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The *'CSI* Effect': Does It Really Exist?

by Honorable Donald E. Shelton

U.S. Department of Justice
Office of Justice Programs

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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

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DIRECTOR'S MESSAGE

As this issue of the *NIJ Journal* goes to press, 2008 has just begun. I want to take this opportunity to say a few words about NIJ's work over the past year.

Law enforcement is undergoing rapid change in the areas of recruitment, training, technology, immigration, and counterterrorism, among others. How, for example, are police departments balancing their daily operations with the post-9/11 pressure to prevent and respond to another terrorist attack? Last year, NIJ joined forces with Harvard University's John F. Kennedy School of Government to take a hard look at these changes and the new demands they are creating for police departments. The 3-year collaboration will not only help refine NIJ's research agenda, it also will produce practical policy and best practices for policing.

In addition to the big-picture view of post-9/11 policing, we are looking at specific cases. We know that agencies have been asked to shift resources or increase spending—or both—to accommodate new requirements related to counterterrorism and homeland security. In 2007, we began an indepth examination of the expanded role of law enforcement agencies in five major cities to gain a better understanding of the financial and operational impacts that these changes have placed on policing.

NIJ is also gaining expertise from our ongoing partnership with Israel's Ministry of Public Security. The partnership culminated in a 2007 symposium in Jerusalem where U.S. and Israeli experts met to finalize research, which will be collected in a joint book on policing in an era of terrorism. Release date: 2008.

Other major NIJ accomplishments in 2007:

- **DNA and property crime.** We wrapped up a field experiment in five cities that looked at the effectiveness of using DNA to solve property crimes and whether doing so helps us catch more dangerous criminals. Findings and recommendations are due in early 2008.
- **Missing persons and unidentified human remains.** NIJ launched NamUs, the National Missing and Unidentified Persons System. NamUs is the Nation's first online database—available to medical examiners, law enforcement, the families of missing persons, and the general public—that will help solve these difficult and often cold cases.
- **Gangs.** Gang violence poses serious problems for communities of all sizes across the country. We issued a major solicitation to address the problem.
- **Justice information sharing.** NIJ launched a new service, called the Nlets Interstate Sharing of Photos (NISP), that vastly streamlines the way law enforcement officials request a driver's license or corrections photo. In the past, the information was available only via fax when the department of motor vehicles or corrections office was open; with NISP, officers can receive images instantly on their computers. The service is being pilot tested in several States.

Some of NIJ's most exciting work this past year took place behind the scenes where we are changing how we do business:

- **Expanding the NLECTCs to include testing and evaluation.** In a vigorous competition, we awarded grants to four Centers of Excellence to strengthen the capability of our National Law Enforcement and Corrections Technology Centers in the areas of communications; forensic science; weapons and protective systems; and sensors, surveillance, and biometric technologies. New testing and evaluation functions will push the Centers to determine what works and how to use new technology.
- **Enhancing scientific assessments.** We have taken a number of steps to strengthen NIJ: The National Academy of Sciences is conducting an independent evaluation of our office, and we are updating our strategic plan. We also are hiring two evaluation specialists to: (1) help integrate the efforts of NIJ's social and physical sciences to ensure that we understand how new technology affects day-to-day criminal justice work, and (2) assess initiatives sponsored by our sister agencies within the Office of Justice Programs.
- **Internationalizing our portfolios of research.** What works in the criminal justice field is not confined by U.S. borders. We are expanding our International Center to ensure that all of our research portfolios consider what we can learn from—and share with—other countries.
- **Redesigning our Web site.** When people want answers, they go to the Web. We gave our Web site a thorough overhaul to make it easier to search and find answers to crime and justice questions. In January 2008, we went live with what I hope will become the premier location for crime and justice research.

Some things, of course, did not change last year. The President's DNA Initiative continues to make significant strides in eliminating backlogs, strengthening crime laboratory capacity, providing training, stimulating research and development, and helping to identify missing persons. NIJ's Technology Working Groups and focus groups continue to ensure that our work addresses the Nation's most pressing needs. We rely on expert practitioners to set our agendas . . . so that our research has the greatest impact on the everyday needs of the professionals who keep us safe.

I am excited to be leading an organization whose mission is to provide innovative criminal justice ideas to the Nation . . . because the evidence shows that the ideas work.

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

NIJ

2008

MARCH 2008

CONTENTS

The *'CSI* Effect': Does It Really Exist?

by Honorable Donald E. Shelton

Crime and courtroom proceedings have long been fodder for film and television scriptwriters. In recent years, however, the media's use of the courtroom as a vehicle for drama has not only proliferated, it has changed focus. In apparent fascination with our criminal justice process, many of today's courtroom dramas are based on actual cases. *Court TV* offers live gavel-to-gavel coverage of trials over the Internet for $5.95 a month. Now, that's "reality television"!

Reality and fiction have begun to blur with crime magazine television shows such as *48 Hours Mystery, American Justice,* and even, on occasion, *Dateline NBC.* These programs portray actual cases, but only after extensively editing the content and incorporating narration for dramatic effect. Presenting one 35-year-old cold case, for example, *48 Hours Mystery* filmed for months to capture all pretrial hearings as well as the 2-week trial; the program, however, was ultimately edited to a 1-hour episode that suggested the crime remained a "mystery" . . . notwithstanding the jury's guilty verdict.

The next level of distortion of the criminal justice system is the extremely popular "reality-based" crime-fiction television drama. The *Law & Order* franchise, for example, appears on television several nights a week promoting plots "ripped from the headlines." It and other television programs pluck an issue suggested by an actual case and weave a story around it.

The most popular courtroom dramas—whether actual, edited, or purely fictional—focus on the use of new science and technology in solving crimes. *CSI: Crime Scene Investigation* has been called the most popular television show in the world. Not only is *CSI* so popular that it has spawned other versions that dominate the traditional television ratings, it has also

Many attorneys, judges, and journalists have claimed that watching television programs like CSI *has caused jurors to wrongfully acquit guilty defendants when no scientific evidence is presented.*

prompted similar forensic dramas, such as *Cold Case, Bones,* and *Numb3rs.* According to one 2006 weekly Nielsen rating:

- 30 million people watched *CSI* on one night.
- 70 million watched at least one of the three *CSI* shows.
- 40 million watched two other forensic dramas, *Without a Trace* and *Cold Case.*

Those ratings translated into this fact: five of the top 10 television programs that week were about scientific evidence in criminal cases. Together, they amassed more than 100 million viewers.

How many of those viewers reported for jury duty the next day?

Claims and Commonly Held Beliefs

Many attorneys, judges, and journalists have claimed that watching television programs like *CSI* has caused jurors to wrongfully acquit guilty defendants when no scientific evidence has been presented. The mass media quickly picked up on these complaints. This so-called effect was promptly dubbed the *"CSI* effect," laying much of the blame on the popular television series and its progeny.

I once heard a juror complain that the prosecution had not done a thorough job because "they didn't even dust the lawn for fingerprints." As one district attorney put it, "Jurors now expect us to have a DNA test for just about every case. They expect us to have the most advanced technology possible, and they expect it to look like it does on television."

But is this really the expectation of today's jurors? And if so, is it the fault of *CSI* and its ilk?

To date, the limited evidence that we have had on this issue has been largely anecdotal, based primarily on prosecutor interviews with jurors after trials. Now, however, we have some findings based on a formal study that two researchers and I recently performed.

Gregg Barak, Ph.D., and Young Kim, Ph.D., criminology professors at Eastern Michigan University, and I surveyed 1,000 jurors prior to their participation in trial processes. The prospective jurors were questioned regarding their expectations and demands for scientific evidence and their television-watching habits, including *CSI* and similar programs. Our goal was to determine if there was any empirical evidence behind the commonly held beliefs that juror expectations for forensic evidence—and their demand for it as a condition for conviction—are linked to watching law-related television shows.

What Programs Do Jurors Watch?

In June, July, and August 2006, a written questionnaire was completed by 1,027 randomly summoned jurors in Ann Arbor, Michigan. The potential jurors, who completed the survey prior to any jury selection, were assured that their responses were anonymous and unrelated to their possible selection as a juror.

First, we obtained demographic information and asked the prospective jurors about their television-viewing habits, including the programs they watched, how often, and how "real" they thought the programs were. Then, we tried to determine what these potential jurors expected to see in terms of evidence from the prosecutor.

The survey asked questions about seven types of cases:

1. Every criminal case.
2. Murder or attempted murder.
3. Physical assault of any kind.

4. Rape or other criminal sexual conduct.
5. Breaking and entering.
6. Any theft case.
7. Any crime involving a gun.

With respect to each of these categories of crimes, we then asked what types of evidence the prospective jurors expected to see:

- Eyewitness testimony from the alleged victim.
- Eyewitness testimony from at least one other witness.
- Circumstantial evidence.
- Scientific evidence of some kind.
- DNA evidence.
- Fingerprint evidence.
- Ballistics or other firearms laboratory evidence.

Then, we got to the heart of the matter: not only did we want to explore jury expectations regarding scientific evidence, we also wanted to discover whether the prospective jurors would demand to see scientific evidence before they would find a defendant guilty.

We asked the survey participants how likely they would be to find a defendant guilty or not guilty based on certain types of evidence presented by the prosecution and the defense. Using the same cases and evidence described above, we gave potential jurors 13 scenarios and five choices for each:

1. I would find the defendant guilty.
2. I would probably find the defendant guilty.
3. I am not sure what I would do.
4. I would probably find the defendant not guilty.
5. I would find the defendant not guilty.

To help ensure that all of the survey respondents were operating from the same legal guidelines, we gave them the burden of proof and reasonable doubt instructions that are given to all seated jurors in criminal cases in Michigan.

Juror Expectations for Forensic Evidence

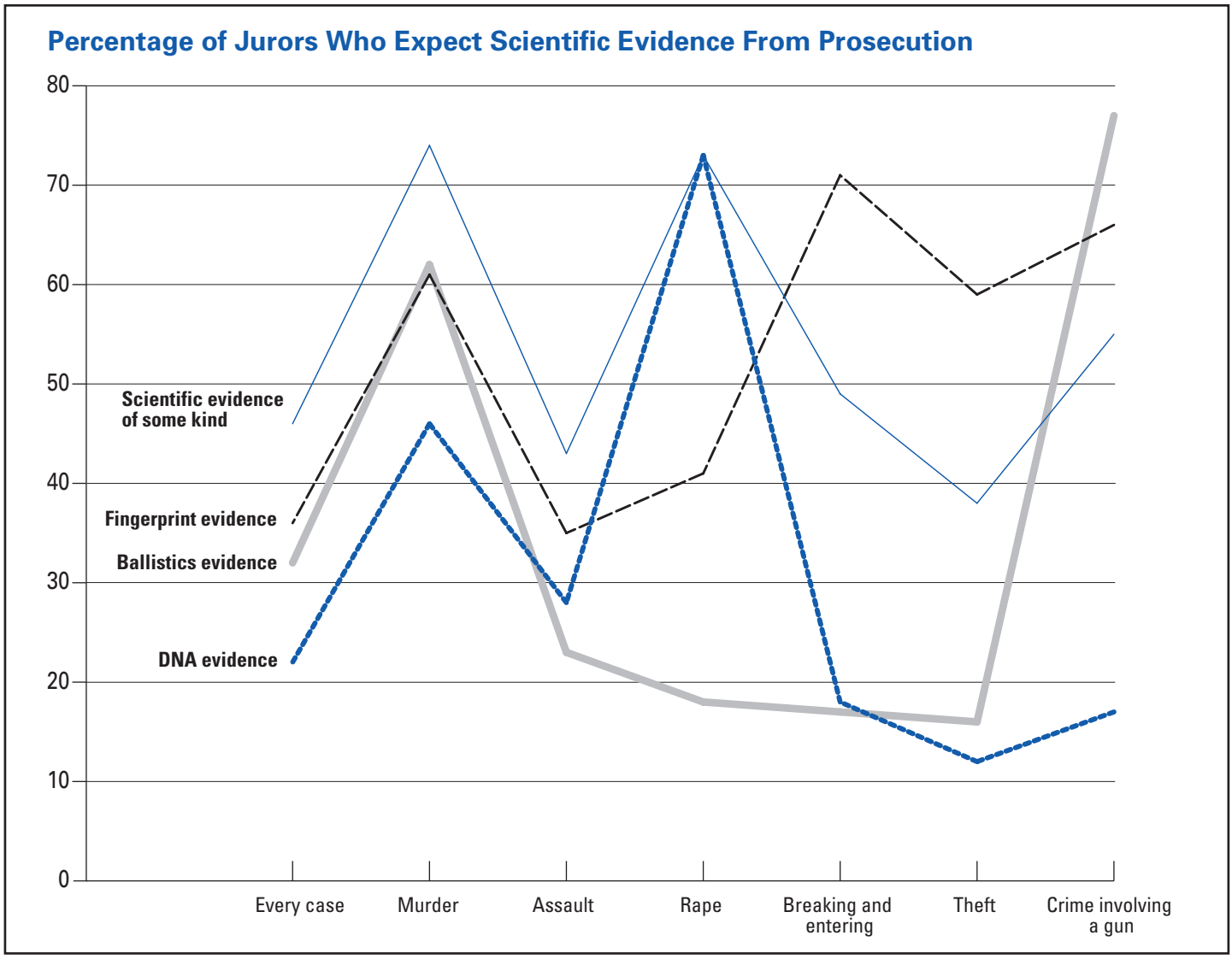
Did the survey respondents expect the prosecution to present some kind of scientific evidence? Our survey indicated that:

- 46 percent expected to see some kind of scientific evidence in *every* criminal case.
- 22 percent expected to see DNA evidence in *every* criminal case.
- 36 percent expected to see fingerprint evidence in *every* criminal case.
- 32 percent expected to see ballistic or other firearms laboratory evidence in *every* criminal case.

