los Angeles Police Department and the Los Angeles County Sheriff's Department; the Los Angeles County District Attorney's Office; the Los Angeles County District Attorney's Office Victim/Witness Assistance Program; the Los Angeles City Attorney's Office; the Los Angeles County Office of the Public Guardian; the Los Angeles County Department of Mental Health (Geriatric Evaluation Networks Encompassing Services Intervention Support Programs); the University of Southern California (USC) Keck School of Medicine; and Bet Tzedek, a legal services provider. The Long-Term Care Ombudsman Program, the Los Angeles County Department of Medical Examiner-Coroner and the area Regional Centers of the Department of Developmental Services participate on an ad hoc basis.[9]

Forensic Center members meet weekly. They typically review two to four new cases, receive case updates and conduct other business. Cases must be referred to the center by professionals within city or county agencies; the majority of new cases are presented by APS (59 percent) and law enforcement agencies (29 percent).[10] The cases include physical or sexual abuse, financial exploitation, isolation, neglect and self-neglect. Often, a case includes more than one of these types of abuse.[11]

Is the Forensic Center Effective?

The NIJ-funded evaluation examined the Forensic Center's effectiveness in increasing the prosecution of cases, promoting safety through conservatorship (where appropriate) and reducing recurrence once a case has been closed.

In the first phase of the evaluation, a team of scientists from the USC Davis School of Gerontology and Azusa Pacific University[12] examined cases that had been referred to the center between April 1, 2007, and December 31, 2009. Using a quasi-experimental study design, they compared the outcomes of these center cases with a group of selected APS cases that had received usual and customary care. The final sample included 296 Forensic Center cases and 296 APS usual care comparison cases.

The researchers found that cases reviewed at the Forensic Center were significantly more likely to be submitted to the district attorney (22 percent) than the comparison APS cases were (3 percent). However, the proportion of cases in which the district attorney then filed charges did not differ significantly (73 percent for the center cases versus 86 percent for the APS group), nor did the proportion of cases with a successful plea or conviction (92 percent for the center cases versus 100 percent for the APS group).

The researchers further found that cases reviewed at the Forensic Center were significantly more likely to be referred to the Office of the Public Guardian (30.6 percent) than usual care APS cases (5.9 percent). However, the proportion of referred cases that needed

conservatorship did not differ significantly between the Forensic Center (52.9 percent) and the APS cases (41.7 percent).

Finally, the researchers found that recurrence of elder abuse was significantly reduced in Forensic Center cases, from 42.7 percent at baseline to 24.6 percent. By contrast, usual care APS cases actually showed a small but nonsignificant increase in recurrence, from 16.7 percent at baseline to 20.3 percent.

But Is It Cost-Effective?

NIJ funded a second team of scientists, which included some of the evaluators from phase I, to examine the cost-effectiveness of the Forensic Center. Using a quasi-experimental design, the researchers compared the estimated average costs of pursuing a case at the Forensic Center with the estimated average costs of a case in the usual care APS system.[13] They found that cases heard by the Forensic Center took longer on average (just over 10 hours, ranging from 3 to 39 hours) than usual care APS cases (just under 4 hours, ranging from 1 to 11 hours). When they factored in staff and team member costs of $674.25 and a facility cost of $306.77 per case, they found that the mean Forensic Center case processing cost was significantly higher than the mean cost for processing usual care APS cases ($1,408.58 versus $153.30).

Looking more closely at the sample of 41 Forensic Center cases, the researchers found that 20 percent went to the district attorney's office for prosecution review and all that went to the district attorney's office had criminal charges filed. None of the 39 comparison usual care APS cases[14] were submitted to the district attorney's office. When the Forensic Center model is adopted, the investigators estimated, the average additional cost per case submitted to the district attorney's office with criminal charges filed is $7,346. The researchers concluded that the Forensic Center may be considered cost-effective if society is willing to pay this cost.

Similarly, the researchers calculated the additional cost per Forensic Center case over the APS usual care case for the following case outcomes:

- Successful prosecution = $8,731.40
- Referral to the Public Guardian = $4,485.97
- Referral to the Public Guardian resulting in conservatorship = $6,691.93

Once again, they noted, the Forensic Center may be considered cost-effective if society is willing to pay these additional costs per case.

The investigators point out that their results comprise the first rigorous analysis of the cost-effectiveness of an Elder Abuse Forensic Center. Although they found significantly higher costs associated with processing cases in this way, they also found that the forensic center yielded better outcomes than the usual care APS system.[15] They note that the marginal gains in elder protection made by the Forensic Center appear to be substantial. The researchers also call the incremental costs associated with the Forensic Center "modest" when compared with health intervention costs. They explained, for example, that the annual costs of new prescription drugs often exceed the incremental case costs of the Forensic Center.

All of these, the researchers noted, are important contexts when evaluating the cost-effectiveness of the Forensic Center and when examining whether it can be sustained and replicated across the United States.

About the Authors

Terry Taylor is a senior science writer and editor at Palladian Partners, Inc. **Carrie Mulford** is a social science analyst in NIJ's Office of Research and Evaluation.

For More Information

To read the full report, *Evaluating the Elder Abuse Forensic Center Model,* go to NIJ.gov, keyword: 246428.

To read the full cost-effectiveness study, *Evaluating the Cost Effectiveness of the Elder Abuse Forensic Center Model,* go to NIJ.gov, keyword: 248556.

