ISSUE NO. 258

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

NIJ
National Institute of Justice JOURNAL

Police Lineups: Making Eyewitness Identification More Reliable

by Beth Schuster

Through-the-Wall Surveillance

Examining Prisoners' Reentry Needs

Training for Sexual Assault Responders

Detecting Concealed Weapons

Practitioners Performing Frontline Research

Forensic Databases

U.S. Department of Justice
Office of Justice Programs

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

Peter D. Keisler
Acting Attorney General

Regina B. Schofield
Assistant Attorney General

David W. Hagy
Acting Principal Deputy 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
www.ojp.usdoj.gov/nij

Office of Justice Programs
Innovation • Partnerships • Safer Neighborhoods
www.ojp.usdoj.gov

NCJ 219603

DIRECTOR'S MESSAGE

As the head of a Federal agency, I make decisions nearly every day on how to spend taxpayers' dollars. My job at NIJ is to ensure that our R&D dollars build the best knowledge possible—the most crucial, the most timely, the highest quality—for the criminal justice community.

Our cover story explores this process of knowledge building in one of the most vital components of our justice system: eyewitness evidence and how lineups are conducted. "Police Lineups: Making Eyewitness Identification More Reliable" discusses the state of knowledge and practice on this controversial subject. We also discuss a very important study that we have recently begun—a field test of simultaneous versus sequential lineups using blind and nonblind administrators.

Another area in which NIJ is working to build knowledge is forensics. I am extremely proud to tell you that Dr. John Morgan, the head of NIJ's science and technology office, and his team of researchers, lawyers, and analysts received the 2007 Service to America Medal in Justice and Law Enforcement. John received the "Sammie" for the knowledge his team has generated as part of the President's DNA Initiative. Their work has helped solve thousands of cold cases and has dramatically expanded the capacity of local law enforcement to use DNA evidence. To John and his team, I offer my praise and recognition for (if I may borrow the words of the Service to America committee) your commitment to and innovation in making our Nation stronger and safer.

Finally, I am excited to report that NIJ and Harvard University have teamed up to repeat history—in the best sense of that concept. A generation ago, NIJ and Harvard's Kennedy School of Government sponsored the Executive Session on Policing. The participants of that landmark project became the police leaders of the following two decades. Now, post-9/11, we are experiencing an unprecedented investment in new data systems, training, and technology for law enforcement. To help guide the Nation in this monumental effort, NIJ and Harvard are now reexamining ways to help elected officials and senior executives use these investments wisely and effectively. Through our executive session on *Policing in the New Century,* we will identify the principles and priorities that will make effective policing not just possible but likely in the next two decades.

As NIJ continues to build the best criminal justice practices and technologies, we remain committed to spreading this knowledge to all corners of the country through publications like this issue of the *NIJ Journal.* I hope you find it interesting and useful.

David W. Hagy
Acting Principal Deputy Director, National Institute of Justice

NIJ

BUILDING
KNOWLEDGE TO
MEET THE CHALLENGE OF
CRIME AND JUSTICE

National Institute of Justice

David W. Hagy
Acting Principal Deputy 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. The Attorney General has determined that publication of this periodical is necessary in transacting the public business of the U.S. Department of Justice as required by law.

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.

Subscription information
online www.nij.ncjrs.gov/subscribe/reg.asp
phone 301–519–5500
800–851–3420
mail NCJRS
P.O. Box 6000
Rockville, MD 20849–6000

World Wide Web address
www.ojp.usdoj.gov/nij/journals

Contact NIJ
National Institute of Justice
810 Seventh Street, N.W., Washington, DC 20531, U.S.A.
www.ojp.usdoj.gov/nij/contact.htm

Editor
Nancy Ritter

Contact the Editor
Nancy.Ritter@usdoj.gov

Production
Palladian Partners, Inc.

Beth Schuster, *Managing Editor*
Stefani E. Avila, *Production Editor*
Aaron Auyeung, *Designer*
Maureen Berg, *Designer*

NIJ

2007

OCTOBER 2007

CONTENTS

Police Lineups: Making Eyewitness Identification More Reliable

by Beth Schuster

About the Author
Ms. Schuster is the managing editor of the *NIJ Journal.*

In 1981, 22-year-old Jerry Miller was arrested and charged with robbing, kidnapping, and raping a woman. Two witnesses identified Miller, in a police lineup, as the perpetrator. The victim provided a more tentative identification at trial. Miller was convicted, served 24 years in prison, and was released on parole as a registered sex offender, requiring him to wear an electronic monitoring device at all times.

Recent DNA tests, however, tell a different story: Semen taken from the victim's clothing—which could have come only from the perpetrator—did not come from Miller. In fact, when a DNA profile was created from the semen and entered into the Federal Bureau of Investigation's convicted offender database, another man was implicated in the crime.

On April 23, 2007, Miller became the 200th person in the United States to be exonerated through DNA evidence.[1]

Eyewitnesses play a vital role in the administration of justice in this country. Their testimony can provide the key to identifying, charging, and convicting a suspect in a criminal case. Indeed, in some cases, eyewitness evidence may be the only evidence available.

Yet cases like Miller's show that eyewitness evidence is not perfect. Even the most well-intentioned witnesses can identify the wrong person or fail to identify the perpetrator of a crime. According to the American Judicature Society, misidentification by eyewitnesses was the leading cause of wrongful conviction in more than 75 percent of the first 183 DNA exonerations in the United States.[2,3]

These cases have caused criminal justice professionals to take a closer look at eyewitness evidence, specifically at the effectiveness of identifying suspects from photographic and live lineups. And recent studies on lineup structure and implementation have led to even more questions and disagreement in the field, highlighting the need for more research and dialogue about what works. The National Institute of Justice (NIJ) has initiated a multisite field experiment of eyewitness evidence to examine the effectiveness and accuracy of this crucial and powerful component of the Nation's criminal justice system as it is used in police departments and courtrooms across the country.

Elements of a Lineup

At its most basic level, a police lineup involves placing a suspect among people not suspected of committing the crime (fillers) and asking the eyewitness if he or she can identify the perpetrator. This can be done using a live lineup of people or, as more commonly done in U.S. police departments, a lineup of photographs. Live lineups typically use five or six people (a suspect plus four or five fillers) and photo lineups six or more photographs.[4]

There are two common types of lineups: simultaneous and sequential. In a simultaneous lineup (used most often in police departments around the country),[5] the eyewitness views all the people or photos at the same time. In a sequential lineup, people or photographs are presented to the witness one at a time.

Typically, the law enforcement official or lineup administrator knows who the suspect is.[6] Experts suggest that lineup administrators might—whether purposefully or inadvertently—give the witness verbal or nonverbal cues as to the identity of the suspect. For instance, if an eyewitness utters the number of a filler, the lineup administrator may say to the witness, "Take your time . . . . Make sure you look at all the photos." Such a statement may effectively lead the witness away from the filler.[7] In a "double-blind" lineup, however, neither the administrator nor the witness knows the identity of the suspect, and so the administrator cannot influence the witness in any way.[8] (See graphic on p. 5, "Live Police Lineups: How Do They Work?")

If continued field research validates the effectiveness of the double-blind sequential model, will police departments be able to smoothly and effectively implement this new procedure?

Additional variables that can affect the outcome of police lineups include:

- **Prelineup instructions given to the witness.** This includes explaining that the suspect may or may not be present in the lineup. Research on prelineup instructions by Nancy Steblay, Ph.D., professor of psychology at Augsburg College in Minneapolis, Minnesota, revealed that a "might or might not be present" instruction reduced mistaken identification rates in lineups where the suspect was absent.[9]
- **The physical characteristics of fillers.** Fillers who do not resemble the witness's description of the perpetrator may cause a suspect to stand out.[10]
- **Similarities or differences between witness and suspect age, race, or ethnicity.** Research suggests that when the offender is present in a lineup, young children and the elderly perform nearly as well as young adults in identifying the perpetrator. When the lineup does not contain the offender, however, young children and the elderly commit mistaken identifications at a rate higher than young adults. Research has also indicated that people are better able to recognize faces of their own race or ethnic group than faces of another race or ethnic group.[11]
- **Incident characteristics, such as the use of force or weapons.** The presence of a weapon during an incident can draw

PRACTICE GUIDE, TRAINER'S MANUAL ON EYEWITNESS IDENTIFICATION

Eyewitness Evidence: A Guide for Law Enforcement, a 1999 report published by the National Institute of Justice (NIJ), offers recommendations for the collection and preservation of eyewitness evidence.

These recommendations were developed by a technical working group of law enforcement investigators, prosecutors, defense lawyers, and psychology researchers convened by NIJ to explore ways to improve the accuracy, reliability, and availability of information obtained from eyewitnesses. The recommendations included:

- Composing lineups in a way to ensure that the suspect does not stand out unduly.
- Explaining to the witness before the lineup begins that the person who committed the crime may or may not be in the lineup.
- Preserving the outcome of the lineup by documenting any identification or nonidentification by the witness.

Four years later, NIJ published *Eyewitness Evidence: A Trainer's Manual for Law Enforcement* to assist law enforcement trainers. This 2003 report can be found on NIJ's Web site: www.ojp.usdoj.gov/nij.

In fall 2007, NIJ plans to convene another advisory panel of researchers and practitioners to help establish protocols for upcoming field experiments on police lineups (see main article).

visual attention away from other things, such as the perpetrator's face, and thus affect an eyewitness's ability to identify the holder of the weapon.[12]

Simultaneous vs. Sequential

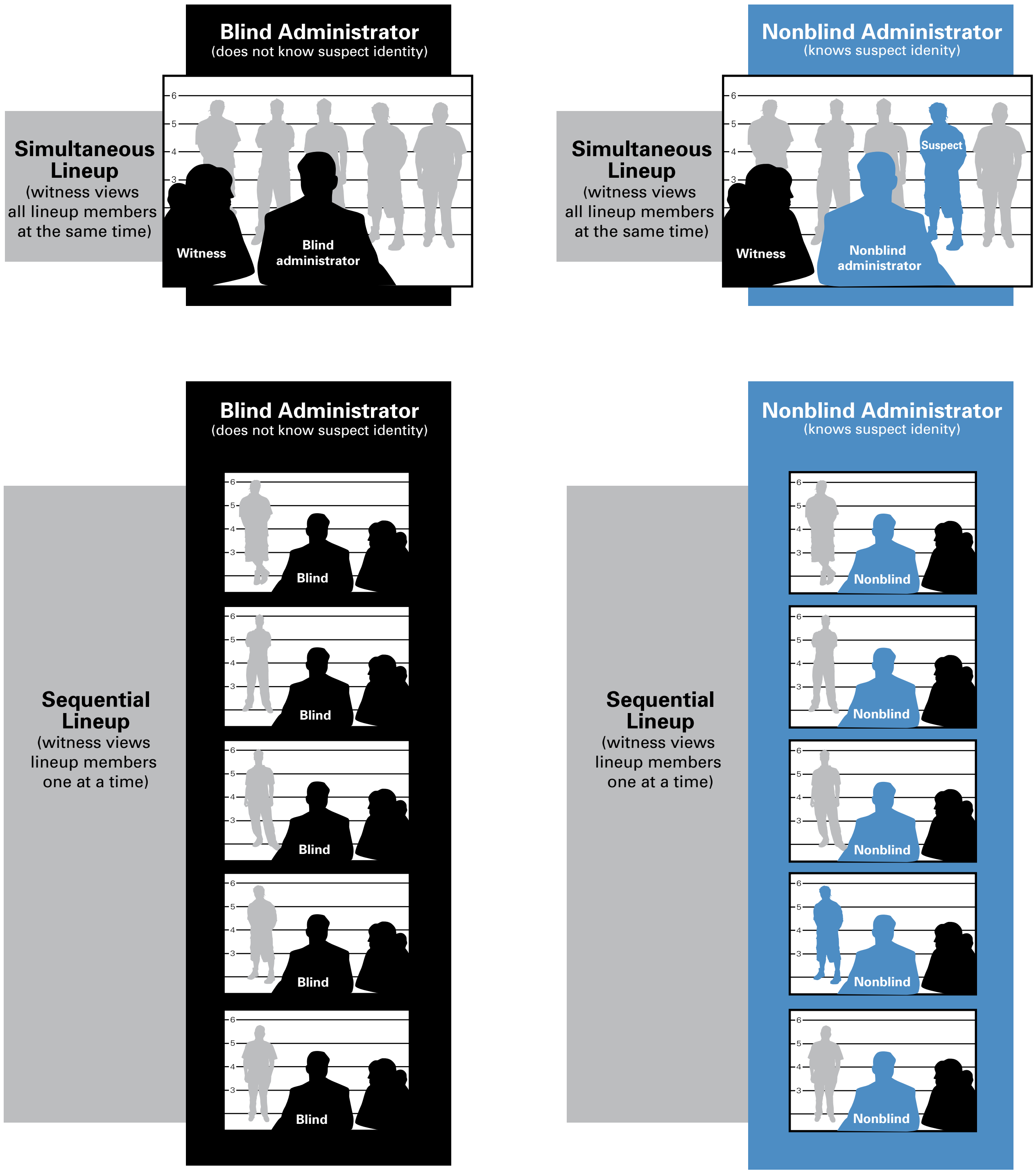
Recent DNA exonerations have ignited heated debate among law enforcement officials, prosecutors, defense attorneys, and researchers over the best way to obtain reliable eyewitness evidence using police lineups.