The findings also suggested that the jurors' expectations were not just blanket expectations for scientific evidence. Rather, expectations for particular types of scientific evidence seemed to be rational based on the type of case. For example, a higher percentage of respondents expected to see DNA evidence in the more serious violent offenses, such as murder or attempted murder (46 percent) and rape (73 percent), than in other types of crimes. Our findings also indicated that a higher percentage wanted to see fingerprint evidence in breaking and entering cases (71 percent), any theft case (59 percent), and in crimes involving a gun (66 percent). (See graphic on p. 4, "Percentage of Jurors Who Expect Scientific Evidence From Prosecution.")

The Envelope, Please . . .

It was not a surprise that *Law & Order* and *CSI* were the two most frequently watched law-related television programs (45 percent and 42 percent, respectively, of the surveyed jurors). We found that frequent *CSI* viewers also frequently watched other law-related programs, and those who did not watch *CSI* tended not to watch such programs. We also found that *CSI* viewers, in general, were more likely to be female and politically moderate. Respondents with less education tended to watch *CSI* more frequently than those who had more education.



As to how "real" a television program was perceived to be, our results indicated that the more frequently jurors watched a given program, the more accurate they perceived the program to be.

What role, then, did watching *CSI* play in the respondents' expectations and demands for forensic evidence?

Forensic Evidence and Jury Verdicts

For all categories of evidence—both scientific and nonscientific—*CSI* viewers (those who watch *CSI* on occasion, often, or regularly) generally had higher expectations than non-*CSI* viewers (those who never or almost never watch the program). But, it is possible that the *CSI* viewers may have been better informed jurors than the non-*CSI* viewers. The *CSI* viewers had higher expectations about scientific evidence that was more likely to be relevant to a particular crime than did the non-*CSI* viewers. The *CSI* viewers also had lower expectations about evidence that was less likely to be relevant to a particular crime than did the non-*CSI* viewers.

Although our study revealed that the prospective jurors had high expectations for scientific evidence, the more important question, I believe, is whether those expectations were more likely to result in an acquittal if they were not met. In

other words, do jurors *demand* to see scientific evidence before they will find a defendant guilty?

Interestingly, in most of the scenarios presented, potential jurors' increased expectations of scientific evidence did *not* translate into a demand for this type of evidence as a prerequisite for finding someone guilty. Based on our findings, jurors were more likely to find a defendant guilty than not guilty even without scientific evidence *if the victim or other witnesses testified,* except in the case of rape.[1] On the other hand, if the prosecutor relied on circumstantial evidence, the prospective jurors said they would demand some kind of scientific evidence before they would return a guilty verdict.

It's Not *CSI!*

There was scant evidence in our survey results that *CSI* viewers were either more or less likely to acquit defendants without scientific evidence. Only 4 of 13 scenarios showed somewhat significant differences between viewers and nonviewers on this issue, and they were inconsistent. Here are some of our findings:

- In the "every crime" scenario, *CSI* viewers were more likely to convict without scientific evidence if eyewitness testimony was available.
- In rape cases, *CSI* viewers were less likely to convict if DNA evidence was not presented.
- In both the breaking-and-entering and theft scenarios, *CSI* viewers were more likely to convict if there was victim or other testimony, but no fingerprint evidence.

Hypothesis and Discussion on What It Means

Although *CSI* viewers had higher expectations for scientific evidence than non-*CSI* viewers, these expectations had little, if any, bearing on the respondents' propensity to convict. This, we believe, is an important finding and seemingly very good news for our Nation's criminal justice system: that is, differences in expectations about evidence did *not* translate into important differences in the willingness to convict.

Although CSI viewers had higher expectations for scientific evidence than non-CSI viewers, these expectations had little, if any, bearing on the respondents' propensity to convict. This is an important finding and seemingly very good news for our Nation's criminal justice system.

That said, we believe it is crucial for judges and lawyers to understand juror expectations for forensic evidence. Even though our study did not reveal a so-called "*CSI* effect" at play in courtrooms, my fellow researchers and I believe that a broader "tech effect" exists that influences juror expectations and demands.

During the past 30 years, scientific advances and discoveries have led to a technology revolution. The development and miniaturization of computers and the application of computer technology to almost every human endeavor have been primary forces in new scientific discoveries. At the same time, new technology has created a revolution in information availability and transmission. The Internet is an obvious example, and, in many ways, it has been the catalyst for this ongoing revolution.

Science and information feed off each other; advancements in science are fostered by the ability of scientists to exchange and transfer information. At the same time, scientific developments almost immediately become available not only to scientists but also to the entire world. It is hardly unexpected that the media grab scientific discoveries and quickly make them part of our popular culture.

Many laypeople know—or think they know—more about science and technology from what they have learned through the media than from what they learned in school. It is those people who sit on juries. Every week, the ever-evolving scientific and information age comes marching through the courtroom door in the psyche of almost every juror who takes a seat in the box.

The Jury Is Always 'Right'

Our legal system demands proof beyond a reasonable doubt before the government is allowed to punish an alleged criminal. When a scientific test is available that would produce evidence of guilt or innocence—but the prosecution chooses not to perform that test and present its results to the jury—it may be reasonable for a jury to doubt the strength of the government's case. This reality may seem unreasonable to some, but that is not the issue. Rather, it is how the criminal justice system will respond to juror expectations.

One response to this change in expectations would be to get the evidence that jurors seek. This would take a major commitment to increasing law enforcement resources and would require equipping police and other investigating agencies with the most up-to-date forensic science equipment. In addition, significant improvements would need to be made in the capacity of our Nation's crime laboratories to reduce evidence backlogs and keep pace with increased demands for forensic analyses.[2]

Another response would be to equip officers of the court (i.e., judges, prosecutors, and defense lawyers) with more effective ways to address juror expectations. When scientific evidence is not relevant, prosecutors must find more convincing ways to explain the lack of relevance to jurors. Most importantly, prosecutors, defense lawyers, and judges should understand, anticipate, and address the fact that jurors enter the courtroom with a lot of information about the criminal justice system and the availability of scientific evidence.

The bottom line is this: Our criminal justice system must find ways to adapt to the increased expectations of those whom we ask to cast votes of "guilty" or "not guilty."

NCJ 221501

For More Information

- The complete results of this study are reported in Shelton, D.E., Y.S. Kim, and G. Barak, "A Study of Juror Expectations and Demands Concerning Scientific Evidence: Does the *'CSI* Effect' Exist?," *Vanderbilt Journal of Entertainment and Technology Law* 9 (2) (2006): 331–368, available at www.law.vanderbilt.edu/journals/jetl/articles/vol9no2/Shelton.pdf.

Notes

1. Only 14 percent of respondents said that they would find a defendant guilty in a rape case if the victim's testimony was presented without any scientific evidence; 26 percent answered that they would find the defendant not guilty without scientific evidence.
2. **Editor's Note:** For information on the National Institute of Justice's work on increasing the capacity of crime labs to process forensic evidence and reduce backlogs, see www.ojp.usdoj.gov/nij/topics/forensics and www.dna.gov.

About the Author

Donald Shelton has been a felony trial judge in Ann Arbor, Michigan, for 17 years. He is on the faculty at Eastern Michigan University (EMU) and conducted the research that is discussed in this article with two other EMU criminology professors, Young S. Kim and Gregg Barak. Shelton presented the results of the study discussed in this article at the 2007 NIJ Conference. He has written extensively on the impact of technology on the law and the right to a trial by jury.

Resources for Practitioners

Forensic Science Tools

How can science be made more understandable to people who are involved in the criminal justice process? The National Institute of Justice (NIJ) is producing tools to help ensure that science—from DNA to fingerprints, and eyewitness evidence to digital evidence—is clearly presented and reliable. Here is just a sample of the tools that NIJ offers.

- **Investigative Uses of Technology: Devices, Tools, and Techniques.** Designed primarily for detectives and forensic examiners, this *Special Report* contains a chapter on using data from cell phones, computers, caller ID, credit card instruments, pagers, voice recorders, GPS devices, and more. It also features notes on search and seizure, privacy, and other constitutional issues.
- **Investigations Involving the Internet and Computer Networks.** This *Special Report* is a resource for all practitioners—investigators, first responders, detectives, prosecutors—who want to learn more about technology-related crimes and investigative tools and techniques.
- **Digital Evidence in the Courtroom: A Guide for Law Enforcement and Prosecutors.** Criminals use computers to steal information, commit fraud, and stalk victims online. This *Special Report* (with accompanying training materials and mock trial video) discusses the legal requirements for handling digital evidence and guidelines for a successful prosecution, including a case study using this kind of evidence in a child pornography prosecution.
- **Online Training (www.dna.gov).**
  - *What Every Law Enforcement Officer Should Know About DNA Evidence*—Issues surrounding DNA evidence and its collection for first responders.
  - *Principles of Forensic DNA for Officers of the Court*—An interactive program on handling forensic DNA cases.
  - *DNA: A Prosecutor's Practice Notebook*—A wide spectrum of topics relating to the science of DNA and its legal application in the courtroom.
  - *Forensic DNA Analysts Training Courses*—Practical skills for laboratory scientists in multimedia, self-paced modules, including lab exercises.
- **Addressing Shortfalls in Forensic Science Education.** Many crime labs find that new graduates from forensic science education programs are not properly trained. This *In Short* describes the benefits of an accredited forensic science education program.

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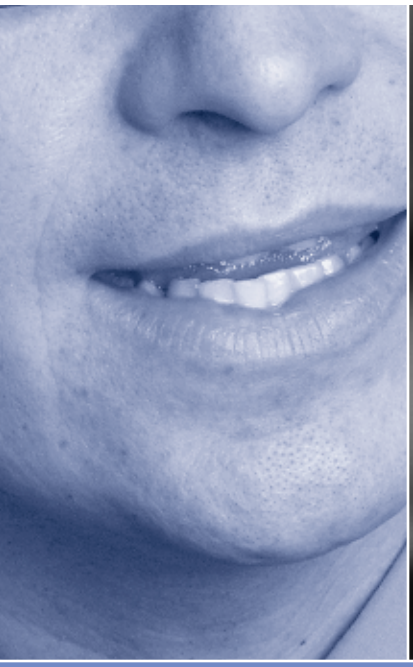
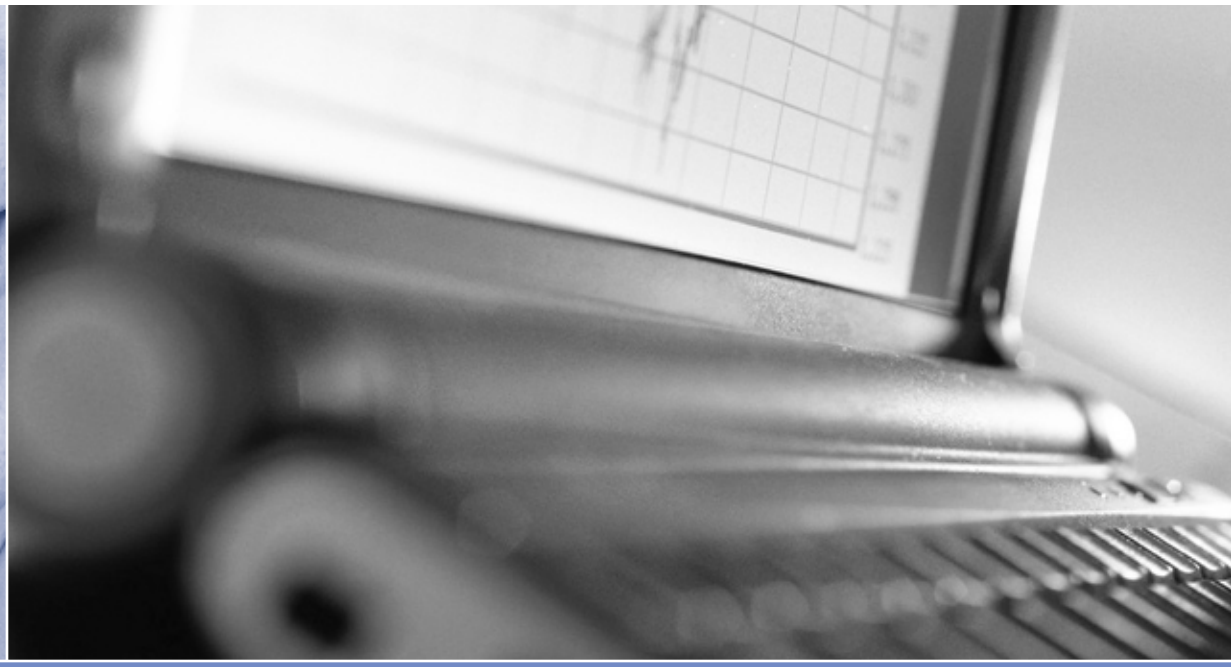




Voice Stress Analysis: Only 15 Percent of Lies About Drug Use Detected in Field Test

by Kelly R. Damphousse, Ph.D.