For more information on NIJ's elder abuse research portfolio, visit NIJ.gov, keywords: elder abuse.

Read a related article, "Elder Abuse Emerges From the Shadows of Public Consciousness," in *NIJ Journal* 265, at NIJ.gov, keyword: 229883.

This article discusses the following grants:

- "Evaluating an Elder Abuse Forensic Center Using a Randomized Controlled Trial," grant number 2009-IJ-CX-0017.
- "Evaluating the Cost Effectiveness of the Elder Abuse Forensic Center Model," grant number 2011-IJ-CX-0015.

Notes

1. Acierno, Ron, Melba A. Hernandez, Ananda B. Amstadter, Heidi S. Resnick, Kenneth Steve, Wendy Muzzy, and Dean G. Kirkpatrick, "Prevalence and Correlates of Emotional, Physical, Sexual, and Financial Abuse and Potential Neglect in the United States: The National Elder Mistreatment Study," *American Journal of Public Health* 100 (2) (2010): 292-297, available at http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2804623.
2. Connolly, Marie-Therese, Bonnie Brandl, and Risa Breckman, *The Elder Justice Roadmap: A Stakeholder Initiative to Respond to an Emerging Health, Justice, Financial and Social Crisis*, Washington, D.C.: U.S. Department of Justice, 2014, available at http://www.justice.gov/elderjustice/research/resources/EJRP_Roadmap.pdf.
3. Jackson, Shelly L., and Thomas L. Hafemeister, *Understanding Elder Abuse: New Directions for Developing Theories of Elder Abuse Occurring in Domestic Settings,* Research in Brief, Washington, D.C.: National Institute of Justice, June 2013, NCJ 241731, available at https://www.ncjrs.gov/pdffiles1/nij/241731.pdf.
4. National Center on Elder Abuse, *Elder Abuse: The Size of the Problem*, available at http://www.ncea.aoa.gov/Library/Data/index.aspx#problem.
5. Navarro, Adria E., Kathleen H. Wilber, Jeanine Yonashiro, and Diana C. Homeier, "Do We Really Need Another Meeting? Lessons From the Los Angeles County Elder Abuse Forensic Center," *The Gerontologist* 50 (2010): 702-711, available at http://gerontologist.oxfordjournals.org/content/50/5/702.long.
6. Wilber, Kathleen H., Adria E. Navarro, and Zachary D. Gassoumis, "Evaluating the Elder Abuse Forensic Center Model," Final report to the National Institute of Justice, grant number 2009-IJ-CX-0017, April 2014, NCJ 246428, available at https://www.ncjrs.gov/pdffiles1/nij/grants/246428.pdf. Peer-reviewed publications from the evaluation include Navarro, Adria E., Zachary D. Gassoumis, and Kathleen H. Wilber, "Holding Abusers Accountable: An Elder Abuse Forensic Center Increases Criminal Prosecution of Financial Exploitation," *The Gerontologist* 53 (2) (2013): 303–312, available at http://gerontologist.oxfordjournals.org/content/53/2/303.long, and Gassoumis, Zachary D., Adria E. Navarro, and Kathleen H. Wilber, "Protecting Victims of Elder Financial Exploitation: The Role of an Elder Abuse Forensic Center in Referring Victims for Conservatorship," *Aging and Mental Health* 19 (9) (2015): 790-798, available at http://www.tandfonline.com/doi/abs/10.1080/13607863.2014.962011?journalCode=camh20.
7. Wiglesworth, Aileen, Laura Mosqueda, Kerry Burnight, Ted Younglove, and Daniel Jeske, "Findings From an Elder Abuse Forensic Center," *The Gerontologist* 46 (2) (2006): 277-283, available at http://gerontologist.oxfordjournals.org/content/46/2/277.long.
8. Navarro, Wilber, et al., "Do We Really Need Another Meeting? Lessons From the Los Angeles County Elder Abuse Forensic Center," 704.
9. Ibid., 705.
10. Ibid., 706.
11. Navarro, Gassoumis, et al., "Holding Abusers Accountable: An Elder Abuse Forensic Center Increases Criminal Prosecution of Financial Exploitation," 303-312.

12. Wilber et al., "Evaluating the Elder Abuse Forensic Center Model," 1.

13. Nichol, Michael B., Kathleen H. Wilber, Joanne Wu, and Zachary D. Gassoumis, "Evaluating the Cost Effectiveness of the Elder Abuse Forensic Center Model," Final report to the National Institute of Justice, grant number 2011-IJ-CX-0015, January 2015, NCJ 248556, available at https://www.ncjrs.gov/pdffiles1/nij/grants/248556.pdf. The costs were estimated based on the average time spent per case by the Forensic Center's core team multiplied by their hourly compensation rates vs. the average time spent by APS on a typical case. The investigators also considered an additional marginal cost per case due to the site costs of operating the Forensic Center.

14. Two of the matching cases were lost; one person died before the investigation could proceed, and the investigation for the other dragged on for more than a year, precluding any resolution during the study period.

15. Nichol et al., "Evaluating the Cost Effectiveness of the Elder Abuse Forensic Center Model," 10.

NCJ 249222

SEXUAL ASSAULT KITS: USING SCIENCE TO FIND SOLUTIONS

(Photo credit: Houston Television)

Science helps our nation develop better responses to sexual assault. NIJ-supported scientists are building evidence-based knowledge about how to develop priorities for processing unsubmitted sexual assault kits (SAKs) in police storage facilities, follow up on hits from DNA databases, improve investigation and prosecution of sexual assaults, and notify victims of recent developments in their cases.