The most common lineup procedure in use by law enforcement is the simultaneous lineup.[13] Researchers like Gary Wells, Ph.D., from Iowa State University, claim, however, that during simultaneous lineups, witnesses use "relative judgment," meaning that they compare lineup photographs or members to each other, rather than to their memory of the offender. This is a problem when the perpetrator is not present in the lineup because often the witness will choose the lineup member who most closely resembles the perpetrator.[14]

During sequential lineups, on the other hand, witnesses must make a decision about each photograph or member before moving on to the next, prompting them to use "absolute judgment." In other words, witnesses compare each photograph or person only to their memory of what the offender looked like.[15]

As the body of research into simultaneous versus sequential methods continued to grow, some researchers working in the lab discovered that the double-blind sequential method—in which the administrator does not know the identity of the suspect—produced fewer false identifications than the traditional simultaneous method.[16] In 2003, the Illinois legislature put this research to the test. Lawmakers charged the Illinois State Police with conducting a yearlong examination of the double-blind sequential

Live Police Lineups: How Do They Work?*



* Most U.S. police departments use photo lineups. The same concepts depicted in this graphic—simultaneous and sequential, blind and nonblind—apply in photo lineups.

PANEL CALLS DESIGN OF ILLINOIS STUDY 'FLAWED'

A panel of social scientists recently said that the design of the Illinois Pilot Program—which compared double-blind sequential lineup procedures to traditional nonblind simultaneous procedures—has "devastating consequences for assessing the real-world implications."

Writing in the July 2007 issue of *Law and Human Behavior,* the panel said that the design of the Illinois field study "guaranteed that most outcomes would be difficult or impossible to interpret."

The panel was convened by the Center for Modern Forensic Practice of the John Jay College of Criminal Justice and included Daniel Schacter of Harvard University and Nobel Laureate Daniel Kahneman of Princeton University. Also on the panel were Robyn Dawes of Carnegie Mellon University; Henry L. "Roddy" Roediger and Larry L. Jacoby of Washington University in St. Louis; Richard Lempert of the University of Michigan Law School; and Robert Rosenthal of the University of California, Riverside.

"The only way to sort this out [that is, which lineup methods produce the most reliable results] is by conducting further studies," the panelists said. (See main article for information on NIJ's recent funding of the Urban Institute to test simultaneous and sequential, blind and nonblind police lineups in the field.)

"The design of these studies, however, will be crucial," they added. "A well-designed field study that avoids the flaw built into the Illinois effort can be an important first step toward learning what we need to know about the best practices in identification procedures."

To read the full article, see www.jjay.cuny.edu/extra/policyforum.pdf.

versus the simultaneous (commonly used) eyewitness identification procedure to determine which produced fewer false identifications.

The results, published in March 2006, surprised many. Although the double-blind sequential lineup had produced more reliable outcomes in the laboratory, this was not the case in the field. Data collected from approximately 700 photo arrays and live lineups from urban, suburban, and semi-rural Illinois police departments revealed that the double-blind sequential procedure resulted in an overall higher rate of false identifications and a lower rate of "suspect picks" than the simultaneous lineup.[17]

The stunning implications of the Illinois Pilot Program have since been marred, however, by questions about the methodology used. Wells, for instance, has noted that the study used double-blind procedures in the sequential lineups but not in the simultaneous lineups. This, he argues, left open the potential for lineup administrators to influence witnesses during the simultaneous lineups.[18] In July, a panel of social scientists expressed similar concerns about the field test's design (see sidebar above, "Panel Calls Design of Illinois Study 'Flawed'").

Also in 2003, around the same time as the Illinois Pilot Program, officials at the Hennepin County, Minnesota, Attorney's Office became convinced by the growing body of scientific laboratory evidence that the double-blind sequential procedure was essential to reduce the risk of misidentification.[19] They instituted a new photographic double-blind sequential lineup protocol in several county police departments. Over a 12-month period, the project involved 280 lineups with

206 eyewitnesses. An NIJ-funded analysis of the project found that although these field tests produced suspect identification rates similar to those in other jurisdictions that used traditional simultaneous lineups, witnesses in Hennepin County chose fillers at a lower rate. The Hennepin County data also revealed that additional viewings (or laps) of the sequential lineup reduced eyewitness accuracy.[20]

Will Double-Blind Sequential Lineups Work in the Field?

Implementation is a crucial factor when examining the reliability of the sequential lineup model versus the simultaneous model. If continued field research validates the effectiveness of the double-blind sequential model, will police departments—most of which currently use simultaneous lineups in which the administrator knows which person is the suspect—be able to smoothly and effectively implement this new procedure?

Departments involved in the Illinois study experienced challenges when implementing the double-blind sequential model. Although the model was relatively easy for them to use with photo arrays, it was more difficult in live lineups, particularly in cases with multiple perpetrators. In these cases, officers often had to place more than one suspect in a lineup because they lacked enough fillers for separate lineups. Conducting sequential lineups with more than one suspect was determined to be difficult and confusing, and therefore the use of sequential lineups in multiple-perpetrator cases was discontinued.

Finding administrators blind to the suspect's identity was also challenging, particularly during photo lineups that took place outside the police station, such as in the witnesses' homes or places of work. This created delays in investigations and inconveniences to witnesses.

After the Illinois Pilot Program had ended, the majority of officers who had participated said they did not think that the sequential lineup was superior; instead, they said that witnesses who can identify the offender can do so under either procedure. Officers also expressed concerns that using a blind administrator disrupts the relationship that an investigator tries to build with a witness.[21]

When Hennepin County tested the double-blind sequential model, police officers initially expressed similar concerns about using blind administrators. To deal with shortages of blind administrators, the Hennepin County investigators turned to other department staff, such as patrol officers, captains, and sergeants, to serve as blind administrators. Overall, the double-blind sequential procedure involved minimal cost to implement, and officials—both chiefs and investigators—found it easier to do so than originally anticipated.[22]

Continuing the Discussion

The current state of research on simultaneous versus sequential lineups—including the limited amount of field testing and the dispute over test designs and methodology—has generated more questions than answers. The results of the Illinois and Hennepin County studies highlight the need for more research on what works in police lineups and how police departments can easily and effectively implement them.

To continue the important discussion of eyewitness evidence and, particularly, to help identify areas for further research, NIJ and the Government Innovators Network at Harvard University's John F. Kennedy School of Government recently sponsored a discussion—a Web chat—among experts. (Hear the Web chat at www.innovations.harvard.edu/xchat.html.)

"At the present time, [when comparing simultaneous and sequential lineup presentations,] there is no definitive sense that one form of lineup presentation is superior to the other," Roy S. Malpass, Ph.D., professor of psychology at the University of Texas at El Paso, said during the Web chat.

"This is the time for academics and law enforcement to come together, have a dialogue, use each other's resources, and move on with a program of research."

–Roy S. Malpass, Ph.D.
University of Texas at El Paso

Malpass noted that certain practices typically used in sequential lineups—such as asking witnesses to make a separate decision on each photograph or individual—have not been examined in simultaneous lineups. Thus, it is unclear whether differences in the effectiveness of the two lineup models are due to method of presentation (simultaneous or sequential) or the presence of these other variables.

Nancy Steblay, also a panelist on the Web chat, noted that, as with many other criminal justice procedures and protocols, there are two sources of information on eyewitness identification: the laboratory and the field. According to James Doyle, director of the Center for Modern Forensic Practice at John Jay College of Criminal Justice in New York City and the third panelist on the Web chat, both field research and lab research have limitations. Lab studies are limited by a lack of real-world, operational challenges. Field studies are limited by uncertainty about who is really the perpetrator.

According to Steblay, the field has gone past the lab and made decisions about certain elements of eyewitness identification, adapting recommended lab-based protocol to the logistics of street practice and to concerns about later courtroom challenges. It is now time for labs to follow up and see if these field decisions make a difference in eyewitness accuracy, she said.

Malpass added that because U.S. academic researchers work outside of law enforcement, law enforcement investigators, who are on the front lines, are not as familiar as they might be with research results and researchers are generally not as familiar as they might be with in-the-field police practices.

"This is the time for academics and law enforcement to come together, have a dialogue, use each other's resources, and move on with a program of research," he said.

Committed to fostering collaboration between researchers and practitioners, NIJ recently funded the Urban Institute to test the reliability of using simultaneous versus sequential and blind versus nonblind lineups in the field. This important research will be guided by an NIJ-sponsored study group of law enforcement officials, defense attorneys, prosecutors, victim/witness advocates, and other stakeholders from across the Nation.

During the recent NIJ-Harvard Web chat, Doyle offered guidance as the criminal justice community continues to grapple with the issue of eyewitness identification. "There are people on the one hand who would like to strangle this double-blind sequential thing and end it right here and now, and there are other people who would like to legislate it down people's throats," he said. "We have to try to avoid the two extremes."

He added, "What we have to do is recognize that we are dealing with a very unusual, complex kind of trace evidence here . . . . It's difficult to recover, easy to contaminate, and very hard to handle."

"All that police want from eyewitness identification is a true and accurate eyewitness identification," said Philip J. Cline, superintendent of the Chicago Police Department, during the Web chat. "We can do better—and we welcome collaboration and guidance from researchers and lawyers, whichever side of the table they sit on."