Law enforcement agencies across the country have invested millions of dollars in voice stress analysis (VSA) software programs.[1] One crucial question, however, remains unanswered:

Does VSA actually work?

According to a recent study funded by the National Institute of Justice (NIJ), two of the most popular VSA programs in use by police departments across the country are no better than flipping a coin when it comes to detecting deception regarding recent drug use. The study's findings also noted, however, that the mere presence of a VSA program during an interrogation may deter a respondent from giving a false answer.

VSA manufacturers tout the technology as a way for law enforcers to accurately, cheaply, and efficiently determine whether a person is lying by analyzing changes in their voice patterns. Indeed, according to one manufacturer, more than 1,400 law enforcement agencies in the United States use its product.[2] But few studies have been conducted on the effectiveness of VSA software in general, and until now, none of these tested VSA in the field—that is, in a real-world environment such as a jail. Therefore, to help determine whether VSA is a reliable technology, NIJ funded a field evaluation of two programs: Computer Voice Stress Analyzer® (CVSA®)[3] and Layered Voice Analysis™ (LVA).

Researchers with the Oklahoma Department of Mental Health and Substance Abuse Services (including this author) used these VSA programs while questioning more than 300 arrestees about their recent drug use. The results of the VSA output—which ostensibly indicated whether the arrestees were lying or telling the truth—were then compared to their urine drug test results. The findings of our study revealed:

- **Deceptive respondents.** Fifteen percent who said they had not used drugs—but

who, according to their urine tests, had—were *correctly* identified by the VSA programs as being deceptive.

- **Nondeceptive respondents.** Eight and a half percent who were telling the truth—that is, their urine tests were consistent with their statements that they had or had not used drugs—were *incorrectly* classified by the VSA programs as being deceptive.

Using these percentages to determine the overall accuracy rates of the two VSA programs, we found that their ability to accurately detect deception about recent drug use was about 50 percent.

Based solely on these statistics, it seems reasonable to conclude that these VSA programs were not able to detect deception about drug use, at least to a degree that law enforcement professionals would require—particularly when weighed against the financial investment. We did find, however, that arrestees who were questioned using the VSA instruments were less likely to lie about illicit drug use compared to arrestees whose responses were recorded by the interviewer with pen and paper.

So perhaps the answer to the question "Does VSA work?" is . . . it depends on the definition of "work."

What Is VSA?

VSA software programs are designed to measure changes in voice patterns caused by the stress, or the physical effort, of trying to hide deceptive responses.[4] VSA programs interpret changes in vocal patterns and indicate on a graph whether the subject is being "deceptive" or "truthful."

Most VSA developers and manufacturers do not claim that their devices detect lies; rather, they claim that VSA detects microtremors, which are caused by the stress of trying to conceal or deceive.

VSA proponents often compare the technology to polygraph testing, which attempts to measure changes in respiration, heart rate, and galvanic skin response.

Even advocates of polygraph testing, however, acknowledge its limitations, including that it is inadmissible as evidence in a court of law; requires a large investment of resources; and takes several hours to perform, with the subject connected to a machine. Furthermore, a polygraph cannot test audio or video recordings, or statements made either over a telephone or in a remote setting (that is, away from a formal interrogation room), such as at an airport ticket counter. Such limitations of the polygraph—along with technological advances—prompted the development of VSA software.

Out of the Lab, Into the Field

Although some research studies have shown that several features of speech pattern differ under stress,[5, 6] it is unclear whether VSA can detect *deception-related* stress. In those studies that found that this stress *may* be detectable, the deception was relatively minor and no "jeopardy" was involved—that is, the subjects had nothing to lose by lying (or by telling the truth, for that matter). This led some researchers to suggest that if there is no jeopardy, there is no stress—and that if there is no stress, the VSA technology may not have been tested appropriately.[7]

The NIJ-funded study was designed to address these criticisms by testing VSA in a setting where police interviews commonly occur (a jail) and asking arrestees about relevant criminal behavior (drug use) that they would likely hide.[8]

Our research team interviewed a random sample of 319 recent arrestees in the Oklahoma County jail. The interviews were conducted in a relatively private room adjacent to the booking facility with male arrestees who had been in the detention facility for less than 24 hours. During separate testing periods, data were collected using CVSA® and LVA.

The arrestees were asked to respond to questions about marijuana use during the previous 30 days, and cocaine, heroin, methamphetamine, and PCP use within the previous 72 hours. The questions and

Editor's Note

POLYGRAPH AND VOICE STRESS ANALYSIS: TRYING TO FIND THE RIGHT TOOL

The validity of the polygraph as a lie-detection device has been under fire for years. In 2003, the National Academy of Sciences issued a report identifying major deficiencies in polygraph technology.[9] The report and other analyses led to the research and development of potential alternatives to the polygraph; one technology that emerged is voice stress analysis (VSA).

The National Institute of Justice funded a study to evaluate two of the most popular VSA software programs in a real-world (that is, nonlaboratory) setting in which jeopardy—the threat of penalty—was present.

The study found that the average accuracy rate of these programs in detecting deception regarding drug use was approximately 50 percent—about as accurate as flipping a coin. But the research also found that subjects may be deterred from lying if they think their responses can be "proven" false.

It remains to be seen, however, if any deterrence factor dissipates as word spreads about the accuracy rate of VSA software programs. Prospective users of VSA should weigh all these factors, including that there may be an investigative, even if there is no evidentiary, use for this technology.

test formats were approved by officials from CVSA® and LVA. The VSA data were independently interpreted by the research team and by certified examiners from both companies.

Following each interview, the arrestee provided a urine sample that was later tested for the presence of the five drugs. The results of the urinalysis were compared to the responses about recent drug use to determine whether the arrestee was being truthful or deceptive. This determination was then compared to the VSA output results to see whether the VSA gave the same result of truthfulness or deceptiveness.

Can VSA Accurately Detect Deception?

Our findings suggest that these VSA software programs were no better in determining deception about recent drug use among arrestees than flipping a coin.

To arrive at this conclusion, we first calculated two percentage rates[10]:

- **Sensitivity rate.** The percentage of deceptive arrestees correctly identified by the VSA devices as deceptive.
- **Specificity rate.** The percentage of nondeceptive arrestees correctly classified by the VSA as nondeceptive.

Both VSA programs had a low sensitivity rate, identifying an average of 15 percent of the responses by arrestees who lied (based on the urine test) about recent drug use for all five drugs. LVA correctly identified 21 percent of the deceptive responses as deceptive; CVSA® identified 8 percent.

The specificity rates—the percentage of nondeceptive respondents who, based on their urine tests, were correctly classified as nondeceptive—were much higher, with an average of 91.5-percent accuracy for the five drugs. Again, LVA performed better, correctly identifying 95 percent of the nondeceptive respondents; CVSA® correctly identified 90 percent of the nondeceptive respondents.

We then used a plotting algorithm, comparing the sensitivity and specificity rates, to calculate each VSA program's overall "accuracy rate" in detecting deception about drug use.[11] We found that the average accuracy rate for all five drugs was approximately 50 percent.

Does VSA Deter People From Lying?

Although the two VSA programs we tested had about a 50-percent accuracy rate in determining deception about recent drug use, might their very presence during an interrogation compel a person to be more truthful?

This phenomenon—that people will answer more honestly if they believe that their responses can be tested for accuracy—is called the "bogus pipeline" effect.[12] Previous research has established that it is often present in studies that examine substance use.[13]

To determine whether a bogus pipeline effect existed in our study, we compared the percentage of deceptive answers to data from the Oklahoma City Arrestee Drug Abuse Monitoring (ADAM) study (1998–2004), which was conducted by the same VSA researchers in the same jail using the same protocols. The only differences—apart from the different groups of arrestees—were that the ADAM survey was longer (a 20-minute survey compared with the VSA study's 5-minute survey) and did not involve the use of VSA technology.

In both studies, arrestees were told that they would be asked to submit a urine sample after answering questions about their recent drug use. In the VSA study, arrestees were told that a computer program was being used that would detect deceptive answers.

Arrestees in the VSA study were much less deceptive than ADAM arrestees, based on responses and results of the urine test (that is, not considering the VSA data). Only 14 percent of the VSA study arrestees were deceptive about recent drug use compared to 40 percent of the ADAM arrestees. This suggests that the arrestees in the VSA study who thought their interviewers were using a form of "lie detection" (i.e., the VSA technology) were much less likely to be deceptive when reporting recent drug use. (See sidebar on p. 10, "Editor's Note, Polygraph and Voice Stress Analysis: Trying to Find the Right Tool.")

The Bottom Line: To Use or Not Use VSA

It is important to look at both "hard" and "hidden" costs when deciding whether to purchase or maintain a VSA program. The monetary costs are substantial: it can cost up to $20,000 to purchase LVA. The average cost of CVSA® training and equipment is $11,500. Calculating the current investment nationwide—more than 1,400 police departments currently use CVSA®, according to the manufacturer—the total cost is more than $16 million not including the manpower expense to use it.

The hidden costs are, of course, more difficult to quantify. As VSA programs come under greater scrutiny—due, in part, to reports of false confessions during investigations that used VSA—the overall value of the technology continues to be questioned.[14]

Therefore, it is not a simple task to answer the question: Does VSA work? As our findings revealed, the two VSA programs that we tested had approximately a 50-percent accuracy rate in detecting deception about drug use in a field (i.e., jail) environment; however, the mere presence of a VSA program during an interrogation may deter a respondent from answering falsely. Clearly, law enforcement administrators and policymakers should weigh all the factors when deciding to purchase or use VSA technology.

NCJ 221502

Notes

1. The National Institute for Truth Verification (manufacturer of CVSA®) states that more than 1,400 law enforcement agencies use its product. See www.nitv1.com/Agenciesusing.htm.
2. Ibid.
3. CVSA® was introduced into the market in 1988 by the National Institute for Truth Verification and has undergone a number of changes and system upgrades over the years. The version used in this field test was the CVSA® introduced in 1997.
4. Hopkins, C.S., R.J. Ratley, D.S. Benincasa, and J. Grieco, "Evaluation of Voice Stress Analysis Technology," *Proceedings of the 38th Annual Hawaii International Conference on System Sciences,* 2005.
5. In the few studies in which the theory behind VSA has been tested, there has generally been solid support. Cestaro, V.L., "A Comparison Between Decision Accuracy Rates Obtained Using the Polygraph Instrument and the Computer Voice Stress Analyzer (CVSA) in the Absence of Jeopardy," *Polygraph* 25 (2) (1996): 117–127; and Fuller,

The products, manufacturers, and organizations discussed in this document are presented for informational purposes only and do not constitute product approval or endorsement by the U.S. Department of Justice.

B.F., "Reliability and Validity of an Interval Measure of Vocal Stress," *Psychological Medicine* 14 (1) (1984): 159–166.