A new interactive Web feature presents what we know from research on unsubmitted SAKs. This Web feature:

- Provides an overview of the issues
- Describes the collection and processing of evidence in kits
- Explains how evidence might be used during an investigation
- Summarizes findings from the SAK action research projects in Houston and Detroit, including evidence-based practices for notifying victims

Learn more about what science tells us about addressing unsubmitted SAKs at **nij.gov/unsubmitted-kits**.

TESTING A CONCEPT AND BEYOND: CAN THE CRIMINAL JUSTICE SYSTEM ADOPT A NONBLAMING PRACTICE?

BY **NANCY RITTER**

NIJ's Sentinel Events Initiative explores how a culture-changing review of errors could improve the criminal justice system.

Confidence in our nation's criminal justice system rests on several core beliefs. First, we believe that most justice work is fairly routine, following a predictable path that makes errors rare. Second, we believe that in the rare instances an error *does* occur, it is the result of simple negligence or individual misconduct, which "the system" can readily detect and fix. Finally, we believe that processes are in place to ensure that similar errors do not happen again.

The truth, however, is that these beliefs may be largely unfounded.

Since 2011, NIJ has been investigating the feasibility of using sentinel event reviews (SERs) in the criminal justice system. Put simply, the theory is that when a bad outcome occurs in a complex social system — like our justice system — it is rarely the result of one person's mistake. Rather, multiple small errors combine and are exacerbated by underlying weaknesses in the system.

One of the godfathers of this theory of human error and organizational processes is James T. Reason, a renowned British researcher whose work has been used to improve safety in medicine, nuclear power, financial services and aviation. Dr. Reason writes, "We cannot change the human condition, but we can change the conditions in which humans operate."

Indeed, it is this principle that lies at the core of NIJ's Sentinel Events Initiative (SEI). The goal of the Initiative is to change the conditions — or culture — in which criminal justice practitioners operate. Just as medicine and aviation have used SERs to instill a "culture of safety," NIJ's Initiative explores a routine, culture-changing practice that would lead to greater system reliability and, hence, greater public confidence in the integrity of our criminal justice system.

Sentinel Event Reviews: The Basics

A "sentinel event" is a negative event or outcome that:

- Signals underlying weaknesses in a system or process.
- Is likely the result of compound errors.
- May, if properly understood, provide important keys to strengthening the system and preventing similar adverse outcomes in the future.

In criminal justice, a sentinel event could be the conviction of an innocent person, a police-citizen encounter that unexpectedly turns violent, the release from prison of a dangerous person, or even a "near

A Glimpse at Ongoing Research Projects

As part of building the evidence base for bringing sentinel event reviews (SERs) into the justice system, NIJ is supporting four major research projects. Here's a glimpse of the ongoing work:

- **Texas State University** is using concept mapping and social-network analysis to look at investigative failures in wrongful convictions and unsolved cases. Failures in law enforcement investigation are sentinel events, which could signal underlying structural problems throughout the entire criminal justice system. The researchers, funded in 2014, are deconstructing wrongful convictions to determine the contributing causal factors — essentially, what went wrong and why. These causal factors will be classified as personnel issues (such as "tunnel vision" or inexperience), organizational problems (such as "groupthink" or insufficient agency resources), or situational features (such as poor community cooperation). The researchers will then build concept maps to graphically display the relationships and interactions between the causal factors. Based on these analyses, they will make recommendations for improvements in criminal justice policies and organizational procedures.
- The **Vera Institute of Justice** is working with the New York City Department of Correction and Department of Health and Mental Hygiene to develop, implement and evaluate a protocol for reviewing and responding to cases of serious self-harm in the New York City jail. Suicides and incidents of self-harm among people in jail are sentinel events that signal a breakdown in the corrections system's ability to ensure inmate health and safety. Most jails, however, do not have adequate processes for reviewing these incidents and taking corrective action based on those reviews. Funded in 2014, the researchers are using several data-gathering methods to create a protocol called SHARP (the Self-Harm Analysis and Review Protocol), including examining morbidity and mortality reviews, surveying correctional and mental health staff, and analyzing administrative data to determine the predictors of self-harm. They will then assess whether SHARP resulted in tangible changes to jail policies and practices. The overarching goal of the project is to create a nationally replicable SER model.
- In 2015, NIJ funded researchers from **Michigan State University** — who have teamed up with researchers from Indiana University and the director of the Milwaukee Homicide Review Commission — to delve deeper into gun homicide and nonfatal shooting review processes in Milwaukee, Detroit and Indianapolis. Multiagency teams will be established in each of these three cities to review approximately 12 sentinel events per city per year during the three-year project. The researchers will also investigate the use of SERs in medicine and aviation to help ensure that the criminal justice system benefits from lessons learned in these fields. For example, the researchers — all of whom have strong ties to public health — will explore the applicability to criminal justice of the "root cause analysis" questions that The Joint Commission developed for SER in the medical field.
- In 2015, NIJ funded the **University of Pennsylvania Law School's Quattrone Center for the Fair Administration of Justice,** which is working with the Philadelphia Police Department, District Attorney's Office, Defender Association and Court of Common Pleas, to evaluate the effectiveness of multidisciplinary SER teams. The goal of the three-year project is to implement a sustainable multistakeholder process for identifying, prioritizing and conducting SERs that improve the administration of justice and that can be replicated in other jurisdictions. The project will create a database of errors and near-misses similar to the Aviation Safety Reporting System, providing a mechanism for prioritizing negative outcomes or "cases of error" suitable for SER. The overarching goal is to develop rules and standards for constructing, managing and maintaining multistakeholder teams that help each stakeholder agency — and the criminal justice system as a whole — embrace SER as part of a culture of learning from error.

miss" that could have led to a bad outcome had it not been caught in time. An SER brings together all of the system's stakeholders (law enforcement, crime laboratory personnel, prosecutors, defense lawyers, judges, corrections officials, victim advocates and others, depending on the event) to review the event and determine — through a deliberative, transparent, nonblaming process — how and why it happened and what can be done to prevent a similar outcome in the future.