NCJ 219604

Notes

1. Willing, R., "DNA Should Clear Man Who Served 25 Years," *USA Today,* available at www.usatoday.com/news/nation/2007-04-22-dna-exoneration-inside_N.htm; and Ferrero, E., "In 200th DNA Exoneration Nationwide, Jerry Miller in Chicago Is Proven Innocent 25 Years After Wrongful Conviction," The Innocence Project, April 23, 2007, available at www.innocenceproject.org/Content/530.php.
2. "Meetings/Events of the AJS Institute of Forensic Science and Public Policy," American Judicature Society, available at www.ajs.org/wc/wc_meetings.asp. See also: Fears, D., "Exonerations Change How Justice System Builds a Prosecution," *Washington Post,* May 3, 2007, available at www.washingtonpost.com; Conway, C., "The DNA 200," *New York Times,* May 20, 2007, available at www.nytimes.com; Duke, S.B., "Eyewitness Testimony Doesn't Make It True—A Commentary by Stephen B. Duke," Yale Law School, June 12, 2006, available at www.law.yale.edu/news/2727.htm; and Ferrero, "In 200th DNA Exoneration Nationwide, Jerry Miller in Chicago Is Proven Innocent 25 Years After Wrongful Conviction."
3. See www.dna.gov/uses/postconviction for more information on using DNA evidence to exonerate the innocent.
4. Wells, G.L., A. Memon, and S.D. Penrod, "Eyewitness Evidence: Improving Its Probative Value," *Psychological Science in the Public Interest* 7 (2) (November 2006): 45–75.
5. Wells, G.L., and E. Olson, "Eyewitness Testimony," *Annual Review of Psychology* 54 (2003): 277–295.
6. Wells, Memon, and Penrod, "Eyewitness Evidence: Improving Its Probative Value," 63.
7. Gary L. Wells' comments on the Mecklenburg Report (see note 8), available at www.psychology.iastate.edu/faculty/gwells/Illinois_Project_Wells_comments.pdf (accessed June 19, 2007).
8. Mecklenburg, S.H., *Report to the Legislature of the State of Illinois: The Illinois Pilot Program on Sequential Double-Blind Identification Procedures,* submitted March 17, 2006, available at www.chicagopolice.org/IL%20Pilot%20on%20Eyewitness%20ID.pdf.
9. Steblay, N.M., "Social Influence in Eyewitness Recall: A Meta-Analytic Review of Lineup Instruction Effects," *Law and Human Behavior,* 21 (1997): 283–297.
10. Wells, G.L., M. Small, S. Penrod, R. Malpass, S.M. Fulero, and C.A.E. Brimacombe, "Eyewitness Identification Procedures: Recommendations for Lineups and Photospreads," *Law and Human Behavior* 22 (6) (1998).
11. Wells and Olson, "Eyewitness Testimony," 280.
12. Ibid., 282.
13. Ibid., 279.
14. Wells, G.L., and E. Seelau, "Eyewitness Identification: Psychological Research and Legal Policy on Lineups," *Psychology, Public Policy and Law* 1 (1995): 765–791.
15. Mecklenburg, *Report to the Legislature of the State of Illinois: The Illinois Pilot Program on Sequential Double-Blind Identification Procedures,* 5.
16. Ibid., 4.
17. Ibid., iv.
18. Gary L. Wells' comments on the Mecklenburg Report, www.psychology.iastate.edu/faculty/gwells/Illinois_Project_Wells_comments.pdf.
19. Steblay, N., *Observations on the Illinois Lineup Data,* May 3, 2006, available at http://web.augsburg.edu/~steblay/ObservationsOnTheIllinoisData.pdf (accessed June 19, 2007).
20. Klobuchar, A., N. Steblay, and H.L. Caligiuri, "Improving Eyewitness Identifications: Hennepin County's Blind Sequential Lineup Pilot Project," *Cardozo Public Law, Policy, and Ethics Journal* (2006).
21. Mecklenburg, *Report to the Legislature of the State of Illinois: The Illinois Pilot Program on Sequential Double-Blind Identification Procedures,* 50–61.
22. Klobuchar, Steblay, and Caligiuri, "Improving Eyewitness Identifications: Hennepin County's Blind Sequential Lineup Pilot Project."

DOMESTIC VIOLENCE AWARENESS MONTH

Making Homes and Communities Safer: Understanding and Preventing Domestic Violence

As the Nation observes Domestic Violence Awareness Month this October, the National Institute of Justice (NIJ) acknowledges the work of law enforcement officials, victim advocates, and criminal justice researchers in addressing domestic violence. NIJ is committed to partnering with these groups to improve domestic violence research and make homes and communities safer. Here is an overview of the Institute's domestic violence program areas:

Intimate Partner Violence
- Batterer intervention programs
- Consequences of childhood exposure to intimate partner violence
- Risk factors for revictimization
- Investigative strategies that lead to successful prosecution

Elder Abuse
- Forensic evidence of abuse and neglect
- Mistreatment in institutional and community settings
- Uniform definitions and measurement of the extent of mistreatment
- Coordinated community responses

Child Abuse
- Evaluation of the Greenbook Initiative: a framework for helping families experiencing both child maltreatment and intimate partner violence

Rape and Sexual Violence
- Sexual violence within diverse communities
- Sexual assault prevention programs
- Using technology and forensic science

For more information on NIJ's domestic violence efforts, see www.ojp.usdoj.gov/nij.

- Approximately 1.3 million women and 835,000 men are physically assaulted by an intimate partner annually in the United States.
- More than 872,000 child maltreatment cases were confirmed by child protective service agencies in 2004.
- Between 1–2 million persons age 65 and older have been exploited or mistreated by someone on whom they depended for care and protection.

Domestic Violence—also called intimate partner violence, battering, or spouse abuse—is violence committed by a current or former spouse, boyfriend, or girlfriend. Historically, domestic violence has been defined broadly to include elder abuse, child abuse, and nonstranger sexual violence.

Sexual Assault: Virtual Training Takes Responders From Exam Room to Courtroom

by Kristina Rose

About the Author

Ms. Rose is senior advisor to the director at the National Institute of Justice. Prior to joining NIJ, Ms. Rose was the chief of staff at the Office on Violence Against Women, where she participated in the development of the U.S. Attorney General's *National Protocol for Sexual Assault Medical Forensic Examinations* and *SAFE Training Standards.*

When Karen Carroll was taken to the hospital examination room 13 years ago after being brutally sexually assaulted, the doctor assigned to her case took out the directions to the rape kit and began to read them. Carroll, an emergency room nurse at the time and now associate director of the Bronx Sexual Assault Response Team, had to guide the doctor through her own examination because he had never received training on how to properly conduct a sexual assault forensic exam.

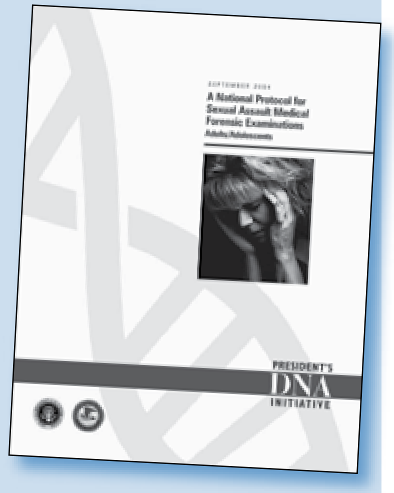
Although many jurisdictions around the country offer sexual assault forensic examiner training, Carroll's scenario is not uncommon. Cost and travel concerns often present barriers to training, particularly in rural and remote areas of the country.

To help ensure that sexual assault victims do not find themselves in Carroll's situation during a forensic exam, the National Institute of Justice (NIJ) and the Office on Violence Against Women funded Dartmouth Medical School to create a state-of-the-art training tool on forensic examinations. Available through the Internet and in CD format, *Sexual Assault: Forensic and Clinical Management*—for health professionals, law enforcement, prosecutors, victim advocates, and lab personnel—offers training in a "virtual sexual assault forensic facility." In the virtual facility, students can participate in interactive training sessions on all aspects of the sexual assault forensic examination—from interviewing the survivor through courtroom testimony—with master practitioners and trainers, including Karen Carroll.

MORE TECHNICAL ASSISTANCE IN SEXUAL ASSAULT FORENSIC EXAMS

The Sexual Assault Forensic Examiner Technical Assistance (SAFE TA) project offers guidance for those using the U.S. Attorney General's *National Protocol for Sexual Assault Medical Forensic Examinations* (SAFE Protocol). Under this project, the International Association of Forensic Nurses provides technical assistance to service providers and agencies serving victims of sexual assault, including medical professionals, law enforcement officers, attorneys, victim advocates, and first responders.

Funded through a grant from the Office on Violence Against Women, this project disseminates the SAFE Protocol, establishes a national toll-free help-line, hosts an interactive technical-assistance Web site for the SAFE Protocol, offers some onsite assistance on establishing and maintaining sexual assault response team initiatives, and provides a national training and education plan. The SAFE TA project also will disseminate the virtual sexual assault forensic examination training tool discussed in the main article.



How Critical Is the Forensic Exam?

The forensic examination is arguably the most critical component in the aftermath of a sexual assault. The exam has two main goals: to treat the assault survivor for medical injuries and to collect evidence that may lead to the arrest, prosecution, and conviction of the offender. Exams are usually conducted by a sexual assault forensic examiner, or SAFE—a medical professional who has received specialized education and has fulfilled clinical requirements to perform medical forensic examinations. SAFEs can be nurses (often called sexual assault nurse examiners, or SANEs), doctors, or even physician assistants.

All sexual assault survivors have the right to a properly conducted exam in which they are treated with dignity, compassion, and respect. In September 2004, former U.S. Attorney General John Ashcroft released the Attorney General's *National Protocol for Sexual Assault Medical Forensic Examinations* (SAFE Protocol), which offers guidance for communities that want to develop a response that is sensitive to sexual assault victims and promotes offender accountability. Produced by the Office on Violence Against Women and based upon best practices from around the country, the SAFE Protocol also examines the roles of other members of the sexual assault response team (SART), namely law enforcement officers, prosecutors, victim advocates, and forensic scientists.

A recent study funded by NIJ examined the efficacy of SANE/SART interventions as tools in the criminal justice system. The study findings indicate that in communities with these programs, sexual assault cases are reported more quickly. In cases involving SANE/SART interventions, the average time between the assault and the report is 5.6 days, compared to 33 days in cases without these interventions. According to the researchers, cases with SANE/SART interventions have more evidence available and are more likely to have victim participation. Further, they found that this intervention is a significant factor in the identification and arrest of a suspect, is a strong predictor that charges will be filed, and increases the likelihood of conviction.[1]

A SANE Success Story

Consider the case of Gina. In 2001, Gina was sexually assaulted in the laundry room of her apartment building by a man she recognized as a new neighbor. The man turned off the lights, closed the door, and trapped her behind a row of dryers. As Gina prayed out loud, her attacker inexplicably stopped and left the laundry room, only to return moments later to continue his violent assault. After making Gina promise that she would not tell anyone, he finally left the laundry room. Once she felt confident that her attacker was not going to return again, Gina ran to a neighbor's apartment and called 911.

She was taken to the hospital, where a SANE was called. That nurse was Karen Carroll. As Gina described it, "When Karen walked into the room, I immediately felt comfortable. She oozed confidence and competence. She was so compassionate. She explained everything she was doing and gave me the choice to stop at any point. However, I didn't want her to stop, as I was determined to do everything I could to catch this guy."

Gina was severely bruised and bleeding. Careful collection by the SANE recovered a microscopic drop of blood on Gina's bathrobe that was analyzed to reveal the DNA profile that linked a man named Oscar Mercado to the crime. Though DNA was just one piece of the evidence used at trial, Gina feels that it was critical.

"We had other evidence that was able to tie him to the crime scene," she said, "but it was the DNA evidence that ultimately proved to the jury that he was the man who sexually assaulted me." Mercado was eventually tried and convicted of four counts of sexual assault and sodomy. He was sentenced to 28 years in prison.

Gina praises the team that worked with her: the SANE, the detective, and the prosecutors. Although it took her a long time to recover emotionally from the attack, she feels that her healing process began with the positive experience she had during the forensic examination with Carroll.

Not all exam experiences are as positive and successful as Gina's. In many parts of the Nation, especially rural and remote locations, forensic examination training for medical personnel is rare or nonexistent because of high cost and travel constraints. Consequently, victims may find themselves in a situation like Carroll's—in an exam room with a doctor or nurse who has never been trained on how to properly conduct a sexual assault forensic examination.

The study found that a SANE/SART intervention is a significant factor in the identification and arrest of a suspect, is a strong predictor that charges will be filed, and increases the likelihood of conviction.

Virtual Forensic Facility

When trainees enter the virtual forensic facility, created by Dartmouth's Interactive Media Laboratory, they will find:

- **Exam Room A:** Here, the student observes interactions between the SAFE and a young woman named "Mary Lange." The student serves as an apprentice, working closely with a master practitioner in two scenarios. In the first, Mary has been raped by an acquaintance. Through video, audio, still, and animated graphics, this scenario teaches students about the basic forensic examination, including history-taking, consent, treatment, and using a virtual sexual assault evidence collection kit to gather evidence.