6. Researchers at the Air Force Research Laboratory concluded that two VSA devices (Lantern™ and the Psychological Stress Evaluator—a precursor of CVSA®) could measure these differences in speech patterns. Hansen, J., and G. Zhou, *Methods for Voice Stress Analysis and Classification: Final Technical Report,* Rome, NY: U.S. Air Force Research Laboratory, 1999; and Haddad, D., S. Walter, R. Ratley, and M. Smith, *Investigation and Evaluation of Voice Stress Analysis Technology,* final report submitted to the National Institute of Justice, 2002 (NCJ 193832), available at www.ncjrs.gov/pdffiles1/nij/193832.pdf.
7. Barland, G., "The Use of Voice Changes in the Detection of Deception," *Polygraph* 31 (2) (2002): 145–153. This study suggests simulated stress in a laboratory setting may not be sufficient to allow VSA to detect deception. This leads to the argument, by some VSA proponents, that mock deception in a staged (lab) scenario fails to create the necessary degree of jeopardy (and therefore stress) to stimulate a measurable response indicating deception. In an experiment in which the subject is not worried about getting "caught" because there are no real consequences or is pretending to lie, it is, they argue, more difficult for the software to detect deception, as the necessary stress levels are not present.
8. Previous arrestee studies suggest that respondents are commonly deceptive about recent drug use. Fendrich, M., and Y. Xu, "Validity of Drug Use Reports from Juvenile Arrestees," *International Journal of the Addictions* 29 (8) (1994): 971–985; Hser, Y.I., "Self-Reported Drug Use: Results of Selected Empirical Investigations of Validity," *NIDA Research Monograph* 167 (1997): 320–343; Lu, N.T., B.J. Taylor, and K.G. Riley, "The Validity of Adult Arrestee Self-Reports of Crack Cocaine," *American Journal of Drug and Alcohol Abuse* 27 (3) (2000): 399–407; Mieczkowski, T., D. Barzelay, B. Gropper, and E. Wish, "Concordance of Three Measures of Cocaine Use in an Arrestee Population: Hair, Urine, and Self-Report," *Journal of Psychoactive Drugs* 23 (3) (1991): 241–249; and Harrison, L., "The Validity of Self-Reported Data on Drug Use," *Journal of Drug Issues* 25 (1) (1995): 91–111.
9. Committee to Review the Scientific Evidence on the Polygraph, National Research Council, *The Polygraph and Lie Detection,* Washington, DC: National Academies Press, 2003.
10. Ibid.
11. Sensitivity and specificity should be examined jointly, because an overly sensitive but not specific instrument—that is, one that indicates all responses as deceptive—is not very useful. The standard way to compare these two scores simultaneously is by examining them on a receiver operating characteristic chart. Programs with high sensitivity and specificity scores will efficiently predict who is being deceptive and who is not. If either the sensitivity or the specificity score is low, the usefulness of the programs for predicting deception is diminished.
12. Jones, E.E., and H. Sigall, "The Bogus Pipeline: A New Paradigm for Measuring Affect and Attitude," *Psychological Bulletin* 76 (5) (1971): 349–364.
13. Aguinis, H., C.A. Pierce, and B.M. Quigley, "Conditions Under Which a Bogus Pipeline Procedure Enhances the Validity of Self-Reported Cigarette Smoking: A Meta-Analytic Review," *Journal of Applied Social Psychology* 23 (5) (1993): 352–373; Botvin, E.M., G.J. Botvin, N.L. Renick, A.D. Filazzola, and J.P. Allegrante, "Adolescents' Self-Reports of Tobacco, Alcohol, and Marijuana Use: Examining the Comparability of Video Tape, Cartoon and Verbal Bogus-Pipeline Procedures," *Psychological Reports* 55 (1984): 379–386; and Sprangers, M., and J. Hoogstraten, "Response-Style Effects, Response-Shift Bias and a Bogus-Pipeline," *Psychological Reports* 61 (1987): 579–585.
14. Hansen, M., "Untrue Confessions," *ABA Journal,* July 1999, 50–53; Wagner, D., "Arguments Rage Over Voice-Stress Lie Detector," *Arizona Republic,* October 10, 2005; and "Innocent Until Proved Guilty?" *ABC News,* March 30, 2006, available at www.abcnews.go.com/Primetime/story?id=1786421&page=1.

About the Author

Kelly Damphousse is associate dean of the College of Arts and Sciences and Presidential Professor of Sociology at the University of Oklahoma. He has 20 years of criminal justice and drug research experience. From 1998 to 2004, Damphousse served as the site director of the Arrestee Drug Abuse Monitoring program in Oklahoma City and Tulsa, Oklahoma. He has directed several statewide and nationwide program evaluation projects.

Books in Brief
(Based on NIJ Research)

The Crime Drop in America

Alfred Blumstein and Joel Wallman, eds.
Cambridge Studies in Criminology, 2005

According to the editors of *The Crime Drop in America,* violent crime in America shot up sharply in the mid-1980s, continued to climb until 1991, and then declined over the next 7 years to a level not seen since the 1960s. The puzzle of how and why this occurred has gone largely unsolved, they say, despite the attempts of criminologists, policymakers, politicians, and average citizens to explain it. The editors note that explanations have ranged from improvements in policing to a decline in crack-cocaine use.

The book assembles experts as they seek to identify and assess the plausible causes and competing claims of credit for the crime drop. They examine the role of guns and gun violence, prisons, homicide patterns, drug markets, economic opportunities, changes in policing, and changing demographics, with a primary focus on urban violence.

Police Innovation: Contrasting Perspectives

David Weisburd and Anthony A. Braga, eds.
Cambridge Studies in Criminology, 2006

During the last three decades, American policing has seen significant change and innovation, write the editors of *Police Innovation: Contrasting Perspectives.* In a relatively short time, they say, police began to reconsider their fundamental mission, the nature of the core strategies of policing, and the character of their relationships with the communities they serve.

This book brings together police scholars to examine innovations in policing that emerged during the last decades of the twentieth century. The focus is on:

- Community policing
- Broken windows policing
- Problem-oriented policing
- Pulling levers policing
- Third-party policing
- Hot spots policing
- Compstat
- Evidence-based policing

According to the editors, this was not intended to be an exhaustive list of innovations; instead the approach was to identify those that influenced the array of police tasks, practices, and strategies broadly affecting American policing.

Marked: Race, Crime, and Finding Work in an Era of Mass Incarceration

Devah Pager
University of Chicago Press, 2007

Marked: Race, Crime, and Finding Work in an Era of Mass Incarceration reports on a field experiment in which young men were paired, randomly assigned criminal records, and sent on hundreds of real job searches throughout Milwaukee, Wisconsin. According to the publisher, all were attractive, articulate, and capable, yet those with a "record" received less than half as many callbacks as those without criminal backgrounds. Young black applicants with clean records fared no better than white men supposedly just out of prison. The author contends that such barriers to legitimate work are an important reason that many former prisoners soon find themselves back in the circumstances that led them to prison in the first place.

Shopping Malls: Are They Prepared to Prevent and Respond to Attack?

by Robert C. Davis

The shootings in an Omaha shopping mall in December 2007 brought home, once again, what security experts have known for decades: retail malls are "soft targets." Based on surveys of private mall security directors and State homeland security officials, researchers reported in 2006 that U.S. retail malls had received "too little attention" from security officials as potential sites for terrorist and other attacks.[1]

An Assessment of the Preparedness of Large Retail Malls to Prevent and Respond to Terrorist Attack, a study funded by the National Institute of Justice, was based on data from the 3-1/2 years after the 9/11 terrorist attacks. It was performed by the Police Foundation, the Vera Institute of Justice, ASIS International, the Midwest Research Institute, Eastern Kentucky University, and Carleton University.

The researchers noted that it is the very nature of retail malls that makes them vulnerable: Large numbers of people, many carrying sizeable parcels, come and go through multiple entrances and exits, making it easy for a shooter to blend in with the crowds. Overseas, open-air street markets—the world's original malls—have similar risk factors. And natural disasters, such as fires, tornados, and earthquakes, pose many of the same security issues for malls. But regardless of the event—natural disaster or attack via automatic weapon, bomb, or chemical or biological agent—casualties in malls can be high. The December 5 shooting at Omaha's Westroads Mall left nine dead and five injured.[2]

In our research, Christopher Ortiz, Robert Rowe, Joseph Broz, George Rigakos, Pam Collins, and I examined the state of private security in U.S. shopping malls in the post-9/11 world. We found significant gaps in the emergency preparedness of malls:

- Very little money has been spent to upgrade security since 9/11.

- Training of mall security staff on preventing and responding to attacks remains inadequate.
- Hiring standards for prospective security officers have not changed substantially since 9/11.
- Risk assessments are rare, and emergency management plans are frequently developed without the input or participation of first responders.

There are several steps that could be taken to be better equipped for all emergency situations, whether terrorist attack, mass shooting and other violent acts, or natural disaster. State homeland security officials, local police, and mall owners and tenants all have roles to play in protecting the Nation's malls.

How the Study Was Conducted

My colleagues and I examined whether malls have become better prepared to respond to incidents since terrorists attacked the World Trade Center and the Pentagon on 9/11. Our investigation—designed to go beyond earlier surveys on mall security—consisted of four parts:

- **Survey of State homeland security advisors.** The U.S. Department of Homeland Security distributed a written survey to homeland security advisors in the 50 States and Puerto Rico. We received 33 responses, representing good dispersion across the country.
- **Survey of mall security directors.** Written surveys were sent to 1,371 security directors of the Nation's largest indoor retail malls; 120 completed surveys were returned. Although only 9 percent responded, there was no significant difference in response rates by mall size or geographic region.
- **State-by-State analysis of legislation.** We analyzed State laws that regulate the hiring and training of private security workers in the 50 States and the District of Columbia to determine whether statutes changed post-9/11.
- **Site visits.** We visited eight malls across the United States[3] and two malls in Israel.

The discussion in this article is based on the two surveys and the legislative analysis. See sidebar on p. 16, "U.S. Site Visits Confirm Lack of Preparedness," for a discussion of the domestic site visits.

Levels of Mall Preparedness

We asked the State homeland security advisors to characterize the level of preparedness of large malls in their States: Of the 33 who responded, 31 percent said "poor," 24 percent said "fair," 27 percent said "good," and 18 percent said "very good."

The most frequently cited reasons for the "poor" rating were inadequate training and equipment, or the opinion that private mall security would be irrelevant during an attack because the responsibility for response would fall to law enforcement. When asked how retail malls could better prepare, nearly half (15) of the security advisors endorsed improved training for security staff and emergency responders.

The need for better training was also cited by the mall security directors. Fifty-two percent of the 120 who responded said that their employees received special training on preventing and responding to terrorism; however, 50 percent also said that their mall's antiterrorism training was inadequate.

Analysis of State Laws

In our analysis of State laws—which was performed approximately 3-1/2 years after 9/11—we found that although 22 States had mandated a minimum number of hours of general training for private security officers, no State had mandated specific training on preventing or responding to terrorism.

Our legislative analysis also revealed that, at that time, two-thirds of States required some level of background investigation for prospective security officers, most commonly a criminal history check. Nearly all mall security directors said they required criminal background checks. Slightly more than half (65 directors) responded that they also required drug tests.

U.S. SITE VISITS CONFIRM LACK OF PREPAREDNESS

As part of our assessment of the preparedness of U.S. malls in the post-9/11 world (see main article), we visited eight malls in the United States. At each site, we spoke with the mall security director, local police, and local fire officials.

One of the most striking findings was that, at that time, the malls had not significantly increased their investment in security after the 9/11 terrorist attacks. Only four sites, which received Federal money through the Buffer Zone Protection Program (BZPP, funds for protecting critical infrastructure), had increased security spending beyond the rate of inflation in the 4 years after 9/11; the other four sites had not. In fact, one mall had dramatically cut its security budget.

Five of the eight malls we visited had conducted risk assessments at the instigation of the State homeland security advisor or through the BZPP application process. Without undergoing some form of risk assessment, it is difficult for mall managers to determine what to protect and which strategies to employ.

Most of the malls had prevention tactics in place, such as policies designed to monitor and restrict deliveries. Security officers were visible throughout the malls and were instructed to observe suspicious dress and patterns of behavior. Seven of the eight malls had some form of closed-circuit television, although the systems varied in sophistication: Some systems were monitored closely; others recorded events for review only after an event occurred.

All of the malls that we visited had some form of antiterrorism training for security personnel; however, the programs varied widely. Most consisted of about 4 hours of classroom training that focused on identifying potential terrorists, spotting suspicious packages, and responding to an attack. We did not find any programs that evaluated what the staff may have gained from the training.

All eight malls had written procedures for responding to a threat or emergency. Typical post-threat protocols included limiting access to critical areas of the mall and increasing security personnel. Other procedures covered evacuations, emergency communications, and, in the event of an attack, contacting emergency services and providing first aid.

At that time, none of the malls had a plan for coordinating with first responders, and only two conducted drills to rehearse emergency responses. We also discovered a significant lack of coordination between mall security and the security staffs of the mall anchor stores. Only one of the eight malls involved tenants in the emergency response plan.

Finally, we did not find any standards for evaluating the adequacy of the malls' preparedness plans. With no tabletop or live exercises—and no clear standards for evaluation—it is impossible to say how well staff would respond in a disaster.

Notably, we found that few hiring standards had changed in response to the 9/11 terrorist attacks: only 6 percent of the 120 mall security directors who responded to the survey said hiring standards were made more stringent, and just one in 10 said they required additional background verification.

Our research indicated, however, that many malls had made operational changes to improve security after 9/11. Sixty-three percent of the 120 mall security directors reported, for example, that patrol and surveillance strategies were modified post-9/11, with the most frequently reported change being the increase in security officer visibility.