From Then to Now

NIJ's work began with a research question posed by Visiting Fellow James Doyle, a criminal defense lawyer from Boston: Could SERs, which have successfully been institutionalized in fields such as medicine and aviation to improve outcomes, be adopted in the criminal justice system?

In his two-year fellowship at NIJ, Doyle performed what social scientists call "key informant interviews," talking with criminal justice practitioners and researchers from around the nation. Doyle's vision — and the positive reactions he received from boots-on-the-ground practitioners, top executives and others throughout the federal, state and local justice systems — helped launch the SEI.

The SEI seeks to answer three empirical questions about using SERs in the justice system:

1. Can it be done?
2. Does it help decrease error, increase effectiveness and produce other public safety dividends?
3. Can it be incorporated into the routine activities of state and local justice processes and sustained over time?

To date, NIJ has reached a number of significant milestones in its work on the SEI. First, NIJ brought together criminal justice experts and potential early adopters to vet the concept. Second, the Institute published *Mending Justice: Sentinel Event Reviews* (NIJ.gov, keyword: 247141), a special report that discusses Doyle's two-year "reconnaissance" and includes commentaries from former Attorney General Eric Holder and 16 highly respected criminal justice practitioners and researchers. In 2014, NIJ funded two research projects and followed that up with an NIJ-supported pilot, or beta, project in three jurisdictions to test the first empirical question: Can it be done? And in 2015, NIJ funded two additional research projects to dig deeper into the best ways to bring SERs into the justice system. (See sidebar, "A Glimpse at Ongoing Research Projects.")

Testing the Concept: The Beta Project

In 2014, NIJ asked jurisdictions from around the country to volunteer to perform an SER. Through a competitive process, it selected three sites: Milwaukee, Philadelphia and Baltimore. NIJ provided minor logistical support, but no funding, to the beta sites.

"It was very rewarding to see the courage and commitment that the beta teams in these three forward-leaning jurisdictions showed," said Katharine Browning, a social scientist who heads up NIJ's SEI. "They are true pioneers."

Each site designed and conducted its own review of an error (a sentinel event) that had occurred in its justice system. Earlier this year, the sites successfully completed their reviews, providing empirical evidence of the feasibility of adopting SERs in the justice system. A summary of the findings from the beta project — *Paving the Way: Lessons Learned in Sentinel Event Reviews* (NIJ.gov, keyword: 249097) — covers issues such as:

- How do you choose the right negative event, case or outcome to review?
- Who should be on the SER team?
- Who should lead — or serve as the facilitator of — the review?
- What does "nonblaming" *really* mean?
- How do you manage the need to share sensitive data and information with others?
- How do you measure impact and outcomes?

Katherine Darke Schmitt, a policy advisor to the Assistant Attorney General in the Office of Justice Programs who is working with the NIJ team, visited the three sites and interviewed members of the SER teams. Her assessment revealed three overarching themes when it came to the sites' choice of a negative event to review: mitigation of legal risk, the age of the event and the need to have broad system participation.

"Perhaps the single most important procedural question facing SERs in the criminal justice system is whether criminal or civil actions regarding the event have been resolved," Darke Schmitt said. "It doesn't mean an SER can't be done if such actions are still pending; it only means that the stakeholders may need to take actions to mitigate any existing or potential legal risks."

Leading an SER

The leader — or facilitator — of an SER in a jurisdiction operates a bit like a project manager. Whether the facilitator is an independent, neutral convener (such as a researcher from a local university) or someone from within a key criminal justice agency, this leadership position requires significant time and energy.

In two of the beta sites, the facilitator was an outside researcher; in the third site, the facilitator came from a criminal justice agency. In all three sites, the facilitator was a fully engaged member of the review team.

Although it remains an open question who is in the best position to lead an SER in the justice system, Maureen McGough, a policy advisor at NIJ and member of the SEI team, said the beta project suggests a variety of workable alternatives.

"That said," McGough added, "some key traits emerged for the role of facilitator: She or he must be intellectually curious and well-informed about the philosophy of SER, possess strong facilitation skills, and be both trusted by the other team members and able to hold them accountable for their participation."

The "Blame Game"

One of the key components of SERs is a systemwide process that is less concerned with fixing blame on one person or agency and more focused on getting to the root(s) of a bad outcome. In her commentary in NIJ's special report, *Mending Justice,* Jennifer Thompson addressed this issue head-on.

Thompson, a sexual assault survivor who lobbies for nonblaming learning-from-error reform in the criminal justice system, titled her piece "The Blame Game." She writes, "[B]lame and fault have *never* answered the big questions, such as, 'How did this [error] happen in the first place?'"

