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Focus on:
Violent Crime

IN THIS ISSUE

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DIRECTOR'S MESSAGE

At NIJ, we have a long-standing and ongoing focus on reducing violent crime. We advance this priority through multiple interrelated research portfolios that address topics like firearms violence, intimate partner violence, terrorism, and gangs. Each portfolio is built on rigorous scientific studies that are designed to help us better understand several types of violent crime and how we can work to deter these crimes and reduce violence. The latest *NIJ Journal* highlights this important work.

As a science organization, we seek to discover the underlying causes and consequences of crime and violence. Two articles in this issue examine particularly insidious forms of violence: school shootings and mass shootings. Who is committing these crimes? Are our perceptions of these violent crimes different from what the data show? Are we collecting the data we need to see crime prevention through a multidisciplinary lens? Our goal is to equip the criminal justice field with the best knowledge to effectively do its job of keeping our students and nation safe.

NIJ also plays a vital role in funding research related to domestic radicalization and terrorism in the United States. Understanding why and how people radicalize, as well as what can be done to prevent radicalization or intervene during the process, are key to countering violent extremism and remain a top research priority for us. One article in this issue details our specific efforts to work with organizations around the world to better understand these crimes and advance evidence-based interventions.

This raises a critical point: At NIJ, we aim to fund relevant research that informs policies and practices centered on evidence about what works to reduce the occurrence and impact of violent crimes. Ultimately, this comes down to rigorous evaluation of program effectiveness. We want to know what works in combating violent crime. We want to know what doesn't work. And we want to know what shows promise and begs further study.

Two articles in this issue reflect our commitment to evaluation. One looks at whether an evidence-based delinquency prevention program can be modified to prevent gang involvement and reduce the criminal activities of gang members. Another explores efforts to expand the evidence base for practices used by law enforcement to prevent and intervene in cases of intimate partner violence. Both articles highlight how rigorous evaluation and evidence can help law enforcement address violent crime.

NIJ also supports a robust body of research on investigative and forensic practices that enhance the capabilities of law enforcement and other criminal justice professionals to deter and respond to violent crime. One article in this issue explores how a forensic intelligence approach to law enforcement has the potential for advancing the detection, investigation, and prosecution of serial and organized violent crimes in jurisdictions across the United States. Another examines how prioritizing cold case investigations can assist in apprehending serial offenders, resolving crimes, and preventing future ones.

Our criminal justice system faces many challenges, including persistent violent crime. The value of research in helping law enforcement officers and prosecutors tackle these formidable obstacles cannot be overstated. Scientific findings serve as a potent tool in developing policies and improving community safety. We are steadfast in our commitment to using science to inform and advance evidence-based policies and practices across the country. Because when it comes to the criminal justice system — and especially violent crime — the stakes couldn't be higher.

David B. Muhlhausen, Ph.D.
Director, National Institute of Justice

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NIJ BULLETIN

Publications in Brief

Conducting Randomized Controlled Trials in State Prisons

State prisons nationwide house approximately 1.3 million inmates, which is more than half of the total population of incarcerated individuals on any given day in the United States. Program evaluation is essential to ensuring that state prison systems adopt effective programs and policies. Emerging areas of interest for state prison systems include the use of restrictive housing, drug and contraband interdiction efforts, responding to the opioid crisis, staff overtime and wellness, reentry planning, risk assessment, and reducing recidivism. All of these areas provide opportunities to evaluate, learn about, and improve the operations, management, and outcomes of state prisons.

The "gold standard" methodology for evaluating the outcomes of programs and policies is the randomized controlled trial (RCT). This white paper presents an overview of the RCT design as a program evaluation method, describes examples of RCT evaluations both in criminal justice generally and in a state prison context specifically, and also discusses considerations and challenges to be addressed when seeking to conduct an RCT evaluation in a state prison.

Read the white paper at https://nij.ojp.gov/library/publications/conducting-randomized-controlled-trials-state-prisons.