  In the second scenario, Mary is the victim of a drug-facilitated assault. Using knowledge gained from the first scenario, the student again works under the supervision of a master practitioner. In essence, Exam Room A is where students can conduct a complete sexual assault forensic examination—to the extent allowed by electronic technology—from initial encounter through preparation of collected evidence, including proper chain of custody.
- **Exam Room B:** In this room, students observe the SAFE working with three patients who represent a mix of demographic variables, including age, gender,

Virtual Forensic Facility

This overview of the virtual forensic facility shows the different rooms in which the Web-based (and CD) training occurs.

and relationship of the victim to the offender. Exam Room B exposes students to various types of sexual assault and the wide range of challenges they may confront in their work.

- **Pretrial Preparation Room:** Here, students learn how to prepare for court testimony.
- **Courtroom Area:** Here, the student becomes an expert witness in the Exam Room A case. In this simulation, the student interacts with prosecutors and defense attorneys, selecting from possible responses and receiving feedback from a coach. The student can also observe the SAFE as an expert witness and learn the best ways of presenting information in court. The coach for this section is Roger Canaff, an assistant district attorney from the Bronx District Attorney's Office, who has extensive experience prosecuting sexual assault cases and preparing SAFEs to testify in court.
- **Forensic Lab Area:** In the lab, the student views talks by forensic scientists covering the basic science of DNA and how tests are interpreted. This section also emphasizes the value of close collaboration between SAFEs and laboratory personnel.
- **Conference Room:** In this room, noted experts discuss a range of topics, including cultural competency and forensic photography. Students listen to roundtable discussions among real-life members of a SART as they discuss specific cases and the day-to-day challenges they face.
- **Learning Resources Room:** Here, the student listens to the personal accounts of sexual assault survivors, including their experiences with sexual assault forensic exams. The student learns how survivors' interactions with the SAFE and members of the SART shaped their view of the justice system and affected their healing process.

Who Benefits From the Training?

This training tool provides an innovative way to learn the fundamental elements of conducting a timely, competent forensic exam. For forensic examiners and trainers with limited resources, the training offers a unique and cost-efficient program that can easily be incorporated into a preexisting curriculum or training module. It can be used as a refresher for SAFEs practicing in rural areas who may handle only a few cases a year. Law enforcement officers, prosecutors, victim advocates, and lab personnel will find the program beneficial, particularly with the program's strong emphasis on a team approach.

The ultimate goal is to ensure that all victims of sexual assault have access to health care professionals who perform forensic examinations that minimize trauma; promote healing; and increase the likelihood that the perpetrator will be caught, prosecuted, and convicted of the crime. Victims deserve to have justice served. Ensuring that innovative, state-of-the-art training is available to all forensic examiners is a crucial step in that direction.

NCJ 219610

For More Information

- Information on the training tool and the SAFE Protocol can be found at www.safeta.org.

Note

1. Nugent-Borakove, M.E., P. Fanflik, D. Troutman, N. Johnson, A. Burgess, A.L. O'Connor, *Testing the Efficacy of SANE/SART Programs: Do They Make a Difference in Sexual Assault Arrest & Prosecution Outcomes?* final report submitted to the National Institute of Justice, 2006 (NCJ 214252), available at www.ncjrs.gov/pdffiles1/nij/grants/214252.pdf.

Publications in Brief

A Special Issue of *Police Practice and Research:* Geographic Profiling

Ronald E. Wilson and Christopher D. Maxwell, eds.
Volume 8, Number 4, Fall 2007

Geographic profiling is an emerging investigative technique that combines criminological theory, technology, and patrol strategy to help law enforcement identify and locate serial offenders. Using information from a series of related crimes, a geographic profiler analyzes the location of each crime to identify where an offender most likely lives, works, or spends time.

This technique is now at the center of an important debate that asks: Is geographic profiling effective? What school of thought and approach should be emphasized and applied?

Edited by Ron Wilson, who manages the National Institute of Justice's Mapping and Analysis for Public Safety Program and Data Resources, and Chris Maxwell, director of the National Archive of Criminal Justice Data at the University of Michigan, this special issue of *Police Practice and Research* explores topics critical to this debate, including:

- The theoretical background, available technology, strengths and limitations, and difficulties in evaluating the effectiveness of geographic profiling.
- The two primary schools of geographic profiling thought.
- Determining whether the offender is a commuter or a marauder.
- Geoforensic analysis.
- An evaluation of six geographic profiling methods.

The issue also reviews books on geographic profiling. For more information, see www.tandf.co.uk/journals/titles/15614263.asp.


Taking the Initiative: Practitioners Who Perform Frontline Research

by Lois A. Tully, Ph.D.

About the Author

Dr. Tully is acting chief of the Investigative and Forensic Sciences Division at the National Institute of Justice.

In the past, the line between practitioners who work in a crime laboratory and researchers who work in a university lab or technology firm was always fairly bright. That line has begun to blur, however, as more and more practitioners take the initiative to perform inhouse research that leads to new forensic tools and technologies.

Although many practitioners who work on the front lines of criminal justice have compelling research ideas, these often must take a back seat to the reality in our Nation's crime labs, where shelves of evidence await testing and there is daily pressure from agencies and the communities they serve. Crime laboratory professionals may realize that research is the key to long-term solutions, but with limited resources and overwhelming caseloads, what can they do to move a great research idea from their heads to the laboratory bench?

In recent years, an increasing number of crime lab practitioners have received funding from such agencies as the National Institute of Justice (NIJ) to help them perform inhouse research. Here are a few of their stories.

Eric Buel, Ph.D., has seen forensic science progress from the days when identifying blood types was state-of-the-art to today, when DNA can be used to identify a person with virtual certainty. In 2000, Buel, who now serves as director of the crime lab at the Vermont Department of Public Safety, wanted to explore promising new technologies to improve the efficiency and efficacy of the human DNA quantification test, which determines if evidence collected from a crime scene is from a human and whether there is enough of it to develop a DNA profile. Buel's search for help led him to NIJ, which funded his development of a new human DNA quantification method.[1] Now his Vermont laboratory and other crime labs routinely use this method.

UNIQUE INSIGHT FROM CRIME LAB PROFESSIONALS

When people think of scientific research, they often think of work being performed in university laboratories or technology firms. Although these may be ideal settings for performing basic research to lay the foundations for future forensic technologies, crime lab practitioners have unique insight into the types of applied research that will provide long-term benefits to their everyday challenges. For example, crime lab professionals understand what it takes to create tools capable of withstanding scrutiny in the courtroom. The types of samples they receive also can prompt important research and development. Unlike samples that generally come into clinical or diagnostic labs, crime lab samples are often poor in quality or limited in amount. It is not unusual to receive a single hair that was found in a cap worn by a suspect or a piece of biological evidence that has been exposed to heat, humidity, or other damaging elements. Because of the limited quantity or poor condition of such a sample, a crime lab typically has only one attempt to perform the test and get a result that may provide a crucial lead in a criminal investigation.

Tom Parsons, Ph.D., faced a similar dilemma. After several years of working with ancient DNA at the Smithsonian Institution, Parsons took a job at the Armed Forces DNA Identification Laboratory (AFDIL), where he and his team were using mitochondrial DNA (mtDNA)[2] to identify the skeletal remains of soldiers killed in the Vietnam, Korean, and other wars. Some of the remains, having been exposed to environmental elements for many years, had severely damaged DNA. As a result, even the most sophisticated mtDNA technologies could not always yield sufficient information to make an identification. Nevertheless, Parsons believed it was possible to boost the power of mtDNA and provide more complete profiles of the soldiers. He also knew that doing such research would take money, people, and many months of experiments. Parsons turned to NIJ, and with a grant, he and his fellow scientists at AFDIL explored a novel way to capture more information from mtDNA. This work helped identify the remains of several soldiers, including one killed in World War II.[3]

Heather Miller Coyle, Ph.D., had spent much of her academic career studying plant sciences, so she never thought that she would end up working in a crime lab. After completing her Ph.D. in plant molecular biology, she spent a few years in the pharmaceutical industry until—seeking a way to use her science background to better serve the public—she took a job as a criminalist in the DNA unit of the Connecticut Department of Public Safety. There, her supervisor encouraged her to look for ways to expand the lab's capabilities. This opened the door for Miller Coyle to team up with scientists from the University of New Haven and, with support from NIJ, explore technologies for plant DNA profiling that can assist in criminal investigations. Miller Coyle has since conducted a workshop to teach other crime lab personnel when and how to use the tools she developed under her NIJ grant.[4]

Helping Practitioners Take Action

In recent years, the entire criminal justice community has benefited from research done inhouse by crime lab professionals like Buel, Parsons, and Miller Coyle through NIJ support. In the years since writing their NIJ grant proposals, these practitioners have published their research in peer-reviewed scientific journals, and more importantly, their contributions have been invaluable to the broader forensic DNA community.

NIJ's support of practitioners with promising research ideas goes well beyond DNA. The Institute's forensic research portfolio extends from arson to anthropology, handwriting to handguns, methamphetamine to maggots, and toxicology to trace evidence. Here are a few more examples of how NIJ grants are being used to foster practitioner research:

- In Washington, criminals who manufacture methamphetamine seemed to stay one step ahead of law enforcement by continuously changing their methods of manufacture. This was making it difficult for police to know what to look for and how to test for it. To meet this challenge, David Northrop, Ph.D., analyst at the Washington State Patrol Crime Laboratory Division, used an NIJ grant to develop better ways to detect and identify substances that are characteristic of methamphetamine manufacturing processes.[5]
- In the Georgia Bureau of Investigation crime lab, George Herrin, Ph.D., and his colleagues explored a more effective method of detecting drugs and poisons in autopsy samples. With NIJ support, they developed a new technology that screens for more than 100 drugs and poisons and is up to 50 percent faster than existing technology.[6]
- Scientists in the crime lab at the California Department of Justice developed an improved tool for capturing, analyzing, and comparing impression evidence left at crime scenes. This tool can enhance forensic comparisons of such items as tire treads and footwear impressions.[7]
- In another section of the crime lab at the California Department of Justice, scientists developed a new DNA quantification method that is now being used to develop profiles in missing persons and unidentified remains investigations.[8]

NCJ 219605

For More Information

- For general information on NIJ's forensic DNA research and development projects, see www.dna.gov/research.

Notes

1. Buel, E., *Simple, Rapid, and Accurate Quantitation of Human DNA,* final report submitted to the National Institute of Justice, August 2006 (NCJ 215340), available at www.ncjrs.gov/pdffiles1/nij/grants/215340.pdf.
2. Human DNA can be extracted from the nucleus of a cell and from another part of the cell called the mitochondrion. Mitochondrial DNA (mtDNA) is present in hundreds to thousands of copies in each cell, making mtDNA analysis the most suitable method for testing samples that are old, degraded, or limited in quantity.
3. Parsons, T.J., *Mitochondrial DNA Genome Sequencing and SNP Assay Development for Increased Power of Discrimination,* final report submitted to the National Institute of Justice, March 2006 (NCJ 213502), available at www.ncjrs.gov/pdffiles1/nij/grants/213502.pdf.
4. Miller Coyle, H., G. Shutler, L. Tully, E. Pagliaro, A. Harper, T. Palmbach, and H.C. Lee, *Validation of a DNA Method for the Individualization of Plant Evidence,* final report submitted to the National Institute of Justice, November 2005 (NCJ 211999), available at www.ncjrs.gov/pdffiles1/nij/grants/211999.pdf.
5. Northrop, D.M., E.C. Person, and L.A. Knops, *Capillary Electrophoretic Analysis of Clandestine Methamphetamine Laboratory Evidence,* final report submitted to the National Institute of Justice, 2005 (NCJ 219501), available at www.ncjrs.gov/App/Publications/abstract.aspx?ID=241293.
6. Herrin, G., H.H. McCurdy, W.H. Wall, and L. Holt, *Investigation of a Unique Adjunct to Enzyme Immunoassay in Order to Rapidly Perform First-Pass Screening for Drugs and Poisons in Postmortem Toxicology Cases,* final report submitted to the National Institute of Justice, 2006 (NCJ 219502), available at www.ncjrs.gov/App/Publications/abstract.aspx?ID=241294.
7. Hamiel, J.S., and J.S. Yoshida, "Evaluation and Application of Polynomial Texture Mapping in the Area of Shoe and Impression Evidence," *Journal of Forensic Identification* 57 (3) (May/June 2007): 414–434.
8. Timken, M.D., K.L. Swango, C. Orrego, M.D. Chong, and M.R. Buoncristiani, *Quantitation of DNA for Forensic DNA Typing by qPCR (quantitative PCR): Singleplex and Multiple Modes for Nuclear and Mitochondrial Genomes, and the Y Chromosome,* final report submitted to the National Institute of Justice, June 2005 (NCJ 210302), available at www.ncjrs.gov/pdffiles1/nij/grants/210302.pdf.