Of course, determining blame and fault is central to what the justice system does. By its very nature, the system is adversarial, which may make the core "nonblaming" component of an SER a particular challenge. Some members of the beta SER teams noted that they were natural adversaries in their day jobs and had to work hard to overcome a reflexive defensiveness.

But, as NIJ Deputy Director Howard Spivak points out, systems such as aviation and medicine have been able to overcome their similar tendency toward assigning blame. Spivak, a physician who was involved in bringing SERs into medicine following child deaths, noted that NIJ's SEI is grounded in the same principles that led to "culture of safety" reforms in other high-risk fields.

In aviation, for example, the National Transportation Safety Board uses an SER approach to analyze airplane crashes and near-misses and publishes the results online.[1] A summary of these reports also appears in magazines, such as *Flying*.

"The result," said Doyle in *Mending Justice,* "is an aviation community — including manufacturers, aviators, airlines and regulators — that is informed about the current lessons of recent errors."

In medicine, the accrediting body for hospitals, The Joint Commission, requires the reporting of sentinel events, defined as "unexpected occurrences involving death or serious physical or psychological injury, or the risk thereof."[2] Hospitals also are required to conduct a "root cause analysis" of each event. The Joint Commission compiles these analyses and periodically — and publicly — issues "Sentinel Event Alerts." In addition, the Institute of Medicine and other medical communities use SER to learn from errors.[3]

"At their core," said Doyle, "the safety reform movements in medicine and aviation depended on laying aside a tradition of 'blaming and shaming' and moving toward a sentinel events approach for reviewing and learning from errors and near misses." (See sidebar, "Successful Models for Change and Challenges for the Criminal Justice System.")

SER: Not Just Another Review

Members of the SER beta teams pointed out that we seem to be living in an era of organizational fatigue, which may make it more difficult to convince jurisdictions to institute SERs. Therefore, it is important to understand that an SER is different from other types of review processes that may already exist in state and local jurisdictions' criminal justice systems, such as after-action reports, task forces, independent monitors, commissions, inspector general reports, internal affairs investigations and performance management systems like CompStat. As noted earlier, one of the most significant ways in which an SER is different: It is *not* about assigning blame.

John Hollway, associate dean at the University of Pennsylvania Law School and executive director of the Quattrone Center for the Fair Administration of Justice, facilitated the Philadelphia beta site's SER team. Hollway said that it cannot be emphasized enough that SERs are not performance evaluations.

"Their purpose is learning, not punishment," he said, adding that personnel and discipline issues are handled through separate processes, which is something that other fields — such as medicine and aviation — have worked out, including by making the results of a review inadmissible as evidence in litigation.

Measuring Impact and Outcomes

In an era of having to do more with less, the institutionalization and sustainability of the SER approach in the criminal justice system will require demonstrable results — not only in policy and practice but eventually in the workplace and systemwide culture. To succeed, SERs must come to be regarded as a good use of people's time and energy, which, of course, will require proof.

"Therefore," said Thomas Feucht, NIJ's senior science advisor and member of the SEI team, "our second research question is to determine whether the SER approach produces measurable outcomes. In other words, does the SER approach improve system functioning, help prevent errors or achieve other public safety dividends?"

No one maintains that measuring progress toward achieving outcomes will be easy, but proponents of bringing SERs into the criminal justice system note that the medical field has established metrics for patient safety, and the aviation field has done the same with respect to airplane crashes and near-misses — so there is confidence that similar metrics could be developed in the justice system.

Despite the challenges in measuring the success of an individual SER — let alone a learning-from-error cultural shift that may accrue over time — the beta project SER teams suggested these possible metrics:

- Were recommendations for policy or process changes produced?
- Were the recommendations presented to decision-makers?
- Did SER team participants value the process?
- Were similar potential sentinel events averted in the future?

Successful Models for Change and Challenges for the Criminal Justice System

The successful implementation of sentinel event reviews (SERs) in medicine and aviation offers promising evidence for those who believe SERs could improve justice outcomes. It is important to keep in mind, however, that the criminal justice system presents unique challenges.

Both medicine and aviation have national-level bodies charged with ensuring that all-stakeholder, nonblaming reviews are performed after a negative event. No similar nationwide — or even state-level — facility exists within the highly fragmented criminal justice system. Therefore, NIJ continues to explore ways to identify and test effective strategies to convene, support and lead SERs.

Another challenge in implementing SERs in the justice system is the reality in which many officials operate. Police chiefs, sheriffs, prosecutors and corrections leaders do their jobs within an inherently political context.

"Although an SER process that identifies and corrects system failures may improve public safety and enhance justice, it also carries the risk of public scrutiny and criticism," said Mallory O'Brien, who led the Milwaukee team in the NIJ beta project.

Other findings from the NIJ beta project about the challenges of instituting SERs in the criminal justice system include the following:

- Ensuring that members of the SER team understand each other's agencies and how they operate.
- Policy or practice recommendations may be beyond the scope of agency leadership to effect, and some changes may require legislative action.
- Because laws drive the criminal justice system, it is often resistant to using the scientific method.

"It is important to remember, however, that when *any* system is introduced to a new idea, there will be challenges to its successful implementation," said Jessica Shaw, a current NIJ Fellow. "Even when the new idea has shown success in other venues — such as in medicine and aviation, in this case — the stakeholders in the new system may *perceive* it to be incompatible or too complex to work."