Evidence-Based Policing in 45 Small Bytes

Evidence-based policing (EBP) involves using data, analysis, and research to complement experience and professional judgment in order to provide the best possible police service to the public. Sometimes police agencies do things a certain way by custom, without analyzing their practices to evaluate how effective they really are. In an EBP framework, law enforcement agencies and personnel are informed by the best available scientific evidence as they go about identifying and understanding issues and problems, choosing responses, making decisions, setting policies, allocating resources, and enhancing employees' well-being.

This publication offers a practical breakdown of EBP in 45 short chapters. Although it is mainly written with high-ranking law enforcement officials in mind, many others will find its content beneficial in measuring effective policing. It covers topics such as gauging external and internal conditions, assessing performance, identifying and analyzing problems, evaluating practices, and testing alternatives. The guidebook emphasizes the data, analysis, and research capabilities that police agencies should have and explains why those capabilities are important, with real-world examples.

Read *Evidence-Based Policing in 45 Small Bytes* at https://nij.ojp.gov/library/publications/evidence-based-policing-45-small-bytes.

Digital Evidence Manual

As the use of mobile technology increases, a growing number of devices are being used in crimes and then seized by law enforcement as evidence. Computers, cellphones, GPS devices, digital cameras, and other types of equipment are used by criminals to communicate, store data, and facilitate crimes — and law enforcement must be prepared to collect, handle, and process the digital evidence they contain.

The purpose of this manual is to help law enforcement agencies develop policies and procedures around digital evidence, ranging from case assignment and laboratory access to equipment testing and evidence storage. Agencies are encouraged to treat this manual as a template and adapt its topics to suit their specific needs. The manual may also be a useful resource for agencies going through the accreditation process of the Commission on Accreditation for Law Enforcement Agencies.

Read the manual at https://nij.ojp.gov/library/publications/ digital-evidence-policies-and-procedures-manual.

Courts Strategic Research Plan 2020-2024

Courts play an integral role in the administration of justice as collaborators and intermediaries between defendants, victims, law enforcement, corrections, and the community. The most visible role of the courts is in legal proceedings. Judges, prosecutors, and other court professionals also engage in a variety of prevention, investigation, and service activities to promote public safety, cost-efficiency, and fair and equitable treatment.

NIJ developed this *Courts Strategic Research Plan* to communicate its research agenda and advance its research mission for courts. The four research priorities elaborated in the plan are to: promote and support research to develop the courts workforce and enhance court workgroups, promote and support research to advance court practice, promote and support research on the fair and impartial administration of justice, and promote data and research capacity building. The plan's priorities and objectives respond to the findings of contemporary research and to needs and requirements identified by prosecutors, defense counsel, judges, and other criminal justice stakeholders.

Learn more about NIJ's courts research at https://nij.ojp.gov/library/publications/ courts-strategic-research-plan-2020-2024.

News & Events

Webinars From the Forensic Technology Center of Excellence

NIJ's Forensic Technology Center of Excellence (FTCoE) supports the implementation of new forensic technology and best practices. As part of its mission to share knowledge and bridge the gap between the scientific and justice communities, the FTCoE hosts frequent webinars as an educational resource for the field. Recent FTCoE webinar topics include:

- *Network Forensics: Challenges and Tools* — Review open-source tools for acquiring, evaluating, processing, and presenting digital evidence.

- *Drug Exposures in the Forensic Laboratory: What We Know, What We Can Learn* — Find out what health hazards are associated with occupational exposures to toxic drugs and review ways to limit employee exposures.

- *Identifying an Unknown Paint System Using the Royal Canadian Mounted Police Paint Data Query Program* — Learn how to use the Paint Data Query Program's database and spectral libraries to identify the most likely source of an unknown paint system.

- *Recent Advances in Tandem Separation and Detection Techniques for the Analysis of Emerging Drugs* — Discover how emergent technologies for the separation and detection techniques employed in chromatographic systems can increase selectivity in the identification of emerging drugs.

- *Results of a Black Box Study on the Accuracy and Reliability of Palm Print Comparisons* — Learn about the results of a first-of-its-kind, large-scale black box study that measured fingerprint examiners' accuracy when conducting palm comparisons exclusively.