NATIONAL MISSING AND UNIDENTIFIED PERSONS SYSTEM

NIJ Launches Missing Persons and Unidentified Decedents Databases

The National Missing and Unidentified Persons System, NamUs, was launched by the National Institute of Justice (NIJ): **www.namus.gov**. This innovative online program represents the first time that two searchable databases—missing persons database and unidentified decedents database—have been brought together. When fully operational, NamUs will link the databases to provide a powerful tool for law enforcement agencies, medical examiners and coroners, victim advocates—and the general public—to search for matches between missing persons and unidentified decedent records and solve these cases.

NamUs also provides resources on missing persons, including a central access point for information on State clearinghouses, medical examiners' and coroners' offices, victim assistance, and legislation.

It has been estimated that there are approximately 40,000 unidentified human remains in the offices of the Nation's medical examiners and coroners or that were buried or cremated before being identified (see www.ojp.usdoj.gov/nij/journals/256/missing-persons.html). In June 2007, the Bureau of Justice Statistics, a sister agency of NIJ, confirmed—through the first survey of medical examiners and coroners—that, in a typical year, they handle approximately 4,400 unidentified human decedent cases, 1,000 of which remain unidentified after 1 year. (See www.ojp.usdoj.gov/bjs/pub/pdf/meco04.pdf for the full report.)

NamUs is just the latest component of a broader program to improve the Nation's capacity to address these cases. For example, NIJ funds free testing of unidentified human remains and provides family reference-sample kits, at no charge, to any jurisdiction in the country. (Contact 800–763–3147 or missingpersons@hsc.unt.edu for more information.) Other efforts include training law enforcement officers, medical examiners, judges, and attorneys on forensic DNA evidence.

Through-the-Wall Surveillance: A New Technology for Saving Lives

by Christopher A. Miles

About the Author

Mr. Miles is the biometrics program manager within the Human Factors Division of the U.S. Department of Homeland Security's Science and Technology Directorate. He is the former senior program manager of NIJ's sensor and surveillance portfolio.

Actor Kevin Costner said it best in the 2006 movie *The Guardian,* in which he played a legendary U.S. Coast Guard rescue swimmer. During a conversation with one of his young charges, he said, "There will come a time when you might have to decide who lives and who dies out there. It's a terrible responsibility, but it's one you will have to make . . . . The bigger reality is it's also something you are going to have to live with as a human being."

With life and death on the line, it is impossible to overstate the value of new technologies that save lives, especially when they reduce the risk to citizens, law enforcement officers, and soldiers. One such technology is through-the-wall surveillance (TWS).

TWS technology helps officers to determine if someone is in a room before putting themselves in harm's way and to save lives by using motion and images to differentiate between a hostage and a hostage-taker. It can also detect motion through floors and rubble following a building structure failure and, therefore, help in the search for survivors. It allows users to conduct room-to-room searches for suspected terrorists, map the interior of buildings, and find military combatants and weapons caches—all through an interior or exterior building wall. Certain TWS technologies do not even need to be placed against a wall and can be used to perform standoff searches, for example, from a vehicle into a building.

All products and manufacturers cited in this document are presented for informational purposes only and do not constitute product approval or endorsement by the National Institute of Justice.

EVALUATING THROUGH-THE-WALL SURVEILLANCE TECHNOLOGY

The National Institute of Justice (NIJ) is currently evaluating through-the-wall surveillance (TWS) technologies in a controlled environment. The Institute has funded the construction of test walls at the Air Force Research Laboratory in Rome, New York, where the efficacy of some TWS technologies is being tested. Such controlled evaluations set clear performance criteria, allow comparisons between systems that are commercially available, and define future research and development priorities.

NIJ also loans technologies to law enforcement and corrections officers for evaluation in real-world situations. These officers often find creative ways to use the technology not envisioned by the manufacturer or NIJ during development. Best-use practices are developed and passed on to other agencies. For example, the police department in Cobb County, Georgia, integrated the Time Domain Radar Vision TWS system with its Peace Keeper SWAT vehicle. The department installed the system on an articulated arm that can look through first- or second-story walls. Video transmits to the interior of the SWAT vehicle, allowing the viewer to remain in a safe location. Such evaluations provide law enforcement with hands-on use, the manufacturer with feedback on industry needs, and NIJ with invaluable information in setting research and development priorities for the future.

Value to Law Enforcement

In the field of law enforcement, the possibility of officer injury and death is all too real. In the decade between 1996 and 2005, more than a half million (566,626) officers were assaulted in the line of duty. In that same period, 575 officers were killed—19 of them during tactical situations involving barricaded offenders, hostage-taking, and high-risk entry.[1]

These situations involve the riskiest of conditions for law enforcement, and consequently, many agencies have specially trained emergency response teams (ERTs) or special weapons and tactics (SWAT) teams to handle them. ERTs and SWAT teams often have access to specialized firearms and weapons, heavy body armor and ballistic shields, equipment for forced entry, covert communications, video and audio surveillance technologies, and special vehicles that can help improve responses and increase safety.

TWS technology could undoubtedly help these men and women in the field (see sidebar on p. 22, "Through-the-Wall Surveillance: Reducing Risk to Law Enforcement"). With the potential benefits of this technology, however, come concerns about high cost, limitations in ability, and privacy and policy issues. These areas must be addressed to ensure that this technology is developed and implemented effectively to reduce the risk to law enforcement and save lives.

THROUGH-THE-WALL SURVEILLANCE: REDUCING RISK TO LAW ENFORCEMENT

Through-the-wall surveillance (TWS) technology could prove invaluable to law enforcement officers, particularly in high-risk situations involving hostages and barricaded offenders (see main story). The 2005 FBI Uniform Crime Report of Law Enforcement Officers Killed and Assaulted (www.fbi.gov/ucr/killed/2005/killedsummaries.htm) describes incidents in which TWS technology could have aided responding officers and perhaps saved their lives. Studying incidents like these provides insight into how technology and revised practices can enhance officer safety.

- On January 19, 2005, the 42-year-old sheriff of the Greenwood County Sheriff's Office (Kansas) was shot and killed while attempting to execute an arrest warrant. The sheriff, along with two deputies, arrived at a residence where they encountered two people who said that the subject of the warrant was not in the house. The two deputies secured the outside of the house while the sheriff, who had 26 years of law enforcement experience, searched inside. While the sheriff was standing near the staircase, the subject emerged from his hiding place, placed a revolver to the sheriff's chest, and fired twice.
- An officer with the Fort Worth Police Department (Texas) was shot on November 29, 2005, while attempting to arrest the alleged subject of a felony warrant. The 17-year veteran officer and two other officers arrived at a residence where they thought the subject was staying. A female met the officers at the door and told them that the man for whom they were searching was not inside. She invited the officers inside and gave them permission to search the rooms. As the officers approached a bedroom and opened the door, a man inside the room fired at them. In the exchange of gunfire that followed, the assailant shot the officer in the head. Two days later, the officer died.
- A young female called the Newton Police Department (Kansas) late on the evening of April 8, 2005, stating that her mother was engaged in a domestic disturbance with the mother's boyfriend, who was armed. ERT officials and hostage negotiators arrived at the scene of the declared hostage situation and established a perimeter barricade. The suspect denied that he had any weapons and agreed to a face-to-face meeting with the negotiators at the door of the residence. As ERT personnel escorted two negotiators, the suspect opened the front door, then slammed it shut after the female inside said something that angered him. Believing that the hostage was in imminent danger, officers forced their way inside. The suspect fired and mortally shot a deputy sheriff, the first ERT official to cross the threshold. The suspect then shot a detective, wounding him in the hands, arm, and leg.

Iraq: The War's Role in TWS Evolution

TWS technology typically has been developed for military use; however, it is now transitioning to law enforcement as costs have become more affordable. Although TWS has been the subject of research and development for the past 10 years, the war in Iraq has moved it to the forefront. The Defense Advanced Research Projects Agency (DARPA), the central research and development organization for the U.S.

Department of Defense, rapidly introduced the Radar Scope device, a portable handheld device designed to penetrate 12 inches of concrete and 50 feet beyond that into a room.[2] Barely larger than today's stud detectors, weighing only 1.5 pounds, and running on two AA batteries, the Radar Scope reliably detects motion as slight as breathing and transmits information on where in the room the motion is occurring. With a projected price of $1,000, this technology is expected to make a quick transition to SWAT teams and, most likely, to general law enforcement.

DARPA has also provided support for a larger SoldierVision device, which creates a two-dimensional color image depicting range and distance to objects in motion.[3] This device penetrates 60 feet into a room and has a standoff capability, allowing it to be 30 feet away from a wall and still penetrate 30 feet into the room. It can provide intensive target detection out to 9 feet, detecting someone hiding in a closet or a crawl space, for instance. Although the SoldierVision device does not comply with Federal Communications Commission (FCC) certification for use in the United States,[4] another version, the RadarVision2 device,[5] is FCC certified.[6] The range of the RadarVision2, however, is cut in half, providing a penetration of 30 feet into rooms. It also sells for more than $20,000, putting it out of reach for many law enforcement agencies.[7]

On the high-end of TWS capabilities—and price—is the Camero Xaver™ 800 product, which produces a 3-D display of a room in real time.[8] Full 3-D imaging can be accomplished up to 26 feet, and it has an extended imaging range of up to 65 feet. Operators can see not only the shape of the room, but also figures moving around or in one place within the room. A person's height and distance from walls or objects can be estimated quite easily. The system is generally considered too expensive for law enforcement. Its manufacturer is currently developing a Xaver™ T system, which should be lower in cost.

TWS technology allows users to conduct room-to-room searches, map the interior of buildings, and find military combatants and weapons caches—all through an interior or exterior building wall.

Current Limitations of TWS Technology

Current TWS technology is limited in what it can do. Metal in walls and metal-backed insulation can block the ability to see into a room, and most TWS technologies provide a lower resolution image compared to video images. Each pixel in the TWS image represents an inch or more across the target, making it very difficult to differentiate between a cell phone and a handgun, for instance.

Although the ability to produce images of moving people, fixed objects, and room structure makes this technology very attractive to law enforcement, systems that offer an actual video currently are too expensive for police departments. Meanwhile, the less expensive systems provide only an indicator of motion on the other side of a wall—which, for example, could be an armed person or an animal.

Privacy Issues Exist

TWS technology raises significant privacy issues: Does it violate a person's Fourth Amendment right against unreasonable search and seizure?

In some situations, this technology would constitute an unreasonable search of a home unless a warrant with probable cause had been issued. The primary exception would be in emergency or exigent conditions. There is a significant body of case law that describes such conditions; perhaps the clearest explanation is:

> A search is reasonable, and a search warrant is not required, if all of the circumstances known to the officer at the time would cause a reasonable person to believe that entry or search was necessary to prevent physical harm to the officer or other persons, the destruction or concealment of evidence, the escape of a suspect, and if there was insufficient time to get a search warrant.[9]

In tactical situations involving barricaded offenders and hostage-taking—situations in which there is not sufficient time to obtain a search warrant—it is fairly reasonable to assume that the use of TWS technology would prevent physical harm to an officer or other person. When serving high-risk warrants, however, it is not reasonable to assume that there is insufficient time to get a search warrant for a known address. In other words, even though serving a high-risk warrant may present a risk to law enforcement, the serving of the warrant is not typically time-critical. Thus, using TWS technologies to search a premises would require the appropriate search warrant under current legal precedent.