Shaw notes that organizational-change research also shows that even when a new idea seems rather straightforward in its logic or conceptual process — for example, shifting from "blaming and shaming" to a system improvement perspective — stakeholders can be resistant.

Although both real and perceived challenges demand explicit attention and realistic expectations, NIJ's beta project showed promising results. A number of SER team members in the three beta sites said that the review was personally and professionally gratifying, offering them a chance to learn from other people in the criminal and juvenile justice bureaucracy.

As one beta team member put it, "These types of case studies are where the organizational learning takes place."

As NIJ continues to explore the use of SERs in the criminal justice system, it will be important to work with early adopters and other champions of the process. Could multiagency commissions or coordinating councils, such as local criminal justice commissions, be supporters? Could risk managers play a crucial role? In the medical field, for example, insurance companies began to see the value of SERs in improving outcomes. If a city or county's risk managers are a logical counterpart to health insurance companies, could they serve as change agents if they believe that using an SER approach in the justice system could result in cost savings?

Conclusion

Recent events on the national stage have highlighted the need for a science-informed approach to making system improvements that go beyond placing blame and disciplining rule-breakers. In the wake of events in Ferguson, Missouri, President Barack Obama established the President's Task Force on 21st Century Policing, which recommended SERs as a way to improve public confidence in the legitimacy and accountability of law enforcement.

Millions of people work in individual criminal justice agencies across the U.S. — law enforcement, crime laboratories, the prosecution and defense bars, judges, corrections, victim advocates and service providers — and, as beta team members noted, they rarely have the opportunity to participate in this sort of review of error.

"It is very hard to step back and take a 30,000-foot view," said one beta team member. "But it is incredibly important that we do so."

About the Author

Nancy Ritter is a writer and editor at NIJ. She is a member of the SEI team.

For More Information

Learn more about implementing SERs in the criminal justice system in *Mending Justice: Sentinel Event Reviews* at NIJ.gov, keyword: 247141.

Learn more about NIJ's beta project in *Paving the Way: Lessons Learned in Sentinel Event Reviews* at NIJ.gov, keyword: 249097.

Stay tuned to NIJ.gov, keywords: sentinel events, for more about NIJ's SEI.

This article discusses the following grants:

- "Case Deconstruction of Criminal Investigative Failures," grant number 2014-IJ-CX-0037.
- "A Sentinel Events Approach to Addressing Suicide and Self-Harm in Jail," grant number 2014-IJ-CX-0030.
- "Instilling a Culture of Continuous Learning From Criminal Justice System Errors: A Multi-Stakeholder Sentinel Event Review of Process in Philadelphia," grant number 2015-R2-CX-K040.
- "Sentinel Events: A Sustainable Model for System Change," grant number 2015-R2-CX-K041.

Notes

1. See National Transportation Safety Board, "Aviation Accident Reports," at http://www.ntsb.gov/investigations/AccidentReports/Pages/aviation.aspx.
2. See The Joint Commission, "Patient Safety Systems Chapter, Sentinel Event Policy and RCA2," at http://www.jointcommission.org/sentinel_event.aspx.
3. See Institute of Medicine, *To Err Is Human: Building a Safer Health System,* Washington, D.C.: National Academies Press, 2000.

NCJ 249220

USING RESEARCH TO MOVE POLICING FORWARD

BY **CAPTAIN JAMES NOLETTE**

A 2014 LEADS scholar explains how his agency uses evidence-based research to reduce crime and better help the public.

Today I drove a Dodge Charger to the Fayetteville (North Carolina) Police Department, where I worked an eight-hour day shift. I wore a white uniform top with navy blue uniform pants and had my 9mm Glock handgun, with which I train four times a year during state-mandated trainings. I used my department-issued smartphone to speak with a member of the public in a quick and transparent manner. The command staff and I discussed crime trends and upcoming events, analyzed past responses and outcomes, and reviewed officer schedules.

I tell you this because every decision that I make as a law enforcement officer is — and should be — based on research. It could be as simple as how effective it is for police officers to carry a tourniquet on their duty belts or as high profile as storing data from body-worn cameras. Research dictates everything that officers do, whether we realize it or not.

For example, the way patrol officers respond to calls, the amount of patrol coverage allocated to a given geographical area, and how detectives evaluate and investigate cases are all based on research from the 1970s. Most supervisors and command staff are familiar with the Kansas City Preventive Patrol Experiment,[1] arguably one of the best-known research projects to date in the field of law enforcement. Yet most of today's junior officers do not know why their agency deploys patrol officers and detectives in a given fashion; often, to these officers, it simply *makes sense.*

Captain James Nolette

Executive Officer to Chief Harold Medlock for the Fayetteville Police Department

As we manage limited budgets to maximize resources and efficiency, research will play an ever-growing role in law enforcement. Today, research results can reach a large audience because of technology and the ease of disseminating information. I know that agencies in Saskatchewan, Canada, are looking at a collaborative approach to reducing crime by addressing both criminal and social aspects and how to keep offenders from re-offending.[2] Data from the Saskatchewan Hub Model — and other projects around the globe — might prove invaluable to agencies like the Fayetteville Police Department as we look for innovative ways to address crime trends.

Using CompStat to Reduce Crime

In the 1990s, the New York City Police Department developed CompStat, a creative approach to looking at crime and accountability. CompStat places an image of crime on a map, so that it can be tracked and evaluated, and assesses the resources and techniques used.