Sixty of the security directors said their malls had a closed-circuit television system, the large majority of which (81 percent) were used to monitor events in real time (as opposed to taping for later review, if necessary). Thirty percent of the malls had passive barriers, or bollards, to prevent vehicles from breaching the entrance. Nearly half (49 percent) reported that their staff were instructed to be on the lookout for unusual behavior or dress of mall clients, including generally suspicious activity such as taking photos or notes of the facilities, suspicious (such as extra-bulky) clothing, and large or unusual packages.

Nearly three-quarters (73 percent) of the security directors reported that they had protocols for security staff to follow in the event of a disaster. The same proportion reported that these plans included coordinating and communicating with local law enforcement, fire, and medical first responders.

But our research revealed little cooperation in rehearsing emergency response. Only 30 percent of mall security directors held exercises to rehearse emergency protocols with first responders. Fifteen of the State homeland security advisors said they were aware of joint exercises between private security staff in some malls and local police. Only 13 of the State officials were aware of joint exercises between mall security staff and fire or EMT professionals.

More State Involvement Sought

The 120 mall security directors reported a low level of support from their State homeland security office in working to improve security. Only 3 percent characterized their State advisor as "very involved" in planning, reviewing, or approving mall security measures. Seventy-eight percent reported that their State security advisor was "not at all involved."

The mall security directors did, however, report that local law enforcement agencies were significantly more involved in mall preparedness than were their State homeland security advisors. Two-thirds characterized their local police as being "somewhat involved" in their security planning. Slightly more than one-third (36 percent) reported that their relationship with local law enforcement had become closer since 9/11.

The majority (63 percent) of security directors said they would welcome more involvement by State homeland security offices and local police, including:

- Sharing more key intelligence (40 percent).
- Conducting risk assessments or developing emergency management plans (33 percent).
- Helping to train security officers (27 percent).

When asked to identify the biggest impediment to improved mall security, the majority of the State homeland security advisors cited cost and lack of funding. Only 16 percent of the mall security directors said that their budgets had increased beyond the rate of inflation since 2001.

How Can Malls Better Prepare?

Private mall security directors and State homeland security officials could take some steps to improve emergency preparedness. Our recommendations include:

- Conducting a formal risk assessment by experts.
- Curtailing access to air circulation systems and other sensitive areas.
- Monitoring deliveries.
- Using passive barriers to prevent cars with explosives from penetrating heavily populated areas.
- Developing and rehearsing detailed and coordinated emergency response plans in coordination with first responders and mall tenants.
- Standardizing antiterrorism training by setting minimum standards for frequency, material, learning methods, and performance measures.
- Enhancing partnerships with the public sector to maximize the expertise of State homeland security officials and first responders.

These measures would not only help prepare malls against attack, but the risk assessments, emergency plans, and drills would also mitigate the impact of random acts of violence, fires, earthquakes, and other natural disasters.

NCJ 221503

Notes

1. Davis, R.C., C. Ortiz, R. Rowe, J. Broz, G. Rigakos, and P. Collins, *An Assessment of the Preparedness of Large Retail Malls to Prevent and Respond to Terrorist Attack,* final report submitted to the National Institute of Justice, December 2006 (NCJ 216641), available at www.ncjrs.gov/pdffiles1/nij/grants/216641.pdf.
2. "Police: Nine Killed in Shooting in Omaha Mall, Including Gunman," *CNN.com,* December 6, 2007, available at www.cnn.com/2007/US/12/05/mall.shooting.
3. Although we do not claim that the eight U.S. malls we visited were representative of the industry, it should be noted that the malls were geographically diverse: They were located in California, Texas, Wisconsin, and Utah.

About the Author

Robert Davis is senior research analyst for the RAND Corporation. At the time of the research discussed in this article, he was with the Police Foundation. Davis has directed projects on policing, domestic violence, victimization, crime prevention, courts, prosecution, and parole reentry. He is the author of two books on crime prevention and editor of five books on crime prevention and victimization.

Software Defined Radios Help Agencies Communicate

by Joseph Heaps

During Hurricane Katrina in August 2005, winds and floods knocked out virtually every form of communication: landline service, cellular phone service, the Internet, and radio transmission. Even when radio equipment did work, law enforcement officials and emergency crews were unable to communicate with one another because their radio systems were incompatible. This caused confusion and delay and made it nearly impossible for officials to coordinate missions.[1]

During emergency situations—whether a natural disaster like Katrina, large transportation accident, or terrorist attack—public safety officials from different agencies (in some cases, different counties and States) must be able to effectively communicate with each other. If they cannot share information quickly, critical time will be wasted and lives could be lost. Unfortunately, police officers, firefighters, and emergency medical personnel cannot always depend on wireless radio communications during natural disasters, major accidents, or criminal activities because their radio systems are often incompatible.

New technology is emerging that will enable public safety officials to exchange information seamlessly: experts call it "interoperability." One of the most promising of these technologies is software defined radio (SDR) systems.

SDR is a type of radio that uses software to control a radio's operating parameters and protocols, allowing the radio to be updated and reconfigured, thus minimizing the need to change existing hardware. SDR can overcome the challenges of incompatible communications systems by allowing radios to be easily updated with new functions, protocols, and standards. Most police radios today cannot be easily reconfigured to implement new capabilities, and as a result, incorporating new communications

AN ANALOGY: HOW DOES SOFTWARE DEFINED RADIO WORK?

The basic concept of software defined radio (SDR) is fairly simple. Think of your home computer. When you want to upgrade some software, you install a new program—you would not look to replace your hardware. SDR works in an analogous way: the user upgrades or reconfigures the radio simply by running new software, thus minimizing changes to the actual radio.

technology into an agency's operations can take decades. SDR technology has the potential to break that cycle by helping to ensure that the investment a department makes today does not lock it into limited solutions for many years. SDR enables new technology to be introduced without replacing the whole system and allows interoperability to be maintained without having to move all users to the new technology at the same time.

The good news is that some elements of SDR technology exist in most public safety radios manufactured today; the bad news is that the full potential of SDR for public safety communications is yet to be realized. Before this can happen, significant technical, operational, and regulatory concerns must be addressed. The National Institute of Justice (NIJ)—through partnerships and research grants—is working to help resolve these issues and accelerate the progress of SDR technology so that public safety officials can communicate effectively with each other and save lives.

Independent Purchasing Yields Incompatible Radios

Traditionally, local police departments and other public safety organizations make independent purchasing decisions for mobile communications devices. With more than 50,000 independent organizations making these decisions—based primarily on local factors—it is not surprising that the field is filled with incompatible communications systems. Further complicating matters, Federal agencies do not generally use the same frequency bands as State and local agencies, making it difficult to coordinate during a major incident.

Significant strides have been made in linking incompatible radio systems to improve first responders' ability to communicate. For example, current technology allows the transmission on one radio system to be rebroadcast on one or more systems. Such rebroadcasts, however, have limitations. Transmitting on a separate channel for every connected radio system is an inefficient use of scarce frequency resources. Channels may also be incorrectly or inadvertently linked, causing communication problems.

Where Does SDR Come In?

SDR technology is increasingly finding its way into public safety products. Some of today's radios use SDR technology to support multiple "protocols," which are the operating rules for communication transmissions. Yet the real future promise of SDR technology is to implement radios that operate:

- On multiple frequency bands.
- Using multiple services, such as two-way radio, cellular, and wireless data.

Multifrequency band radios could include software that controls operating parameters, such as frequency, and allows the radio to be reconfigured, as needed, as one of the three main frequency bands used by public safety officials: (1) very high frequency, or VHF; (2) ultra-high frequency, or UHF; or (3) 800 megahertz (MHz). This approach has been implemented in military radios but has yet to be incorporated in radios used by public safety personnel. The intent in the public safety arena is to allow users to eventually communicate with systems operating on frequency bands

SDR can overcome the challenges of incompatible communications systems by allowing radios to be easily updated with new functions, protocols, and standards.

other than their normal "home" systems—for example, a radio could be developed that includes both an 800-MHz capability used by a city police force and a VHF capability used by sheriffs' departments in the surrounding counties.

Software could also be developed to further support interoperability by enabling the user to communicate with other responders using both voice and data—such as Wi-Fi and commercial cellular capabilities—and to configure the device to the system needed at a particular moment. These abilities would allow, for example, responders who are called to a scene outside of their coverage area to participate fully in the emergency response.

Saving Taxpayer Dollars

Although the major benefit of SDR technology for public safety is increased interoperability—and how that translates into saving lives—other benefits include potential cost savings over the life of the radio equipment. SDR would allow police departments to easily:

- Upgrade individual pieces of equipment with new features and new communications protocols.
- Upgrade an entire communications system.
- Add new frequencies as they become available.

With respect to upgrading an entire communications system, SDR basestations could communicate via old and new devices until all equipment is upgraded, or equipment could be configured as needed during transition periods. Reprogramming transmitted over the air from the basestation to radios would reduce the labor and coordination of physically reprogramming radios.

Another significant benefit of SDR is the enhancement of cognitive capabilities. A cognitive radio, for example, can sense its environment and adjust its operating parameters accordingly. Although it does not need to be an SDR, the capability to rapidly adjust operating parameters in real time can be implemented very effectively through software.

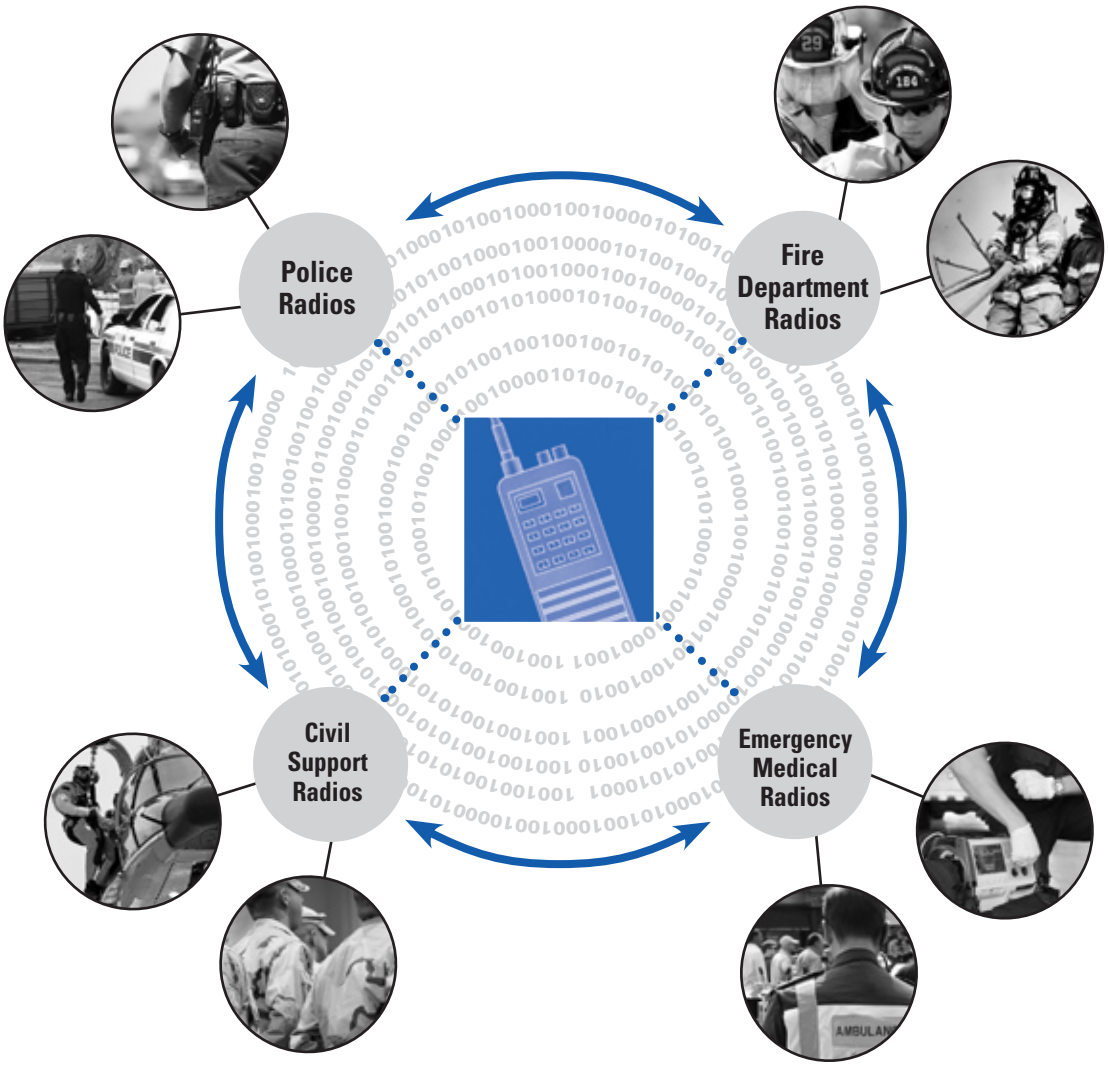
Equipment, Security Challenges

To make SDR technology useful and affordable for law enforcement and other public safety organizations, some key issues must be addressed:

- **Equipment.** Antennas and front-end processing continue to present challenges. Efficient antennas that can simultaneously handle VHF, UHF, and 800-MHz frequencies remain too large for portable use. In addition, development must work toward accommodating different frequency bands. As the frequency range of bands increases, the physics of the antenna present greater design challenges. For example, extending the range to low-band VHF is particularly difficult.