- *Forensic Epidemiology: Monitoring Fatal Drug Overdose Trends* — Hear from epidemiologists about their experiences monitoring drug overdose deaths, observing trends, and using data from medical examiners and coroners to inform public health policy.

- *Marijuana or Hemp: From Farm Bill to Forensic Analysis* — Learn how the field of forensic drug testing has developed since the 2018 Farm Bill removed longstanding federal restrictions on hemp cultivation.

Access the webinars at https://forensiccoe.org/all-webinars.

Multimedia

Recent School Safety Research

The research projects funded through NIJ's Comprehensive School Safety Initiative from 2014 to 2017 continue to deepen our understanding about root causes of school violence and strategies that can increase school safety. A series of recent interviews from NIJ discusses how well schools are prepared for emergencies, how to conduct effective school safety planning, how well students and staff know the emergency procedures in their schools, and how police engagement with rural school districts affects school violence prevention.

Watch the interviews on YouTube at https://www.youtube.com/watch?v=FjoloAkOrQc&list=PLpll UxHJ-xbryLlDl-Qx1Ps8_eV_uK-0d.

Women in Policing

Captain Ivonne Roman, a participant in NIJ's Law Enforcement Advancing Data and Science (LEADS) Scholars program and an officer in the Newark (NJ) Police Department, describes how LEADS has helped her research on women in policing and shares some of her findings.

Watch the interview on YouTube at https://www.youtube.com/watch?v=6vwQugXGRYk.

Combating Officer Stress With Research

As part of NIJ's focus on advancing law enforcement, NIJ supports research on the safety, health, and wellness of law enforcement officers. A series of recent interviews from NIJ discusses:

- Practitioners and researchers working together to study the effects of stress and trauma on law enforcement.

- The importance of sharing research on officer resiliency with law enforcement agencies.

- Recommendations for a preventive maintenance approach to the health and wellness of officers.

- Law enforcement culture as a deterrent to seeking help for mental health issues, and ways to shift that culture in healthier directions.

Watch the interviews on YouTube at https://www.youtube.com/watch?v=4qZ4do0NfsM&list=PLp llUxHJ-xbpiZzh-1pLcnjBcBnxCA_-G.

Recent Research Findings

Sexual Violence Against Alaska Women: Village Public Safety Officers Having Some Impact

Alaska's village public safety officers (VPSOs) support state troopers by serving as first responders and assisting with investigations. Recent NIJ-funded research looked at the impact VPSOs can have in cases of sexual assault, sexual abuse, and intimate partner violence against Alaska Native and American Indian women in Alaska's tribal communities. Evaluation findings showed that the people who serve in Alaska's VPSO program, along with other paraprofessional police, play a central role in the criminal justice response to these crimes in tribal communities. Their efforts increase the probability that reported cases will be referred and accepted for prosecution and will ultimately lead to a conviction. The research examined more than 1,500 sexual assault and intimate partner violence cases in parts of western Alaska where tribal communities are concentrated.

Read more about the VPSO research at https://nij.ojp.gov/topics/articles/sexual-violence-against-alaska-women-village-public-safety-officers-having-some.

Gaps in Reporting Human Trafficking Incidents Result in Significant Undercounting

For decades, the FBI's Uniform Crime Reporting (UCR) Program has been a leading provider of information on crime in the United States. However, recent NIJ-supported research has revealed that labor and sex trafficking data appearing in the UCR Program may significantly understate the extent of human trafficking crimes. To determine how human trafficking cases are identified and reported by the police, the research team examined more than 600 human trafficking investigations at local law enforcement agencies in three U.S. communities and interviewed law enforcement and crime-reporting personnel at each study site. By gauging how accurately law enforcement data on human trafficking offenses represented the population of human trafficking victims in a community, the researchers discovered a widespread inability of law enforcement officers to identify local trafficking offenses, coupled with inadequate reporting of the offenses that were identified.