The use of TWS technologies in all situations must follow clearly defined policies and procedures that have been vetted by an agency's command and legal staff.

Federal Coordination

In the 1990s, the Technology Policy Council (TPC) was formed at the direction of the U.S. Attorney General to provide a forum for Federal agencies to share information about their research and development of law enforcement technology. Administered by the National Institute of Justice (NIJ), TPC provides an opportunity for agencies throughout the Federal Government to leverage projects, where it makes sense, to avoid duplication of efforts and to maximize the return on investment. The Deputy Attorney General serves as the chair of TPC.

At a December 2006 TPC meeting sponsored by the U.S. Department of Justice, representatives from several government agencies shared information on their TWS technology programs. The meeting revealed significant interest and investment in detecting objects and people in buildings and providing surveillance into a structure prior to entry. The meeting also revealed the need for standards and test protocols to ensure that:

- Performance is objectively measured and evaluated in the laboratory and in the field.
- Systems are interoperable with data-sharing and command and control environments.
- Performance objectives for future research and development are realistically set.

Federal agencies will continue to coordinate to ensure that they have identified and discussed the important issues surrounding privacy and human subject impact assessments. Without an upfront understanding of the legal and health implications posed by TWS technology, criminal justice agencies could face problems they had not considered—problems that may be easily avoided through coordination and policy planning.

Where to Go From Here?

TWS technology continues to evolve and improve. In July 2006, the Office of Naval Research initiated a Transparent Urban Structures program to collect and integrate information to determine the intent of above- and below-ground structures and quickly get the right data to the right user.[10] The program seeks to provide military personnel with an intuitive, portable interface that presents a clear, real-time picture of the battlefield and threats, likely enemy courses of action, and actionable intelligence of the situation surrounding them.

DARPA has a major program under way called Visibuilding, which is developing further technologies for sensing people and objects in buildings.[11] A key component of this project is making technology useful during a range of operations—from pre-mission planning to find which buildings should be searched, through post-mission analysis to find hidden objects or people.

NIJ is also working to advance TWS research, development, and evaluation through its sensors and surveillance portfolio and solicitation for proposals.[12] Through a 2006 solicitation, the Institute is funding a research project to add an acoustic TWS capability to the TimeDomain system, which uses ultrawide band radar TWS technology. Because radar currently is blocked by metal walls or aluminum-backed insulation, an acoustic capability would allow the TWS device to provide some surveillance capability to penetrate through those walls. A prototype system integrating radar and acoustic capabilities should be complete in early 2008.

As the capabilities, cost, and availability of TWS technology continue to improve, there will be many more opportunities to save lives by reducing the risk to law enforcement in tactical situations so that officers can make quicker, smarter, life-saving decisions.

NCJ 219607

Without an upfront understanding of the legal and health implications posed by TWS technology, criminal justice agencies could face problems they had not considered—problems that may be easily avoided through coordination and policy planning.

Notes

1. *Law Enforcement Officers Killed and Assaulted 2005,* U.S. Department of Justice, Federal Bureau of Investigation, October 2006: Tables 1, 20, and 65, available at www.fbi.gov/ucr/killed/2005.
2. More information on Radar Scope is available at www.darpa.gov/sto/smallunitops/radarscope.html.
3. More information on SoldierVision is available at www.radarvision.com/SoldierVision/sv.htm.
4. The FCC and the American National Standards Institute set limits for the safe amount of energy that can be emitted by devices for the operator and the individuals under surveillance. These limits are often not applied when devices are used overseas, so many of the companies sell a different, less-powerful version in the United States. The FCC requirements also ensure that the devices do not interfere with other communications devices.
5. More information about RadarVision2 is available at www.radarvision.com/RadarVision2/Rv2.htm.
6. This device is certified and complies with Part 15 of the FCC rules. Parties using this equipment must hold a license issued by the FCC to operate a transmitter in the Public Safety Radio Pool under Part 90 of CFR Title 47.
7. Enhanced Tactical Entry, ArmorOutlet.com, available at www.armoroutlet.com/AOtactical/AOtac_radar.html.
8. More information on the Xaver™ 800 is available at www.camero-tech.com/xaver800.shtml.
9. "The 'Lectric Law Library's Lexicon on Exigent Circumstances," 'Lectric Law Library, available at www.lectlaw.com/def/e063.htm.
10. Kruger, M., *Transparent Urban Structures Enabling Capability Program,* Office of Naval Research, available at www.onr.navy.mil/about/events/docs/83_TUS_Industry_Day_brief.pdf.
11. More information on Visibuilding is available at www.darpa.gov/sto/smallunitops/visibuilding.html. See also Baranoski, E.J., "Urban Operations: The New Frontier for Radar," in DARPATech 2005 Conference Proceedings, DARPA Special Projects Office, 2005, available at www.darpa.gov/darpatech2005/presentations/spo/baranoski.pdf.
12. For example, see "FY2007 Solicitation: Sensors and Surveillance Technologies," available at www.ncjrs.gov/pdffiles1/nij/sl000757.pdf.

Detecting Concealed Weapons: Directions for the Future

by Chris Tillery

About the Author

Mr. Tillery is the associate deputy director for science and technology at the National Institute of Justice.

On July 24, 1998, a man entered the U.S. Capitol building in Washington, DC, with a .38-caliber handgun concealed under his clothing. A security check point with a portal weapons-detection system had been established at the entrance of the building. Knowing that his gun would be detected if he walked through the portal, the man stepped around it. Immediately, he was confronted by Jacob Chestnut, one of the Capitol Police officers operating the portal. The man drew his gun and killed Chestnut. He then shot and killed a second officer, John Gibson, before he was stopped.[1]

Seven years later, on December 5, 2005, a man with a bomb vest under his clothing approached a shopping mall in Netanya, Israel. His behavior alerted police and mall security. When he was confronted outside the mall, the suicide bomber detonated his bomb, killing 5 people and injuring 50.[2]

Although there has yet to be a suicide bombing in this country, such an attack could happen anywhere—on a bus, at a mall, at the Super Bowl, or at the Academy Awards. It is vital for law enforcement to be able to detect and respond to weapons at a sufficient distance to allow officers to make decisions and take actions that deal safely with the situation. For over a decade, the National Institute of Justice (NIJ) has been working to address this need.

Limitations of Current Weapons-Detection Systems

The incident at the U.S. Capitol showed the limitations of current security-detection portal systems—they must be near an individual to work. They generally provide sufficient warning when it comes to detecting a knife, but they cannot detect weapons that can kill beyond arm's reach. By the time a handgun or a bomb vest is detected, it generally is too close to be dealt with safely.

But there are ways to provide more warning. One is to move the portal farther from the operator. For example, it can be incorporated into a building's entrance and operated from a control room at another location. A person who wants to enter the building is then required to first go through the portal before an interior door opens to allow admittance to the building. If the portal detects a weapon, the operator does not open the interior door or the door locks automatically, without the operator's intervention. To further protect the public, exterior doors open only after a second interior door is closed behind the person who has entered. In this way, only one person at a time can enter the building, preventing the possibility that innocent bystanders would be trapped in an entryway with an armed person.

Despite their advantages, remote portal weapons-detection systems have significant limitations. They require more space for the remote location, which is not always available, and they impede traffic flow. Using a remote exterior door with screening equipment and a second interior door in a crowded venue, such as a sporting event or an airport, would impede the flow of pedestrian traffic and cause people to collect in a relatively small area, creating a prime target for a suicide bombing or other attack.

Another approach to detecting concealed weapons is through the use of back-scatter x-ray weapons-detection systems, which use low-dose x-rays to develop images of objects under clothing. The x-rays pass through clothing and are reflected—or "scattered back"—by the skin. These systems have the same limitation as existing portal weapons-detection systems: They require close proximity to detect a weapon. They can, however, reduce the nuisance alarms that occur when metal objects other than weapons are detected and thus move pedestrian traffic more quickly through security checkpoints.

Where Are We Going?

In the late 1990s, NIJ launched an aggressive program to find ways to detect concealed weapons from a safe distance. The Institute investigated a wide range of potential solutions—radar, infrared radiation cameras, acoustic devices—and determined that passive millimeter wave (MMW) cameras offered the greatest potential.

Use-of-force protocols for dealing with an armed gunman, who may or may not be suicidal, may not be appropriate for dealing with a suicide bomber, whose device might be detonated remotely by an accomplice or by the bomber himself even after being restrained.

A passive MMW camera is one that does not use an artificial source of MMW radiation. It develops images from ambient MMW radiation, which, like infrared radiation, is all around but cannot be seen by the human eye. Although both infrared and MMW radiation can penetrate clothing to develop images of hidden objects, MMW radiation is more effective in this respect. For example, an MMW camera can develop an image through a heavy coat, but an infrared camera cannot.

Over the past decade, NIJ has leveraged research and development on MMW technology performed by the U.S. Department of Defense to the point that there now are commercially available MMW weapons-detection cameras.[3] These cameras represent a 10-fold decrease in size and cost from the initial prototypes, but much work remains to be done in improving resolution and range, and reducing weight and cost.

NIJ continues to work on developing the potential for MMW technology to detect concealed weapons. For example, the Institute is exploring the use of automobile collision-avoidance MMW radar; and in another project, it is supporting efforts to develop smaller, less expensive MMW cameras. NIJ is also reexamining other technologies, such as infrared cameras, that have advanced in the last decade and could offer new opportunities for the detection of concealed weapons.

New Technologies Demand New Protocols

New technology is never, in itself, the solution. Rather, the solution lies in adopting effective policies and practices for use of the technology. Emerging weapons-detection technologies pose complex questions for law enforcement agencies, particularly the development of legally defensible protocols for using them.

For instance, using a device to remotely search people walking in a public venue, without their knowledge, raises fundamental Fourth Amendment concerns with respect to lawful searches. When and under what circumstances can such a device be used? What is the public's reasonable expectation of privacy in a public venue? What constitutes probable cause for the use of these devices? What is a reasonable search?

Another issue is appropriate use-of-force protocols. The use of deadly force is governed by the totality of the situation. There are two salient points to keep in mind when developing protocols under these circumstances. The first is that no technology is perfect. An MMW camera may reveal an object that, in all likelihood, is a bomb vest, but there is still a possibility, however slim, that it may not be a bomb vest. The second point is that a suicide bomber, by definition, intends to kill or injure as many people as possible. Use-of-force protocols for dealing with a person armed with a handgun, who may or may not be suicidal, may not be appropriate for dealing with a suicide bomber, whose device might be detonated remotely by an accomplice or by the bomber himself even after being restrained.

Under the Nation's federalist system of government, the development of specific protocols for the effective use of these technologies must be done jurisdiction by jurisdiction. Jurisdictions need not work in a vacuum, however. Key professional public safety organizations have begun to develop guidelines, including ways for responding to suicide bombers. The International Association of Chiefs of Police (IACP), for example, includes this issue in its *Training Key* monographs, which provide officers with authoritative information on a broad variety of law enforcement practices and procedures. For more information on the IACP *Training Key* monographs, see www.iacp.org.

A New Century of Challenges

The new century brings with it new challenges in detecting concealed weapons. As criminal justice professionals work on the technology and protocols to address these challenges, NIJ will continue to provide the research and development that the Federal, State, and local law enforcement communities need to help prevent attacks and ensure the safety of citizens.