Agencies across the country have adopted the CompStat model of policing. Why? Because the research shows that if used properly, along with other policing techniques, there is a great likelihood that crime can be reduced.[3] Some argue that it is not CompStat that reduces crime but rather the techniques used in conjunction with CompStat. Either way, crime is reduced, and the research proves it.

In the Fayetteville Police Department, we have a robust CompStat program that, together with the sector model of policing and intelligence-led policing, has seen great reduction in crime. Every Wednesday morning, we meet with members from neighboring agencies and military representatives from Fort Bragg's Provost Marshal to discuss crime trends and responses. We have also developed a Crime Intelligence Unit, which focuses on crime analytics and how crime affects every aspect of life within our jurisdiction.

Incorporating Research Into Practice

In recent years, the Fayetteville Police Department has implemented numerous programs and made many decisions based on research, and we continually evaluate these programs and decisions for their effectiveness, efficiency and sustainability. Here are some examples:

- We have developed an electronic monitoring unit that places grant-funded GPS monitors on offenders for specific felony crimes, such as robbery and burglary, while the offenders await the conclusions of their court cases. The offenders enter this program, which is based on past practices and success from other agencies in North Carolina, as a condition of their release. By using GPS technology and crime-scene correlation, the Fayetteville Police Department can compare the known location of crimes to the known locations of offenders wearing GPS locators. We do not constantly monitor the offenders; instead, we run a daily report correlating the offenders' locations with crime locations. This program has limited the recidivism rate among these offenders and has freed up space within our local county jail. We have also seen significant reductions in robberies and property crimes.[4]
- Fayetteville patrol officers currently work a 10-hour shift, rotating between weekdays and weekends on a quarterly basis. Each of our three districts has one overlap day a week when the majority of their officers work. This schedule is based on NIJ-funded research[5] and agency best practices. Meanwhile, schedules for our detective division are unit specific, because detectives must be present when the crime they investigate typically occurs. In our investigative division, we have three separate schedules for different sections of the district. These schedules have reduced overtime within the units and have helped us better manage manpower allocation.

For the past two years, the Fayetteville Police Department has also collaborated with a research team from Rutgers University as a pilot organization for a project called Risk Terrain Modeling, which states that criminal activity is attracted to a given location because of specific risk factors in that area. In theory, by removing those risk factors, we will alter the environment so much that it will no longer appeal to criminals.

The research team, led by Joel Caplan, an associate professor at Rutgers, reviewed five years of crime data and identified five areas that account for a large percentage of Fayetteville's violent crime. Using risk-factor targeting and smart policing concepts, the researchers identified factors that contributed to bringing crime into the five areas and, subsequently, suggested tactics that we could implement in response to our unique circumstances. Using new operations based on the results of this data analysis, the Fayetteville Police Department was able to reduce violent crime citywide by 11 percent. Not only did we

reduce crime, but we did so with minimal disruption to normal patrol functions and no additional resources.[6] The bottom line: Research-backed operations can be effective, inexpensive and sustainable.

The LEADS Program

In October 2014, based on the partnership between the Fayetteville Police Department and the Rutgers University team, I was recognized for bringing research into the law enforcement workplace. I was one of nine midrank officers chosen to participate in the first year of the Law Enforcement Advancing Data and Science (LEADS) program. The LEADS program — a partnership between NIJ and the International Association of Chiefs of Police (IACP) — brings together the researchers who study policing, the policymakers who make policing decisions and the officers who implement those decisions with the goal of supporting law enforcement in learning how to use and integrate research into policing. (See sidebar, "Developing the Next Generation of Law Enforcement Leaders.")

As part of the program, I attended the 2014 IACP annual meeting in Orlando, Florida, met leaders at the U.S. Department of Justice and attended Research Advisory Committee sessions. This year, the LEADS program gave me the opportunity to once again attend IACP's annual meeting and spend time in Washington,

Developing the Next Generation of Law Enforcement Leaders

by **Theodore D. Robinson**

To support the professional development of research-minded law enforcement officers, NIJ and the International Association of Chiefs of Police (IACP) launched the Law Enforcement Advancing Data and Science (LEADS) program in 2014. Under LEADS, NIJ awards merit-based scholarships to sworn, midrank officers who have either partnered on a research project or infused research into policy development at their agency.

Through LEADS, NIJ and IACP are helping to develop the next generation of law enforcement leaders. LEADS scholars attend the IACP Annual Conference and Exposition, where they network with law enforcement leaders, learn about the latest research, and see how other agencies and jurisdictions operate. The LEADS scholars can then take back the information they've gleaned from the conference to their own agencies to strengthen policy and practice. Scholarship recipients also attend NIJ's IACP Conference research track, titled "What Works and What Matters in Policing"; participate in private roundtable events with NIJ, Office of Justice Programs and IACP leadership; and participate in the IACP Research Advisory Committee.

NIJ used the insight gained from the first year of the LEADS program to guide development for 2015 and to ensure that we continue to identify rising leaders in law enforcement and nurture their professional growth. Furthermore, the Institute is arranging activities that allow for collaboration between the 2014 LEADS recipients and 2015's incoming class. NIJ hopes that through LEADS, we can ensure that future law enforcement executives use evidence-based research to advance criminal justice.

About the Author

Theodore D. Robinson is an editorial assistant for the National Criminal Justice Reference Service.

As law enforcement officers and administrators, we must be willing to try something, celebrate both successes and failures, share our experiences with other agencies, and develop better methods of policing.