  Also, although solutions exist for increasing a radio's processing, memory, and power, they add weight and reduce the time that a battery remains charged, neither of which is acceptable to public safety agencies. Therefore, additional innovative processing approaches are needed.
- **Security.** Although SDRs are not inherently insecure, the potential impact of viruses or other malicious code is much greater with highly reconfigurable radios, particularly as over-the-air reprogramming occurs. The development of effective security measures will be essential in the deployment of SDR technologies.
- **Standards.** The U.S. Department of Defense has developed SDR standards for all new military radios under the

Software Defined Radio: Connecting Public Safety Officials



Joint Tactical Radio System. Whether these standards (designed to meet military requirements) are suitable for public safety communications remains an open question.

- **Understanding the pros and cons.** Cost-benefit analyses are needed so that vendors and public safety organizations have a better understanding of appropriate price points for SDR. For example, how much extra is reasonable for the purchase of a multiband radio? Can vendors produce equipment at that price point? And it is crucial that such a cost-benefit analysis of SDR consider not only the unit-cost level but, more importantly, the life cycle or advantages of SDR over time.

Current solutions for increasing a radio's processing, memory, and power add weight and reduce the time a battery remains charged—neither of which is acceptable to police officers.

Working to Advance SDR Technology

To help address these issues and advance SDR technology for public safety officials, NIJ has implemented a multifaceted strategy.

In 2002, NIJ began to work with the Software Defined Radio Forum, an international consortium of organizations that promote the development and application of public safety radios. Within the SDR Forum, the Public Safety Special Interest Group—chaired since its creation by an NIJ grantee from the National Law Enforcement and Corrections Technology Center–Northeast (NLECTC–NE)—is working on two major initiatives:

- Developing a cost model that will allow vendors and users to identify critical price points for SDR and to perform cost-benefit analyses.
- Identifying opportunities for cognitive technology to improve responders' ability to communicate.

NIJ supports IEEE P1900, a committee that is developing standards for advanced radio concepts and cognitive radio technology.

The Institute is also funding two research and development projects at the Virginia Polytechnic Institute and State University. In the first project, Charles Bostian, Ph.D., and his colleagues are conducting research on cognitive radio for public safety applications. They have developed a prototype radio that is aware of its environment and can identify available frequencies and communicate on them. In the second project, Steve Ellingson, Ph.D., is developing a low-cost prototype multiband radio that will operate in the most common law enforcement radio bands. The architecture of this radio will become "open source"—that is, available to anyone or any company at no cost.

Finally, NIJ is funding three major projects to evaluate SDR technologies in the field:

- Building a prototype software defined, multiband conventional emergency radio that complies with the current standard for public safety radio communications (University of Texas–Dallas).
- Placing multiband military radios in a police department on an experimental basis to evaluate operational issues (NLECTC–NE).
- Developing ergonomically appropriate SDR technology for the public safety community (University of Notre Dame).

For more information on this work, see www.ojp.usdoj.gov/nij/topics/technology/communication, or contact NLECTC–NE at 888–338–0584.

SDR technology holds significant promise for addressing critical issues in public safety communications, including interoperability, performance enhancement, and life-cycle cost reduction. More work remains to be

About the Author

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done, however, and operational limitations and issues regarding security and standards need to be addressed. As SDR technology evolves, police officers will be able to respond more effectively to emergency situations and save lives.

NCJ 221504

Note

1. Warrick, J., "Crisis Communications Remain Flawed," *Washington Post,* December 10, 2005, A06; and Joch, A., "Communications Breakdown," *Federal Computer Week,* December 5, 2005.

Editor's Correction

Forensic Databases: Paint, Shoe Prints, and Beyond

In the last issue of the *NIJ Journal* (October 2007), the article "Forensic Databases: Paint, Shoe Prints, and Beyond" contained inaccuracies on the two databases maintained by the U.S. Secret Service. Here are corrected descriptions of the databases.

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.

The revised article and downloadable PDF are available at www.ojp.usdoj.gov/nij/journals/258/forensic-databases.html.

Prison Rape: Research Explores Prevalence, Prevention

by Pat Kaufman

An estimated 60,500 inmates—4.5 percent of the Nation's prisoners—report experiencing sexual violence ranging from unwanted touching to non-consensual sex, according to a recent Bureau of Justice Statistics (BJS) survey of Federal and State inmates.[1] A separate BJS survey found that more than 6,500 official allegations of prison sexual violence were reported to correctional officials in 2006.[2]

The two BJS studies offer different data that contribute to our understanding of the prevalence of prison sexual violence. For years, there were limited data on the topic, and the few researchers who ventured into this complex and controversial area were confronted with a host of obstacles, including:

- Low response rate from victims due to embarrassment or fear of reprisal.
- Challenges in verifying victims' self-reports.
- Lack of common terminology to describe sexual abuse.[3]

All that began to change in 2003 when the U.S. Congress crafted a wide-ranging legislative response. The Prison Rape Elimination Act of 2003 (PREA), passed unanimously by the House and the Senate, established a "zero-tolerance standard" for prison rape and mandated that the U.S. Department of Justice (DOJ) "make the prevention of prison rape a top priority in each prison system."[4]

One of the goals of PREA was to increase the data and information on the incidence of prison rape to help improve management and administration in regard to sexual violence in correctional facilities. The law also created an independent National Prison Rape Elimination Commission, which was charged with studying the impact of sexual assault in correction and detention facilities and developing national standards to address the problem.[5]

Today, 4 years after PREA became law, we have a more complete picture of sexual

THE PRISON RAPE ELIMINATION ACT OF 2003 DEFINES RAPE

In the Prison Rape Elimination Act of 2003, "rape" is defined as "carnal knowledge" (contact between the penis and the vulva or penis and the anus, including penetration of any sort, however slight), "oral sodomy" (contact between the mouth and the penis, the mouth and the vulva, or the mouth and the anus), sexual assault with an object, or sexual fondling of a person:

- Forcibly or against that person's will.
- Not forcibly or against the person's will, where the victim is incapable of giving consent because of his or her youth or temporary or permanent mental or physical incapacity.
- Achieved through the exploitation of the fear or threat of physical violence or bodily injury.

violence in prisons, providing prison officials and policymakers with the information and assistance they need to address this complex problem.

Congress Responds to Prison Rape

When Federal lawmakers wrote PREA, they cited concerns of inadequate training of prison staff, under-reporting by victims, threats to prison security, and the danger to public safety posed by abused inmates after they are released. The Act's imperative was clear: obtain an accurate understanding of the extent and effects of prison rape in Federal, State, and local institutions.[6]

Taking a multipronged approach, PREA assigned specific responsibilities:

- A comprehensive statistical review by BJS of the incidence and effects of prison rape.
- The creation of a DOJ review panel to conduct hearings, with subpoena power over officials who run the three facilities with the highest incidence and the two facilities with the lowest incidence of prison rape.
- The requirement that the National Institute of Corrections (NIC) provide training and technical assistance and serve as a national information clearinghouse.
- The award of grants—developed and administered by the Bureau of Justice Assistance (BJA)—to assist States in implementing PREA's requirements.
- The award of research grants by the National Institute of Justice (NIJ) to address issues exclusive of the preva-lence or extent of the problem of prison rape, which the U.S. Congress put on BJA's agenda.
- The creation of a Federal commission to develop national standards for the detection, prevention, reduction, and punishment of prison rape, with the caveat that the commission would not be able to recommend standards that would add costs to prison administration.[7]

See sidebar on p. 26, "Four Years Later: Progress on Many Fronts."

To accomplish these goals, annual appropriations of $60 million for each fiscal year from 2004 through 2010 were authorized. In the Act, the U.S. Congress issued a stern warning to State officials who demonstrated "indifference" to protecting prisoners from sexual assault, stating, "States that do not take basic steps to abate prison rape by adopting standards . . . are not entitled to the same level of Federal benefits as other States."[8]

NIJ's work under PREA has yielded important research-based evidence to improve knowledge, practice, and policy to address sexual violence in prisons. Three major research efforts are discussed below.

The Nature of Prison Sexual Violence

In 2006, James Austin, Ph.D., and his associates at the JFA Institute issued findings regarding sexual violence in the Texas prison system,[9] the third largest prison

FOUR YEARS LATER: PROGRESS ON MANY FRONTS

Today, 4 years after the Prison Rape Elimination Act of 2003 (PREA) became law, progress has been made on many fronts:

- The Bureau of Justice Statistics (BJS) has developed uniform definitions of sexual violence, and in 2007, it released the results of its third annual national survey of reported allegations and the outcome of follow-up investigation in adult correctional facilities. The sample included 344 local jail jurisdictions that participated in the survey, assisting BJS in developing and implementing survey instruments and protocols. According to this review of administrative records, 47 percent of the estimated 6,528 official allegations of prison sexual violence in 2006 involved sexual violence between inmates and 53 percent involved corrections staff.[10]
- In a separate 2007 study, BJS reported victimization based on anonymous surveys completed by a sample of male and female inmates currently in State prisons (and not, as in the BJS annual national survey referenced above, based on official allegations reported to correctional officials). According to the survey, approximately 27,500 inmates reported an incident of sexual victimization involving another inmate; 38,600 reported an incident involving facility staff.[11] (For more information on the methodology of both studies, see www.ojp.usdoj.gov/bjs.)
- The Review Panel on Prison Rape held its first hearing in November 2006 at the California State Prison in Sacramento. (For more information, see www.ojp.usdoj.gov/reviewpanel.)
- The National Institute of Corrections (NIC) has held workshops across the Nation for senior correctional administrators to share ideas, strategies, plans, and programs related to PREA initiatives. In addition, NIC has developed a package of materials that includes videos *(Responding to Prisoner Rape* and *Assessing Your Agency's Response to Prison Sexual Assault),* a resource CD, and a slide presentation about PREA.[12] (For more information, see www.nicic.org.)
- The Bureau of Justice Assistance has awarded more than $10 million to 16 States to train staff, buy and install surveillance equipment, develop advisory boards, pay for medical services for victims and predators, supply additional housing to safeguard victims, and add sexual assault awareness to inmate orientation programs.[13] (For more information, see www.ojp.usdoj.gov/bja.)
- The eight-member National Prison Rape Elimination Commission—which operates independently of the U.S. Department of Justice—has held public hearings around the country to, as Congress ordered, "carry out a comprehensive legal and factual study of the penological, physical, mental, medical, social, and economic impacts of prison rape in the United States."[14] The commission is in the process of developing national standards for the detection, prevention, reduction, and punishment of prison rape. (For more information, see www.nprec.us.)

system in the Nation. The researchers chose this system because it had the highest rate of alleged incidents (550 alleged incidents, for a rate of 3.95 per 1,000 prisoners); on the other hand, it also has one of the lowest substantiation rates (less than 3 percent). In studying the number and nature of sexual assault allegations in this system from 2002 to 2005, they assembled "lessons learned" to help reduce sexual assaults across all correctional systems.

Among their findings in *Sexual Violence in the Texas Prison System:*

- **White inmates are attacked more than any other race.** Nearly 60 percent of the 43 "sustained" incidents—those proven to be true by an investigation—involved a white victim.
- **Victims are generally younger than their assailants.** The average age of victims in "sustained" cases was 3 years younger than the assailants.

- **Mentally ill or intellectually impaired inmates are more likely to be victimized.** Although only 12 percent of the allegations involved a mentally ill or intellectually impaired prisoner, this percentage is 8 times the proportion of mentally ill inmates in the general prisoner population (1.6 percent).
- **Cellblocks with solid cell fronts may contribute to sexual assault.** Solid cell fronts, while permitting privacy for the inmates and reducing noise within the unit, also provide the degree of privacy that permits sexual assaults to occur. Unlike older prison designs, in which the cell fronts consist of bars, solid doors limit visual observation by staff and, to some degree, soundproof the cells to the point that staff have difficulty hearing what is going on in individual cells.

The researchers made several recommendations, including that officials provide more structured opportunities to report sexual assault and that prisoners who have been implicated in such incidents be closely monitored. The researchers also recommended that a better system of categorizing victims and assailants be considered and provided a characteristics checklist for correctional officials to use to help identify potential victims and assailants.