NCJ 219608

Notes

1. "Shooting at the Capitol, Special Report: From the Shootings to the Investigation," *Washington Post,* available at www.washingtonpost.com.
2. Myre, G. "Bomber Kills 5 Outside Shopping Mall in Israel," *New York Times,* December 5, 2005, available at www.nytimes.com.
3. Two commercially available products resulting from NIJ's investment in concealed-weapons detection are the Sago ST 150 (www.trexenterprises.com/Subsidiaries/sago.html) and the Brijot BIS-WDS (www.brijot.com). These products and manufacturers are cited for informational purposes only and do not constitute product approval or endorsement by the National Institute of Justice.

Recently Released by NIJ

Addressing Shortfalls in Forensic Science Education
May 2007

Many crime laboratories find that new graduates of forensic science education programs are not properly trained. This *NIJ InShort* explains the benefits of accredited programs. An accredited curriculum gives employers—such as crime lab directors—standard criteria to assess whether an applicant is qualified. This publication is available at www.ncjrs.gov/pdffiles1/nij/216886.pdf.

Mental Health Screens for Corrections
May 2007

This *Research for Practice* reports on two projects that created and validated mental health screening instruments, which corrections staff can use during intake. Short questionnaires help identify inmates who require mental health assistance. One screening instrument was found to be effective for men and is being adapted for women. The other has effective versions for both men and women. This publication is available at www.ncjrs.gov/pdffiles1/nij/216152.pdf.

Public Safety Communications and Interoperability
May 2007

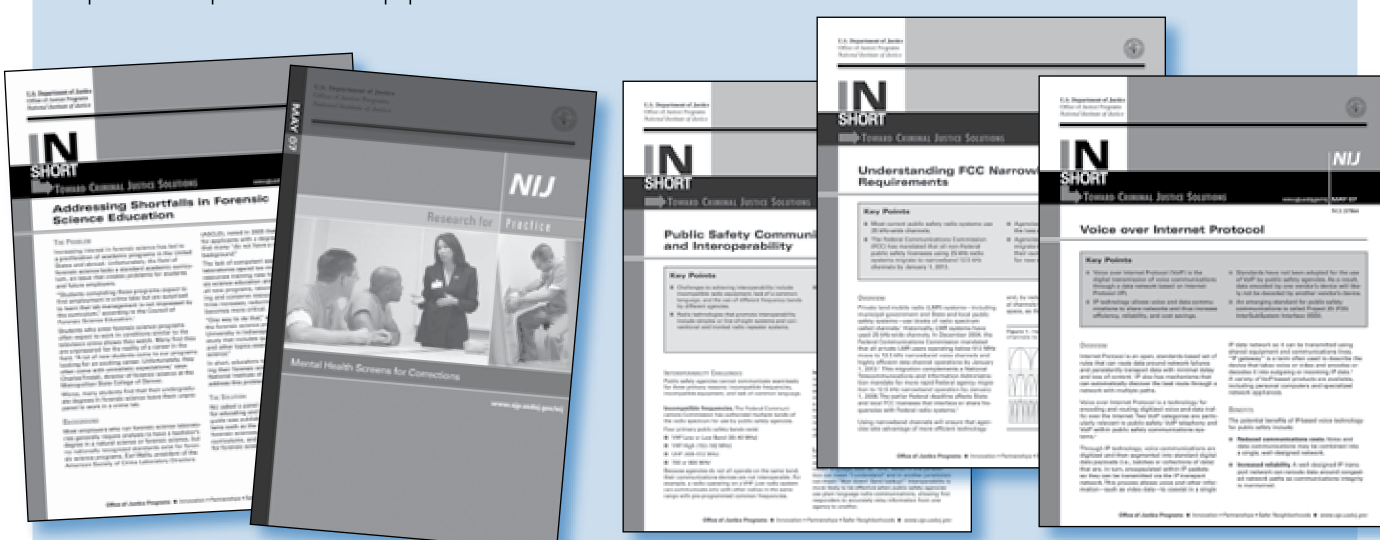
Public safety agencies often have difficulty communicating with each other due to incompatible frequencies and equipment and lack of a common language. This *NIJ InShort* describes these barriers and offers recommendations to help overcome them. This publication is available at www.ncjrs.gov/pdffiles1/nij/214331.pdf.

Understanding FCC Narrowbanding Requirements
May 2007

The Federal Communications Commission has required all non-Federal public safety licensees currently using 25-kHz radio systems to migrate to narrowband 12.5-kHz channels by January 1, 2013. This *NIJ InShort* explains how those who do not meet the deadline may lose communication capabilities and provides guidance on how to prepare for the migration. This publication is available at www.ncjrs.gov/pdffiles1/nij/217865.pdf.

Voice over Internet Protocol
May 2007

Voice over Internet Protocol (VoIP) is a technology for encoding and routing digitized voice and data traffic over the Internet. This *NIJ InShort* discusses the technology's potential benefits and explores two types of VoIP particularly relevant to public safety. It also reviews issues to consider before implementation and introduces an emerging public safety standard that may allow interoperability between technologies. This publication is available at www.ncjrs.gov/pdffiles1/nij/217864.pdf.



Major Study Examines Prisoners and Their Reentry Needs

by Christy A. Visher, Ph.D., and Pamela K. Lattimore, Ph.D.

About the Authors

Dr. Visher is a principal research associate at the Urban Institute's Justice Policy Center. Dr. Lattimore is a principal scientist at RTI International's Center for Crime, Violence, and Justice Research.

Key demographics were recently released from a study of reentry programs under the Serious and Violent Offender Reentry Initiative (SVORI)—a Federal effort to help States use their correctional resources to reduce recidivism.[1] Aimed at increasing public safety, SVORI is an unprecedented national response to the criminal justice, employment, education, health, and housing challenges that adult and juvenile offenders face when they return to the community.

RTI International, a nonprofit research group, and the Urban Institute, a nonpartisan economic and social policy research organization, are conducting a 5-year evaluation of the effectiveness of the SVORI programs. In the National Institute of Justice–funded evaluation, researchers interviewed prisoners at 16 sites, asking them shortly before they were released what services they felt they would need. Here is a summary of the demographics and responses of the SVORI group (a sample of 935 men who received SVORI services) and the comparison group (923 men who did not receive SVORI services).[2]

Who Are the SVORI Men?

More than half of the men in the SVORI group are African American, and nearly one-third are Caucasian.[3] The majority of the SVORI group are neither married nor in a steady relationship. The average age of the men is 29. Sixty percent are fathers of minor children, and nearly half of them reported having primary care responsibilities. Less

SVORI GROUP DEMOGRAPHIC HIGHLIGHTS

- Average age 29 years
- 56% African American
- 32% Caucasian
- 4% Hispanic
- 83% served prior prison terms
- 52% had been incarcerated in juvenile correctional facility
- 62% completed high school or GED
- 60% with children under age 18
- Of those with minor children, 49% have primary care responsibilities of children
- 37% in a steady intimate relationship
- 8% married

than two-thirds have completed 12th grade or earned a high school equivalency degree.

Nine out of 10 men in the SVORI group reported having a job at some point in their lifetime, and nearly two-thirds said they were employed during the 6 months before their incarceration. They typically held blue-collar jobs, serving as laborers, service workers, equipment operators, and skilled craftspeople.

Nearly half reported that they had supported themselves in part through illegal activities, and more than two-thirds reported perpetrating violence during the 6 months before they were incarcerated. Eighty-three percent served prior prison terms. The majority of the group reported having family members and friends who had been convicted of a crime or had problems with drugs and alcohol.

The SVORI Men Define Their Needs

Part of the evaluation of the SVORI programs is based on prisoners' responses to questions about the services they need after they are released from prison. The most commonly reported reentry needs were more education, general financial assistance, a driver's license, job training, and employment.

Nearly three-quarters of the SVORI group reported needing transportation assistance and better money-management skills. More than half said they needed some of the most basic and immediate needs—food, clothing, and a place to live—along with basic identification (birth certificate, Social Security card, and photo ID card) and financial assistance. Those who had minor children also reported a need for parenting classes and child care, help with child support payments, and help resolving custody issues.

When asked what health services they needed upon release, three-quarters identified health care insurance and more than half identified medical treatment. It is important to keep in mind that many reported needs are intertwined. For example, when a former prisoner applies for medical insurance or treatment, he is also likely to need identification and possibly transportation.

What education and employment experience do they have?	
Ever held a job	89%
Held a job during 6 months pre-prison	64%
High school graduate or GED	62%
Expect to return to a previous job	56%
Never held a job for more than 1 year	42%

How did they support themselves pre-prison?	
Partly through illegal activities	45%
Mostly through illegal activities	39%
Help from family	32%
Help from friends	18%

What experience have they had with violence?	
Perpetrated violence during 6 months pre-prison	69%
Victim of violence during 6 months pre-prison	59%
Victim of violence during incarceration	56%

What experience have their friends and family had with criminal behavior?	
Friends have been convicted of a crime or incarcerated	84%
Friends have drug or alcohol problems	82%
Family members have been convicted of a crime or incarcerated	78%
Family members have problems with drugs or alcohol	72%

What family services do those with minor children need?	
Parenting classes	61%
Help with child support payments	45%
Child care	40%
Help resolving child custody issues	36%

What other services do they need?	
Transportation assistance	73%
Money-management skills	71%
Access to food or clothing banks	62%
Identification (e.g., birth certificate)	56%
Financial assistance from government	53%
A place to live	52%
Legal assistance	46%

What health services do they need?	
Health care insurance	76%
Medical treatment	57%
Alcohol or substance abuse treatment	38%
Mental health treatment	23%

What attitude and behavior help do they need?	
Change attitude about criminal behavior	65%
Improve personal relationships	64%
Mentoring	60%
Spiritual or religious assistance	52%
Anger management	36%

The majority of the SVORI group seemed to recognize some aspect of their own behavior that they need to change to improve their lives after they are released. Almost two-thirds reported needing to work on their personal relationships, and more than half said they needed a mentor and spiritual or religious assistance. One-third reported needing anger management training.

Over the next 2 years, additional findings will be released. These will be based on interviews with the SVORI group and the comparison group at 3 months, 9 months, and 15 months postrelease. The interviews will include drug testing at the 3- and 15-month marks, which will offer critical data not only on postrelease drug use, but also on the consistency of self-reported information. Additional analyses will examine recidivism and other outcomes at 12 and 24 months postrelease. For more information on SVORI programs and the evaluation, see www.svori-evaluation.org.

NCJ 219609

Notes

1. SVORI is funded by the U.S. Departments of Justice, Labor, Education, Housing and Urban Development, and Health and Human Services.
2. The evaluation also includes interviews with adult female prisoners and juvenile males. This article, however, discusses only the adult males in this study.
3. Although this article presents statistics for the SVORI group only, responses from the comparison group were similar in terms of demographics and types of services needed.

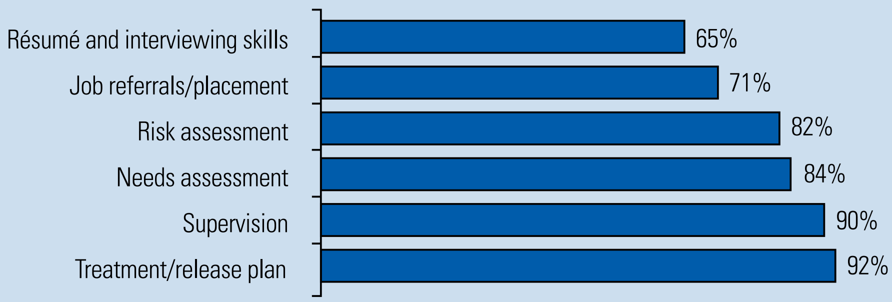
WHAT DO THE SVORI PROGRAMS OFFER?

SVORI funding supports a three-phase service continuum that focuses on reentry preparation: (1) just prior to release from prison, (2) during the first few months postrelease, and (3) for several years postrelease as participants take on more productive and independent roles in the community. There are 89 adult and juvenile SVORI programs, which offer such services as life-skills training, dental and medical services, needs and risk assessments, treatment and release plans, and job placement.