Learn more about the study's methods and results at https://nij.ojp.gov/topics/articles/gaps-reporting-human-trafficking-incidents-result-significant-undercounting.

Taking on the Dark Web: Law Enforcement Experts ID Investigative Needs

The dark web — a part of the internet defined by its anonymity, encryption, and inaccessibility to regular web browsers — is a haven for criminal commerce and other illicit activity. The dark web is used to trade in contraband such as opioids and other drugs, bomb parts, weapons, child sexual abuse imagery, Social Security numbers, body parts, and even criminal acts for hire. Despite this profusion of crime, the dark web's anonymity makes it extremely difficult for law enforcement to identify suspects and collect evidence. To raise awareness among law enforcement agencies and identify tools that can help them police dark web activity, an NIJ-supported gathering of experts identified law enforcement's key dark web challenges and opportunities. The high-priority needs identified during this workshop present a pathway for preparing law enforcement personnel at all levels to better address the challenges posed by cybercrime.

Read an article about the workshop's recommendations at https://nij.ojp.gov/topics/articles/taking-dark-web-law-enforcement-experts-id-investigative-needs.

When Grandpa Gave Away the Farm: His Own Darn Fault, or a Case of Elder Abuse?

Older adults can become more susceptible to financial abuse as their cognitive capacity declines. A significant barrier to identifying such abuse has been difficulty distinguishing older adults' authentic financial decision-making from incidents of manipulation by others. To help find cases of abuse, researchers are crafting social science tools to quantify an individual's capacity for financial judgment. A recent NIJ-sponsored study refined and evaluated three tools developed to measure seniors' financial judgment — a financial decision rating scale, a financial decision screening scale, and a rating scale for friends and family members.

Learn more about these tools at https://nij.ojp.gov/topics/articles/when-grandpa-gave-away-farm-his-own-darn-fault-or-case-elder-abuse.

Specialized Smartphones Could Keep Released Offenders on Track for Successful Reentry

NIJ is seeking new ways to use smartphones and other mobile devices to help offenders returning to the community. Mobile devices driven by artificial intelligence (AI) can tailor reentry programming to the individual, helping released inmates communicate seamlessly with their probation or parole supervisors, avoid or correct missteps, and efficiently tap into the community resources best suited to their circumstances. Along those lines, a recent NIJ-funded project has developed an AI-based system to monitor and support offender reentry. The system will be deployed within Tippecanoe County (IN) Community Corrections, where 250 randomly selected offenders will participate in the study; half will be provided with smartphones and wearable biometric devices or bracelets, and the other half will be assigned to a control group. NIJ views this study as the first phase of research and development applying the power of AI to the objectives of community reentry.

Read more about the study at https://nij.ojp.gov/topics/articles/specialized-smartphones-could-keep-released-offenders-track-successful-reentry.

The Evolution and Impact of Electronic Cigarettes

Electronic cigarettes, first introduced in the U.S. market in 2006, have evolved from nicotine delivery systems to sophisticated, customizable devices that can deliver a range of drugs such as THC (the intoxicating compound in marijuana), methamphetamine, fentanyl, and synthetic cannabinoids. NIJ funded a group of researchers to analyze new e-cigarette models and explore how they are customized. The researchers also characterized a variety of commercially available e-liquids for refilling e-cigarettes (including some advertised as containing drugs other than nicotine) and developed a model for understanding the particle-size distribution in the aerosols that the devices produce. The researchers determined that fourth-generation e-cigarettes are effective drug delivery systems — including for drugs that are not liquids, such as synthetic cannabinoids.

Read a summary of the research at https://nij.ojp.gov/topics/articles/evolution-and-impact-electronic-cigarettes.

Determining the Age of a Sample Using RNA Sequencing

Like DNA, RNA contains genetic information that can be used to identify individuals, reconstruct phenotypes, and suggest ancestry. But because RNA degrades rapidly, biological samples have generally been considered useless for collecting RNA information. Nonetheless, identifiable RNA can be isolated from samples many years old — in fact, recent NIJ-sponsored research has used the degree of RNA degradation in a sample to estimate how old the sample is. The study analyzed RNA over the course of a year in multiple sample types and discovered that the rate of RNA decay appeared to depend on the type of body fluid from which the RNA originated.