The Prisoner's View

In another NIJ-funded project, researchers under the direction of Mark Fleisher, Ph.D., of Case Western Reserve University and Jessie Krienert, Ph.D., of Illinois State University conducted a sociocultural study of prison sexual violence in men's and women's high-security prisons across the United States.[15] The investigators interviewed a large cross section of inmates (408 males and 156 females in 30 prisons across 10 States) and allowed them to express their perceptions on prison sexual violence. In their report *The Culture of Prison Sexual Violence,* the investigators identified major attitudes and beliefs that inmates have about prison sexual assault, including:

- Inmate culture has a complex system of norms on sexual conduct. An act of sexual violence that occurs in one context may be interpreted differently in another context. Interpretation depends on the pre-assault behavior of the victim and the assailant, as well as other inmates' perceptions of the causes of the sexual violence.
- Inmates "self-police" against unwanted sexual predators and maintain protective relationships to facilitate safety from physical and sexual abuse.
- Inmate sexual culture allows inmates to disagree on the meaning of sexual violence in similar contexts. Some inmates may interpret sexual violence as rape, whereas other inmates may interpret a similar act as other than rape. The response of a victim toward an aggressor after the act of sexual violence plays a key role in an inmate's interpretation of sexual violence.
- Inmates judge prison rape as detrimental to the social order within the prison community—prison rapists are unwelcome.

The researchers offered approaches for observing and supervising inmates that would help correctional officers identify sexual aggressors and preempt violent encounters—such as having officials observe who prisoners spend time with and which prisoners appear fearful of using the shower—to gain direct input on potential pairings of sexual aggressors and victims. They also recommended orientation for new inmates that provides a balanced account of sexual and other types of violence and improved mechanisms for victims to report rape.

Correctional Departments Address Prison Sexual Violence

In 2006, Janine Zweig, Ph.D., of the Urban Institute, Rebecca Naser, Ph.D., of Peter D. Hart Research Associates, Inc., John Blackmore of the Association of State Correctional Administrators, and Megan Schaffer of the John Jay College of Criminal Justice issued the report *Addressing Sexual Violence in Prisons: A National Snapshot of Approaches and Highlights of Innovative Strategies.*[16] This wide-ranging study

WEB SITE, WEB CHAT ON SEXUAL VIOLENCE IN PRISON

For more information on sexual violence in prisons—including an overview of the Prison Rape Elimination Act of 2003 (PREA), current research findings, descriptions of ongoing work by the National Institute of Justice (NIJ) and other Federal agencies to address prison rape, and links to additional resources—see www.ojp.usdoj.gov/nij/topics/corrections/prison-rape.

NIJ, along with the Government Innovators Network at Harvard University's John F. Kennedy School of Government, sponsored a Web chat on prison sexual violence on February 7, 2008. Web chat participants discussed the status of PREA research, as well as innovative practices to prevent sexual violence in prisons. For more information, see www.innovations.harvard.edu/xchat.html.

provided a national snapshot of U.S. Department of Corrections (DOC) initiatives to address prison sexual violence and identified specific practices that are particularly promising or innovative in nature.

The NIJ-funded research consisted of written surveys and telephone interviews with DOC officials in 45 States and site visits to selected facilities from November 2004 to September 2005 to gain insight into States' overall approaches to prison sexual violence. At the time of the survey and interviews—just over a year after PREA became law—33 of the 45 State departments had prison sexual violence policies in place. Twenty-three departments had comprehensive policies addressing prevention and detection of prison sexual violence, response to incidents, training, and services for victims; 10 other States had policies relating to most of these issues. Meanwhile, nine additional States were actively developing comprehensive prison sexual violence policies. Since this study was completed, many States have created, enhanced, or changed their policies in response to PREA.

Many States share a common theme in their new policies and procedures: a commitment at the most senior levels to change the correctional culture, thereby affecting the attitudes of staff and inmates. The researchers highlighted several States with promising practices, such as Oregon, which mandates training for all staff on inappropriate sexual conduct and sexual violence and offers inmate education on reporting mechanisms and services for victims. But the researchers also found a familiar litany of barriers to the effective investigation and prosecution of prison sexual violence in many States, including inmate unwillingness to report victimization, staff fear of false allegations, lack of staff training, and delayed reporting of incidents.

Working Together

Correctional authorities continue to address this complex problem, participating in training offered by NIC and working together with Federal agencies on research and program development. With the implementation of PREA and the active engagement of correctional officials, a multifaceted effort to understand the extent of prison sexual violence and to identify solutions for reducing it is well under way.

NCJ 221505

Notes

1. The survey was done via an audio-assisted computer program in which the inmates, using a touch-screen laptop, answered a questionnaire and followed instructions via headphones. Inmates were asked about sexual victimization that occurred at the facility during the last 12 months; those who had served less than 12 months were asked about their experience since they had arrived at the facility. The study looked at a range of sexual victimization by inmates and staff: oral, anal, or vaginal penetration; handjobs; touching of the inmate's buttocks, thighs, penis, breasts, or vagina in a sexual way; and other sexual contacts. See Beck, A.J., and P.M. Harrison, *Sexual Victimization in State and Federal Prisons Reported by Inmates, 2007,* Bureau of Justice Statistics Special Report, December 2007 (NCJ 219414), available at www.ojp.usdoj.gov/bjs/pub/pdf/svsfpri07.pdf.
2. Following an investigation, more than half of the allegations (55 percent) were unsubstantiated; more than a quarter (29 percent) were determined not to have occurred. Seventeen percent of the allegations were substantiated. See Beck, A.J., P.M. Harrison, and D.B. Adams, *Sexual Violence Reported by Correctional Authorities, 2006,* Bureau of Justice Statistics Special Report, August 2007 (NCJ 218914), available at www.ojp.usdoj.gov/bjs/pub/pdf/svrca06.pdf.

3. Gaes, G.G., and A.L. Goldberg, *Prison Rape: A Critical Review of the Literature,* working paper submitted to the National Institute of Justice, March 2004 (NCJ 213365), available at www.nicic.org/Downloads/PDF/2004/019813.pdf.
4. Prison Rape Elimination Act of 2003, Public Law 108-79, 117 Stat. 972, U.S. Congress (108th 1st Session), September 2003: Sec. 3, 3, available at www.spr.org/pdf/PREA.pdf.
5. National Prison Rape Elimination Commission Web site, available at www.nprec.us.
6. Prison Rape Elimination Act of 2003, Public Law 108-79, 1.
7. Ibid, 1–19.
8. Ibid, Sec. 2, 2.
9. Austin, J., T. Fabelo, A. Gunter, and K. McGinnis, *Sexual Violence in the Texas Prison System,* final report submitted to the National Institute of Justice, September 2006 (NCJ 215774), available at www.ncjrs.gov/pdffiles1/nij/grants/215774.pdf.
10. Beck, Harrison, and Adams, *Sexual Violence Reported by Correctional Authorities, 2006,* 3.
11. Beck and Harrison, *Sexual Victimization in State and Federal Prisons Reported by Inmates, 2007,* 2.
12. *Report to the Congress of the United States on the Activities of the Department of Justice in Relation to the Prison Rape Elimination Act (Public Law 108-79),* National Institute of Corrections, September 2006 (Accession number 022675), available at http://nicic.org/Library/022675.
13. Ibid.
14. Prison Rape Elimination Act of 2003, Public Law 108-79, Sec. 7, 10.
15. Fleisher, M.S., and J.L. Krienert, *The Culture of Prison Sexual Violence,* final report submitted to the National Institute of Justice, November 2006 (NCJ 216515), available at www.ncjrs.gov/pdffiles1/nij/grants/216515.pdf.
16. Zweig, J.M., R.L. Naser, J. Blackmore, and M. Schaffer, *Addressing Sexual Violence in Prisons: A National Snapshot of Approaches and Highlights of Innovative Strategies, Final Report,* final report submitted to the National Institute of Justice, January 2007 (NCJ 216856), available at www.ncjrs.gov/pdffiles1/nij/grants/216856.pdf.

About the Author

Pat Kaufman is an attorney and freelance writer with more than 10 years of experience in legal writing and editing, mainly in the areas of drug enforcement, particularly in Fourth Amendment privacy and search and seizure issues; criminal drug testing involving violations of probation and supervised release by drug offenders; and corrections law.

In Memoriam: Paul Cascarano

by Mary G. Graham

In August 2007, Paul Cascarano—a pioneer in translating criminal justice research into practice—died. He was 76 years old. Here are just some accomplishments of his 30-year career at the National Institute of Justice (NIJ), which culminated in his position as assistant director of the agency.

In 1968, when Paul Cascarano joined the National Institute of Law Enforcement and Criminal Justice—predecessor to NIJ—he became part of a small team that launched one of the Nation's first programs of criminal justice research.

Cascarano spearheaded NIJ's early work in identifying model criminal justice programs, documenting them in easy-to-read manuals that were widely disseminated, and providing training to policymakers, local officials, and managers. One dissemination method he used was the regional training workshop: in 1976, for example, Cascarano—drawing on NIJ research about the difficulties often experienced by rape victims after reporting crimes—helped develop training for police, prosecutors, emergency room doctors, and citizens' groups. These sessions often represented the first time that such diverse groups of professionals sat down at the same table.

He also spearheaded the effort to make the National Criminal Justice Reference Service (NCJRS) the premier information clearinghouse it has become. When he assumed responsibility for NCJRS, its database included 7,000 documents. Today, the collection includes more than 190,000 publications, reports, articles, and audiovisual products from around the United States and the world.

"The Institute owes Paul a great debt," said Gerald Caplan, director of NIJ from 1973 to 1977. "He was creative and farsighted, and his work as head

Left photo: Paul Cascarano. Right photo: The Partnership Against Violence Network receives the "Hammer Award" (from left to right) Jamie Gorelick, Paul Cascarano, and Vice President Al Gore.

of [what was then] the Technology Transfer Division resulted in the successful implementation and marketing of Institute research and demonstration programs throughout the Nation."

Believing that NIJ should offer criminal justice professionals the kind of annual research review that many other fields use, Cascarano commissioned Norval Morris and Michael Tonry in 1977 to create *Crime and Justice: An Annual Review of Research.* Over the years, NIJ supported 25 volumes in the series, which quickly became—and remains today—one of the most frequently cited journals in the criminal justice community.

Beyond his efforts to maximize NIJ's dissemination of best practices through publications like *Research in Briefs* and the *NIJ Journal,* Cascarano used innovative ways to reach wider audiences. "Paul's creativity played a critical role in NIJ's growth and development," said Laurie Robinson, former Assistant Attorney General for the Office of Justice Programs. "He made a large contribution."

Under his leadership, *Crime File*—a series of 32 videotaped discussions on crime control among frontline professionals and scholars, moderated by James Q. Wilson—was broadcast on public television stations. Between 1985 and 1994, 54,000 of these videos were distributed and viewed in scores of classrooms and other lecture and discussion sessions.

During this period, drug problems were escalating in the Nation's cities. An NIJ-supported pilot project in the Pretrial Services Agency in Washington, D.C., used urinalysis for drug testing arrestees to give judges important information in their decisions regarding pretrial release and conditions to impose if an arrestee were released pending trial. Cascarano explored the expansion of this project, working with researchers to develop the Drug Use Forecasting program. By the 1990s, this became the Arrestee Drug Abuse Monitoring program, which was carried out in 40 U.S. communities.

"The Institute owes Paul a great debt. He was creative and farsighted, and his work as head of [what was then] the Technology Transfer Division resulted in the successful implementation and marketing of Institute research and demonstration programs throughout the Nation."

–Gerald Caplan
NIJ Director, 1973–1977

With the 1994 Crime Act came an increased focus on combating violent crime. Cascarano was involved in evaluating new approaches in community policing, drug courts, and corrections. At the same time, NIJ continued its push for new technologies to disseminate criminal justice innovations. One such initiative that benefited from Cascarano's leadership was the Partnership Against Violence Network (PAVNET), an online consortium through which Federal agencies could share their research findings. PAVNET earned NIJ an award from the National Partnership for Reinventing Government (see photograph on p. 30).

Cascarano's death prompted tributes from many former NIJ colleagues, including Jeremy Travis, director of the Institute from 1994 to 2000. Travis described Cascarano as "a visionary who believed deeply in the value of research as a tool to help practitioners deal with real problems . . . . He left an impressive legacy."

NCJ 221506

About the Author

Mary Graham is a freelance writer with more than 30 years of experience in criminal justice writing. She retired as communications director at the National Institute of Justice in 1999.

Cost, Performance Studies Look at Prison Privatization

by Gerry Gaes, Ph.D.

Seven percent of the 1.5 million prisoners in the United States are held in privately operated prisons, according to the most recent survey of prisons published by the Bureau of Justice Statistics.[1] At midyear 2006, there were 84,867 State inmates and 27,108 Federal inmates in privately operated prisons—a 10-percent increase over the previous year.