D.C., meeting policymakers and researchers to learn more about how departments and universities across the United States are collaborating to address policing issues through research.

A glimpse at the enormous scope and impact of the work happening around the country has been eye opening. After attending the IACP Research Advisory Committee (RAC) last year as part of the LEADS program, I submitted a résumé and a letter of interest to join the committee. Today, I am one of the RAC's newest members.[7] I am honored to be able to participate in research and research-based projects to find better ways for law enforcement to help the public.

Propelling Policing Forward

For research to be successful, it does not always have to prove that a theory is correct or an operation is effective. We often learn as much — or even more — from failures as we do from successes. As law enforcement officers and administrators, we must be willing to try something, celebrate both successes and failures, share our experiences with other agencies and develop better methods of policing.

I do not rest on past successes. Every day, I look at my job, my profession and myself, and I think about what we can improve and what evidence is available to show that we can improve in those areas. I try not to reinvent the wheel — too many people have done this job for too long to have not tried what I am thinking about. Before making a major decision, I look for the research and whether its results can be recreated or the process tweaked so that it can be successful within my department. As an agency, we are always looking to use new, innovative and evidence-based ways to propel our officers forward.

About the Author

Captain James Nolette has been with the Fayetteville Police Department for 15 years working in areas of patrol and investigation. He is currently assigned as the Executive Officer to Chief Harold Medlock. Captain Nolette was a 2014 LEADS scholar.

For More Information

For more information on the LEADS program, go to NIJ.gov, keyword: scholarship.

See NIJ Director Nancy Rodriguez, IACP's Director of Research and Programs Hassan Aden, and former LEADS scholars talk about the program at NIJ.gov, keyword: leadsvideo.

Read about NIJ's current risk terrain modeling grants, "Risk Terrain Modeling Experiment: A Multi-Jurisdictional Place-Based Test of an Environmental Risk-Based Patrol Deployment Strategy" and "Linking Theory to Practice: Testing Geospatial Predictive Policing in a Medium-Sized Police Agency," at NIJ.gov, keywords: 2012-IJ-CX-0038 and 2013-IJ-CX-0054.

Notes

1. Kelling, George L., Tony Pate, Duane Dieckman, and Charles E. Brown, *The Kansas City Preventive Patrol Experiment: A Summary Report,* Washington, D.C.: Police Foundation, 1974, available at https://www.ncjrs.gov/pdffiles1/Digitization/42537NCJRS.pdf.

2. Nilson, Chad, *Risk-Driven Collaborative Intervention: A Preliminary Impact Assessment of Community Mobilization Prince Albert's Hub Model,* Saskatoon, Saskatchewan: Centre for Forensic Behavioral Science and Justice Studies, University of Saskatchewan, 2014, available at http://saskbprc.com/images/content/pdf/FINALHubPIAMay2014.pdf.

3. Walsh, William F., "Compstat: An Analysis of an Emerging Police Managerial Paradigm," *Policing: An International Journal of Police Strategies & Management* 24 (3) (2001): 347-362, available at http://www.emeraldinsight.com/doi/abs/10.1108/13639510110401717.

4. Padgett, Kathy G., William D. Bales, and Thomas G. Blomberg, "Under Surveillance: An Empirical Test of the Effectiveness and Consequences of Electronic Monitoring," *Criminology & Public Policy* 5 (2006): 61-91, available at http://onlinelibrary.wiley.com/doi/10.1111/j.1745-9133.2006.00102.x/abstract.

5. Pearsall, Beth, "Sleep Disorder, Work Shifts and Officer Wellness," *NIJ Journal* 270 (June 2012): 36-39, available at http://www.nij.gov/journals/270/pages/officer-wellness.aspx.

6. To date, the Fayetteville Police Department, in partnership with Rutgers University, has not published its final findings, but we have seen promising results based on the work being implemented.

7. *Editor's note:* Captain James Nolette serves alongside police chiefs, sheriffs, executive directors and heads of university research programs on the IACP RAC.

NCJ 249223

FREE ACCESS TO PUBLIC SAFETY AND FIRST RESPONDER GUIDES & STANDARDS

NIJ now provides free access to ASTM standards to public safety professionals and first responders. Using the ASTM Compass portal, agencies can easily identify and incorporate best practices into their operations. The portal includes standards and practice guides on a variety of topics, including:

- Biological agent detection
- Decontamination stations
- Emergency management
- Explosive detection
- Protective equipment
- Robotics

Register for access, and you will be able to:

- View and download ASTM standards, practices and test methods
- Compare them to previous versions
- Annotate documents online free of charge, resulting in significant cost savings for your agency

Learn how to get your free access to the ASTM Compass portal at NIJ.gov, keyword: ASTM.

THIS ISSUE DOESN'T HAVE TO END

You can stay on top of the latest NIJ research between issues of the *NIJ Journal* by following NIJ on Facebook and Twitter.

Access daily updates on new research findings, events and award announcements covering law enforcement, corrections, victims, forensic science, technology, courts and crime prevention.

Follow NIJ today!

facebook.com/OJPNIJ

twitter.com/OJPNIJ

ISSUE NO. **276**

U.S. Department of Justice
Office of Justice Programs
National Institute of Justice

8660 Cherry Lane
Laurel, MD 20707-4651

Official Business
Penalty for Private Use $300

PRESORTED STANDARD
POSTAGE & FEES PAID
DOJ/NIJ/GPO
PERMIT NO. G-26

NCJ 249218

NIJ