Read more about the research at https://nij.ojp.gov/topics/articles/determining-age-sample-using-rna-sequencing.

Sharing Data To Improve Science

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

- Learn about NIJ's Data Resources Program at https://nij.ojp.gov/funding/opportunities/ nij-2016-9052.

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

- Capital Punishment in the United States, 1973-2010

- Monitoring the Future: A Continuing Study of American Youth, 2019

- Community Restorative Healing Project, Los Angeles, California, 2017-2018

- Gang Affiliation and Radicalization to Violent Extremism Within Somali-American Communities, 5 North American Cities, 2013-2019

- Evaluation of the Implementation of the Sex Offender Treatment Intervention and Progress Scale (SOTIPS), United States, 1978-2017

- Campus Climate Survey on Sexual Assault and Sexual Misconduct, 2014-2019

- Responding to Sexual Assault on Campus: A National Assessment and Systematic Classification of the Scope and Challenges for Investigation and Adjudication, [United States], 2014-2019

- Understanding Pathways to and Away From Violent Radicalization Among Resettled Somali Refugees, 4 North American Cities, 2013-2015

- A Natural Experiment in Reform: Analyzing Drug Law Policy in New York City, New York, Quantitative Data, 2006-2012

- Assessing the Impact of a Graduated Response Approach for Youth in the Maryland Juvenile Justice System, 2013-2017

Want to stay informed about the latest research and publications from NIJ? Subscribe for updates at https://nij.ojp.gov/subscribe.

UNDERSTANDING DOMESTIC RADICALIZATION AND TERRORISM: A NATIONAL ISSUE WITHIN A GLOBAL CONTEXT

BY **AISHA JAVED QURESHI**

The urgency, lethality, and multifaceted complexity of the problem of domestic radicalization to terrorism make it a top research priority for NIJ.

In 2017, there were 10,900 terrorist attacks around the world that killed more than 26,400 people, according to the National Consortium for the Study of Terrorism and Responses to Terrorism (START).[1] The number of terrorist attacks per year in the United States in the post-September 11 era has increased from 33 in 2002 to 65 in 2017.[2] It is evident that the number of terrorist attacks and the lethality of these attacks are increasing at alarming levels within the United States and abroad, and terrorism is a pressing national issue that lies very much within a global context.

With the threat of terrorism on the rise and acts of terrorism occurring increasingly at a national and global level, it is imperative — perhaps now more than ever — that we ensure our resources are being directed to the most practical and evidence-based means of countering violent extremism (see sidebar, "Defining Terrorism"). Understanding why and how people radicalize, as well as what can be done to prevent radicalization or intervene during the process, are key to countering violent extremism.

What makes this issue complex is that in the United States, terrorist acts are carried out by people who are motivated by a wide variety of ideological viewpoints, who have gone through different radicalization processes, and who have unique grievances or life experiences that lead them toward radicalization to terrorism. This, in turn, makes it difficult to target prevention and intervention efforts toward any one "vulnerable" population. Radicalization to terrorism can be motivated by extremist groups/ideologies, or it can occur at an individual level (commonly referred to as "lone wolf terrorism"). In the United States, terrorists are usually associated with one of the six most commonly known ideologies: right-wing extremism, left-wing extremism, environmental extremism, nationalist/separatist extremism, religious extremism, and single-issue extremism.[3] Further, the nature of radicalization and types of extremist attacks are dynamic, changing from year to year and from decade to decade.[4]

NIJ plays a vital role in funding research related to domestic radicalization and terrorism in the United States. As a federal leader in the field, NIJ's work

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is complementary to that of the Department of Homeland Security (DHS) and Department of Defense, as well as international partners in Canada, the United Kingdom, Australia, and New Zealand, among others. Although the field of domestic radicalization and terrorism research as a whole is considered to be in its infancy (compared to other fields in criminology, such as gangs or violent crime), significant achievements have been made.