The following charts, based on a survey of SVORI program directors in 2005, show the percentage of adult SVORI participants that received particular types of services in prison (prerelease) and after they were released.

Adult SVORI Participants Receiving Prerelease Services

Adult SVORI Participants Receiving Postrelease Services



Forensic Databases: Paint, Shoe Prints, and Beyond

by Robin Bowen and Jessica Schneider

About the Authors

Ms. Bowen is the forensic program coordinator for the Forensic Science Initiative at West Virginia University. Ms. Schneider is a graduate student in public administration at West Virginia University.

A detective working a missing persons case undoubtedly knows how to make the most of databases such as the Combined DNA Index System (CODIS) and the Integrated Automated Fingerprint Identification System (IAFIS), but does he or she know how to investigate a paint chip, a tire track, an ink sampling, or a piece of glass?

Many government and private forensic databases can help both law enforcement investigators and the scientists who support their work in the lab. To help spread the word about the existence of these tools, the National Institute of Justice (NIJ) funded West Virginia University to gather the following basic information.[1]

Integrated Ballistic Identification System: IBIS

Maintained by the Bureau of Alcohol, Tobacco, Firearms and Explosives' National Integrated Ballistic Information Network, this forensic database contains bullet and cartridge casings that have been retrieved from crime scenes and test-fires of guns found at a crime scene or on a suspect. One limitation of this database is that there must be a suspected gun to make a comparison. Because the database contains information on bullets and casings—and not on specific guns—a test-fire bullet from a gun must be compared to a bullet found at a crime scene, for example, to determine whether a bullet came from a specific gun. Any image of a casing or bullets must be sufficiently clean—that is, be clear, show characteristics, and have little glare—for a comparison to be valid.

How does IBIS work? Technicians use forensic imaging technology to enter bullet and casing evidence into IBIS. New images are correlated against data, and technicians are alerted to possible matches. At that point, a firearms examiner uses a comparison microscope to perform a manual examination. For more information, see www.atf.gov.

Paint Data Query: PDQ

Maintained by the Royal Canadian Mounted Police (RCMP), PDQ contains the chemical compositions of paint from most domestic and foreign car manufacturers and the majority of vehicles marketed in North America after 1973. The PDQ software is free to agencies that supply a minimum of 60 paint samples per year. The database information comes from the street (more than 60 percent from body shops and junkyards) and from manufacturers. In 1998, RCMP entered into agreements with the German Forensic Institute and the Japanese National Police Agency, which resulted in 1,500 samples being added to the database each year. Not all manufacturers, however, are willing to divulge the chemical composition of paint used on their vehicles. If a particular sample has not been entered into the database from the street, it would not be possible to obtain a match.

How does PDQ work? Each paint layer—an automotive paint job usually consists of four—is examined to determine the spectra and chemical composition. The chemical components and proportions are coded into the database. These known samples are compared against a paint sample from a crime scene or a suspect's vehicle to search the make, model, and year of manufacture of a vehicle involved in a hit-and-run or other criminal activity. For more information, see www.rcmp-grc.gc.ca.

National Automotive Paint File

This Federal Bureau of Investigation (FBI) database contains more than 40,000 samples of automotive paint from manufacturers.

How does the database work? Paint chips from cars can be compared to samples in the database. Undercoats help to narrow down possible manufacturers. For more information, contact the FBI's Laboratory Division at 202–324–3000.

Glass Evidence Reference Database

This database contains more than 700 glass samples from manufacturers, distributors, and vehicle junkyards. It is housed by the Technical Support Working Group, an interagency group that includes the U.S. Department of State and the U.S. Department of Defense. Although it cannot determine the source of an unknown piece of glass, the database can assess the relative frequency that two glass samples from different sources would have the same elemental profile.

How does the database work? Two plasma mass spectrometers are used to perform an elemental analysis of glass. For more information, e-mail isfsubgroup@tswg.gov.

TreadMark™

The number of shoe prints at a crime scene can be so large that the process of impression recovery becomes very time-consuming. TreadMark™ is a commercial product that uses four parameters—pattern, size, damage, and wear—to identify individual outsole impressions. These are then compared with shoe print data from two sources: suspects in custody and crime scenes. A match could yield the name, date of birth, criminal record number, places of interest, and similar offenses for possible suspects.

How does TreadMark™ work? Impressions from a crime scene are obtained using the current recovery methods of photograph, gel lift, dust lift, and adhesive lift. These are input directly into the analytical system by high-resolution digital imaging. The same procedure is used with an impression of a suspect's shoe print: It is photographed using a high-resolution digital camera, and these impressions (along with the offender's details) are input into the analytical system, where the operator can measure, analyze, and compare crime-scene and suspect images. Both image sources can be searched within themselves and against each other, allowing such images to be transmitted to other users. For more information, see www.csiequipment.com/systems.aspx.

SoleMate

This commercial database contains information—manufacturer, date of market release, an image or offset print of the sole, and pictorial images of the uppers—for more than 12,000 sports, work, and casual shoes. Sold on DVD, the product is updated and distributed to subscribers every 3 months. One limitation is that different manufacturers often use the same sole unit. Therefore, it may be difficult to determine the exact make and model of a shoe. The software links such records, however, so that all footwear that might match a crime-scene print can be considered.

How does SoleMate work? The pattern of an unidentified shoe print is assigned a set of codes to isolate basic features, such as circles, diamonds, zigzags, curves, and blocks. Options, with variations, are presented pictorially, which allows an investigator to code features that best match the shoe print. These codes form the database search, with results presented in descending order of pattern correlation. For more information, contact Foster & Freeman USA Inc., at 888–445–5048 or usoffice@fosterfreeman.com.

TreadMate

Maintained by the same United Kingdom company that markets SoleMate, this database contains information on more than 5,000 vehicle tires and tire tread patterns, including manufacturer, date of market release, pictorial image, and pattern features. Because manufacturers sometimes use the same tread, it may be difficult to find the exact make and model match of a tire. In these cases, records are linked so that all tires that might match a crime-scene tire mark may be considered.

How does TreadMate work? The pattern of an unidentified tire mark is assigned a set of codes for pattern features, such as waves, lines, diamonds, zigzags, curves, and blocks, which then form the basis of the database search. Results are presented in descending order of correlation. For more information, contact Foster & Freeman USA Inc., at 888–445–5048 or usoffice@fosterfreeman.com.

Forensic Information System for Handwriting: FISH

Maintained by the U.S. Secret Service, this database enables document examiners to scan and digitize text writings such as threatening correspondence.

How does FISH work? A document examiner scans and digitizes an extended body of handwriting, which is then plotted as arithmatic and geometric values. Searches are made on images in the database, producing a list of probable "hits." The questioned writings, along with the closest hits, are then submitted to the Document Examination Section for confirmation. For more information, see www.secretservice.gov/forensics.shtml.

International Ink Library

The collection—maintained jointly by the U.S. Secret Service and the Internal Revenue Service—includes more than 9,500 inks, dating from the 1920s. Every year, pen and ink manufacturers are asked to submit their new ink formulations, which are chemically tested and added to the reference collection.

Open-market purchases of pens and inks ensure that the library is as comprehensive as possible.

How does the library work? Samples are chemically analyzed and compared with library specimens. This may identify the type and brand of writing instrument, which can be used to determine the earliest possible date that a document could have been produced. If the sample matches an ink on file, a notation is made in the database. The U.S. Secret Service generally provides assistance to law enforcement on a case-by-case basis. For more information, contact 202-406-5708.

Ident-A-Drug

The Therapeutic Research Center, a private company, publishes a computer program and book to help identify drugs in tablet or capsule form. To make an identification, sufficient information about the unknown drug must be available.

How does Ident-A-Drug work? Data used for comparison purposes contain codes that are imprinted on tablets and capsules, information on color and shape, the national drug code (NDC #), and drug class. Schedule information is shown if the drug is a narcotic or in one of the U.S. Drug Enforcement Administration schedules. For more information, see www.therapeuticresearch.com.

PharmInfoNet

This free Internet database contains information on prescription drugs, including uses, marketing and availability, and common side effects.

How does PharmInfoNet work? To perform a search, the generic or brand name of the drug must be known, which may not be possible if only a portion of the drug exists or the drug is not marked with a name. For more information, see http://pharminfo.8media.org/drugpr/drugpr_mnu.html.

RxList

Another free Internet database of prescription drugs is RxList.com.

How does RxList work? As with PharmInfoNet, the name of the drug must be known. Information in the database may not be current because new drugs are created regularly and new side effects are discovered. Search results include patient summaries; side effects and interactions; and links to public health, policy, and economic information. For more information, see www.rxlist.com.

Ignitable Liquids Reference Collection: ILRC

Maintained by the National Center for Forensic Science, this database and associated liquid repository allows a laboratory to isolate an ignitable liquid of interest for inclusion in an inhouse reference collection. Designed for screening purposes only, it parallels—but does not replace—American Standard Testing Materials requirements for an inhouse reference collection. A laboratory does not need to adopt the ILRC classification system to use this database.

How does ILRC work? Users enter the name of the liquid into the searchable database. The database can also be organized by classification of the liquid for quick reference. Users can then purchase samples of the liquid. Commercial samples are obtained directly from manufacturers and distributors. The products are then repackaged for distribution using the product name and sent to forensic science laboratories. For more information, see www.ncfs.org.

ChemFinder

This free Internet-based database contains information from manufacturers on chemicals, including chemical structures, physical properties, and hyperlinks.

How does ChemFinder work? Searches are conducted using a chemical name, Chemical Abstract Service (CAS) registry number, molecular formula, or weight. For more information, call 800–315–7300 or see http://chemfinder.cambridgesoft.com/reference/chemfinder.asp.

Integrated Automated Fingerprint Identification System: IAFIS

This FBI-maintained database contains:

- Fingerprints acquired after arrest at the city, county, State, and Federal levels.
- Fingerprints acquired through background checks for employment, licensing, and other noncriminal justice purposes (if authorized by State or Federal law).
- Latent prints found at crime scenes.

Although IAFIS offers electronic search and storage capabilities, it has some limitations. The database contains the fingerprints of only a small percentage of the population. Moreover, to make a comparison, the latent print must be of sufficient quality to identify certain individual characteristics. For example, the cores and deltas must be present in the print to determine the orientation of the print.

How does IAFIS work? The database receives data electronically, in hard copy, or in machine readable data format. IAFIS accepts, stores, and distributes photographs, including the results of remote 10-print and latent searches. These are returned electronically to the requesting agencies with a list of potential matching candidates and their corresponding fingerprints for comparison and identification. For more information, see www.fbi.gov/hq/cjisd/iafis.htm or contact the FBI's Criminal Justice Information Services Division at 304–625–2000.

Combined DNA Index System: CODIS

This FBI-run database blends forensic science and computer technology into a tool for solving violent crimes. CODIS enables Federal, State, and local crime labs to exchange and compare DNA profiles electronically, thereby linking crimes to each other and to convicted offenders. CODIS uses two indexes: (1) the Convicted Offender Index, which contains profiles of convicted offenders, and (2) the Forensic Index, which contains profiles from crime-scene evidence.

How does CODIS work? Searches are performed to find a match between a sample of biologic evidence and an offender profile. Matches made between the Forensic and Offender Indexes provide investigators with the identity of a suspect. DNA analysts in the laboratories share matching profiles, then contact each other to confirm the candidate match. For more information, see www.fbi.gov/hq/lab/codis/index1.htm.

NCJ 219606

Note

1. The information in this article regarding manufacturers and products, including Internet databases, is presented for informational purposes only. The National Institute of Justice has not evaluated the utility, accuracy, or veracity of the data in these databases; no product approval or endorsement by the U.S. Department of Justice should be inferred.

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 Community Capacity Development Office; 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: PunchStock, iStock, and Getty Images

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

Washington, DC 20531

Official Business
Penalty for Private Use $300

PRESORTED STANDARD
POSTAGE & FEES PAID
DOJ/NIJ
PERMIT NO. G-91

ISSUE NO. 258

NIJ