The overall percentage of adults in private prisons is relatively small, but the actual impact for some States may be much greater. An article in *The New Mexican,* for example, suggested that New Mexico was overpaying millions of dollars to private providers that were housing more than 40 percent of the State's inmate population.[2]

Thus, it is vital that policymakers have the best possible cost and quality information when they are making decisions regarding privatizing prisons in their jurisdiction. But what criteria should prison administrators and policymakers use when making cost and quality evaluations?

To help answer these questions, the National Institute of Justice (NIJ) assembled researchers, prison officials, private service providers, and proponents and opponents of prison privatization on March 28, 2007, to discuss this complicated and often controversial issue. At the core of the meeting was a rare occurrence: two cost and performance analyses of the same four prisons—one privately operated and three publicly operated—with different findings. The two reports are referred to in this article as the "Taft studies."[3]

One of the Taft studies was conducted by Doug McDonald, Ph.D., principal associate with Abt Associates Inc. (referred to as the "Abt report").[4] The other study, funded by the Bureau of Prisons (BOP), had two components: a performance or quality analysis conducted by Scott Camp, Ph.D., a senior research analyst in BOP's Office of Research and Evaluation,[5] and a cost analysis conducted by Julianne Nelson, Ph.D., an economist with the Center for Naval Analyses (referred to collectively as the "BOP report").[6]

The Taft studies offer the research and public policy communities a rare opportunity to consider the different approaches that were used, why the results were different, and how this can inform not only the prison privatization debate, but in many ways, the government outsourcing, or privatization, issue in general.

Making Prison Privatization Decisions

Although every jurisdiction has its own economic and managerial idiosyncrasies, lessons learned from the Taft studies and the NIJ meeting may help administrators and public policy analysts avoid mistakes that could lead to higher taxpayer costs and possible dire consequences of poor performance. These lessons include:

- Cost comparisons are deceivingly complex, and great care should be taken when comparing the costs of privately and publicly operated prisons.
- Special care should be given to an analysis of overhead costs.
- A uniform method of comparing publicly and privately operated prisons on the basis of audits should be developed.
- Quantitative measures of prison performance, such as serious misconduct and drug use, should be incorporated in any analysis.
- Future analytical methods could allow simultaneous cost and quality comparisons.

One key lesson learned from the Taft privatization studies is that cost comparisons are not as simple as might be presumed.

Someone not familiar with the literature on prison privatization might assume that cost comparisons are accomplished without controversy or ambiguity. One key lesson learned from the Taft privatization studies is that comparisons are not as simple as might be presumed.

Consider, for example, per diem (or daily) costs. The chart below lists the per diem costs, in dollars, as analyzed by the Abt and BOP researchers for the three publicly operated prisons and Taft, the privately operated facility, for fiscal years 1999–2002.

According to the Abt analysis, the Taft facility was cheaper to run, every year, than the three publicly operated facilities. In 2002, for example, Abt reports that the average cost of the three public facilities was 14.8 percent higher than Taft.

The BOP analysis, however, presented a much different picture. According to the BOP researchers, the average cost of the public facilities in 2002 was only 2.2 percent higher than Taft.

Why were the Abt and BOP cost analyses so dramatically different? And, importantly, what policy implications does this have?

Average Per Diem Costs Per Inmate (in dollars) for FY 1999–2002

	FY 1999		FY 2000		FY 2001		FY 2002	
	Abt	BOP	Abt	BOP	Abt	BOP	Abt	BOP
Publicly operated prison								
Elkton	$39.72	$35.24	$39.77	$34.84	$44.75	$36.79	$46.38	$40.71
Forrest City	39.46	35.29	39.84	35.28	41.65	37.36	43.61	38.87
Yazoo City	41.46	36.84	40.05	34.92	43.65	37.29	42.15	38.87
Privately operated prison								
Taft	33.82	34.42	33.25	33.21	36.88	37.04	38.37	38.62

HOW DID WE GET THE BENEFIT OF TWO STUDIES?

Due to the sheer expense of conducting evaluation studies, it is a rare occurrence to have competing research analyses like those discussed in this article. To understand how this happened, some historical perspective is in order.

In 1996, the U.S. House of Representatives directed the U.S. Bureau of Prisons (BOP) to perform a 5-year prison privatization demonstration project of the low- and minimum-security prisons in Taft, California. BOP awarded a 10-year contract to the Geo Group (formerly Wackenhut Corrections Corporation), which operated the facilities from 1997 to 2007. The contract was then recompeted, and a new contract to run the Taft prisons was awarded to Management and Training Corporation.

Although the U.S. Congress did not request a formal evaluation of the Taft facilities, BOP leadership decided that an evaluation of cost and quality would help them make better decisions regarding privatization. BOP funded the National Institute of Justice to secure proposals for an evaluation of Taft and similar BOP facilities. Abt Associates won that competition and conducted the study. BOP's Office of Research conducted its own independent study in order to understand how to conduct this new type of research.

There are two primary reasons why the cost analyses were different: (1) the way inmate population sizes were treated, and (2) what was included in overhead costs.

With respect to inmate populations, Taft had on average approximately 300 more inmates each year than the three publicly operated prisons throughout the study period. Therefore, the private service provider for Taft benefited from economies of scale that reduced average costs. To adjust for such economies of scale, the BOP researchers made adjustments to the expenditures.

Abt, in its analysis, however, did not consider economies of scale, choosing, instead, to use the actual average per diem amount that BOP paid the Taft contractor. In other words, BOP estimated what expenditures would have existed for identically sized prisons, and Abt based its analysis on actual expenditures.

McDonald, the researcher who performed the Abt analysis, argues that his approach—using actual costs that BOP paid to have a private contractor operate Taft—yields a more telling comparison. Although the BOP researchers disagree, this leads to one of the primary points of this article, which is to remind policymakers and others interested in the prison privatization issue that making cost comparisons is not a simple matter of arithmetic.

What Should Be Included in Overhead Costs?

Prison costs comprise:

- Direct operations costs, such as staff salaries, inmate food, medical care, and other services.
- Indirect (overhead) costs, such as regional and central office supervision, computer services, planning, and budget development.

With respect to overhead costs, different approaches by the two research groups led to different findings. Basing its analysis on the extent to which the government actually provided resources to support the Taft operation, Abt concluded that only a bare minimum of support was provided. Therefore, the Abt analysis reported a 100-percent savings of indirect, overhead costs for Taft during the time period in the study. BOP, on the other hand, assumed that most overhead costs (planning, auditing, and other central and regional operations) could continue to be incurred by the government, even if a private company

was operating the prison. Therefore, the BOP researchers applied a 10–12 percent overhead rate (the average for BOP prisons during the 1998–2002 Taft study period), calculating privatization savings of 35 percent of overhead for that 5-year period. Here again, BOP estimated the costs that the government would have incurred by central administration, and Abt presented only what was reported.

One can anticipate that underlying assumptions regarding overhead costs will have significant implications for bottom-line estimations of costs and savings. As previously discussed, the assumptions made by Abt led to a finding of much less overhead for the Taft private provider, suggesting that the government could save a great deal of money by privatizing prisons. The assumptions underlying the BOP analysis were different, however, and led to a less sanguine conclusion. Unless policymakers are mindful of these subtleties in basic assumptions, they are not likely to delve so deeply—or even be presented with this level of detail—when considering taxpayer benefits of prison privatization.

At the March 2007 NIJ meeting, Mark Cohen, Ph.D., an economist at Vanderbilt University, presented data showing that privately operated (and sometimes privately financed) prison systems have lower costs over time than publicly operated prison systems. Although this may be true as an overall average, it is not necessarily true for a particular jurisdiction. Any prison administrator or other policymaker considering privatization would be well advised to consider the specific analytic assumptions underlying the studies.

Performance: Contract Compliance vs. Auditing

Performance is a vital part of any prison privatization discussion. In many jurisdictions, a truly accurate comparison of privately versus publicly operated prisons is hampered by different performance yardsticks. A privately operated prison, such as Taft, has a contract; performance, therefore, can be measured by compliance with specific contract terms (which, of course, can vary from contract to contract). BOP-operated prisons, on the other hand, measure performance through an auditing procedure called program review.

There are two primary reasons why the cost analyses were different: (1) the way inmate population sizes were treated, and (2) what was included in overhead costs.

Because no method existed for measuring publicly and privately operated prisons on many dimensions for performance, both of the Taft studies have limitations. Until a common yardstick exists, any analysis will not be as rich as it could be. Nonetheless, it is important to make whatever performance analyses are possible—in areas such as safety, medical care, programming, and rehabilitation services—when considering prison privatization.

In the Taft comparison studies, the Abt researchers first looked at 19 functional areas—including food services, health care, safety, and security—that were specified in the Taft private-service provider contract. The contract had a scoring system, upon which possible bonuses and possible deductions would be based:

- Unsatisfactory = 0
- Marginal = 1
- Fair = 2
- Good = 3
- Excellent = 4
- Outstanding = 5

Over the first 5 years of its contract (1997–2001), the Taft private provider received a rating of 2.5; during the 2002–2004 contract period, the average rating was 2.8, which resulted in a possible award fee of nearly 50 percent of the amount allocated.

In their performance analyses, both the BOP and the Abt researchers also looked at misconduct, comparing assaults at the Taft facility to assaults at 20 publicly operated low-security prisons. Both reports found that the Taft assault rate was lower than the average of the 20 prisons; with respect to the four facilities in the Taft studies, Elkton had an assault rate similar to what would have been expected based on its inmate composition; Forrest City, Yazoo City, and Taft had lower than expected assault rates (Yazoo City was the lowest).[7]

The researchers also considered drug use, escapes, inmate grievances, and access to medical care in their performance analyses. During the study period, Taft had a very high drug-use rate compared to the 20 BOP-operated low-security prisons. Abt noted two escapes at Taft and only two in the BOP prisons; the BOP researchers reported the same two Taft escapes, but also noted a disturbance at Taft that involved 1,000 inmates who refused to return to their cells for the 10 p.m. count.

With respect to access to medical care, the researchers found that the Taft inmates were more likely to see a physician than inmates in the 20 BOP-operated prisons.

Despite Differences, Lessons Learned

Despite differences in the approaches and assumptions used by Abt and BOP in the Taft studies, these reports represent two of the best prison privatization analyses performed so far. Administrators, policy analysts, and researchers looking at prison privatization and the larger public policy issue of government outsourcing would benefit from a closer consideration of the full reports.

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Notes

1. Sabol, W.B., T.D. Minton, and P.M. Harrison, *Prison and Jail Inmates at Midyear 2006,* Bureau of Justice Statistics, U.S. Department of Justice, 2007, available at www.ojp.usdoj.gov/bjs/pub/pdf/pjim06.pdf.
2. Terrell, S. "Audit: N.M. Private-Prison Costs Soar," *New Mexican,* May 24, 2007, available at www.freenewmexican.com/news/61780.html (accessed January 15, 2008).
3. The four prisons in the Taft studies are low- and minimum-security facilities constructed by BOP during the same period. The prison operated by the private company (through a contract with BOP) is in Taft, California. The three publicly operated prisons are in Elkton, Ohio; Forrest City, Arkansas; and Yazoo City, Mississippi.
4. McDonald, D.C., and K. Carlson, *Contracting for Imprisonment in the Federal Prison System: Cost and Performance of the Privately Operated Taft Correctional Institution,* final report submitted to the National Institute of Justice, November 2005 (NCJ 211990), available at www.ncjrs.gov/pdffiles1/nij/grants/211990.pdf.
5. Camp, S.D., and D.M. Daggett, *Evaluation of the Taft Demonstration Project: Performance of a Private-Sector Prison and the BOP,* Washington, DC: Federal Bureau of Prisons, October 2005, available at www.bop.gov/news/research_projects/published_reports/pub_vs_priv/orelappin2005.pdf.
6. Nelson, J., *Competition in Corrections: Comparing Public and Private Sector Operations,* Alexandria, VA: The CNA Corporation, December 2005, available at www.bop.gov/news/research_projects/published_reports/pub_vs_priv/cnanelson.pdf.
7. In any analysis of prison misconduct, it is important to account for the composition of the inmate population (with respect to risk of misconduct) in addition to the security level of the prisons. An expected level of misconduct takes this into account; an average (actual) level does not take inmate composition into account.

About the Author

Gerry Gaes has 27 years of criminal justice experience. From 1988 to 2002, he served as director of research at the Bureau of Prisons (BOP); during that time, he worked on an interim BOP report concerning the Taft privatization study that is discussed in this article. Gaes was a visiting scientist with the National Institute of Justice from 2002 to 2007. His other research interests include the simulation of criminal justice processes, the criminogenic effect of prisons, and inmate gangs.

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