NIJ's Terrorism and Radicalization Research

In response to the September 11 terrorist attacks, NIJ started working with the National Academies in 2002 to help craft a research agenda to move the field of terrorism research forward. NIJ funded projects that focused on:

- Developing terrorism databases for analysis.
- Improving the criminal justice response.
- Addressing potential high-risk terrorism targets.
- Examining the links between terrorism and other crimes.
- Studying the organization, structure, and culture of terrorism.

After investing in numerous projects, NIJ played a shared role in the development and longevity of numerous national and global terrorism databases (such as the American Terrorism Study and the Global Terrorism Database) and institutions (such as START

at the University of Maryland, the Terrorism Research Center at the University of Arkansas, and the Triangle Center on Terrorism and Homeland Security at Duke University).

In its fiscal year 2012 appropriation, Congress directed NIJ to administer dedicated funding for "research targeted toward developing a better understanding of the domestic radicalization phenomenon, and advancing evidence-based strategies for effective intervention and prevention."[5] Every year since then, NIJ has received similarly dedicated funding to carry out this mission. In its first five years, the goal of NIJ's Domestic Radicalization and Terrorism research portfolio was to answer the following questions:

- What are the primary drivers of radicalization to violent extremism, and how do they vary across cohorts (e.g., by grievance, by age, by socioeconomic categories)?
- How is radicalization to violent extremism analogous to other forms of extreme violence, such as mass casualty events and gangs?
- Which policy choices or programmatic interventions prevent or reduce radicalization to violent extremism, induce disengagement from violent extremism, or support deradicalization and desistance from violent extremism?

The program aimed to answer these questions for the benefit of multiple stakeholders but considered criminal justice agencies and their community partners as the primary beneficiaries.

Between 2012 and 2019, NIJ made competitive awards for 34 projects through its annual domestic radicalization and terrorism solicitation. Three of the most common topic areas funded under these awards involve research surrounding:

- The drivers of radicalization.
- The role of the internet and social media in the radicalization and recruitment process.
- Program evaluations of extremism prevention and intervention programs.

Defining Terrorism

The definition of terrorism/terrorists is often a contested issue, with academics, government entities, media outlets, and others using varying language to define this concept. For the purposes of soliciting applications for research, NIJ has defined terrorists as "those individuals who commit or provide support for the commission of ideologically motivated violence to further political, social, or religious goals." NIJ's focus has been on the radicalization process as it occurs in the United States, regardless of the location of any act of terrorism that may ensue from that process.

Some of the most important findings to date come from a set of NIJ-commissioned papers that summarize key findings from approximately 15 NIJ-funded studies and an international conference.[6] For example, one paper explores research on risk factors associated with radicalization to violent extremism that was presented at an international conference in 2015. These risk factors include violent extremists in an individual's social network, identity processes, violent extremist belief systems and narratives, group dynamics, connections with violent extremists and violent extremist material through the internet and social media, and grievances.[7]

Two papers on radicalization risk factors[8] and the radicalization process[9] emphasize the social nature of radicalization. Reasons for concern may include an individual's associates and drastic changes in those relationships. The papers also found 16 potential risk factors associated with attempts to engage in terrorism by both group-based and lone-actor terrorists. Although lone actors tend to be more public with their grievances and their intent to do harm,[10] they share these common risk factors with group-based terrorists:

- Having a criminal history.

- Having mental health issues (or receiving a diagnosis of schizophrenia or delusional disorder).

- Being unemployed.

- Being single.

- Being a loner (or socially isolated).

- Having military experience.

Meanwhile, NIJ-funded researchers at Georgia State University compared the motive, weapon use, and behaviors of three types of terrorists — lone-actor terrorists (not related to or in contact with a terrorist group), solo terrorists (those who act alone but are related to a terror group or network), and mass murderers. They found that these offenders can be distinguished by the degree to which they interact with co-conspirators, their antecedent event behaviors, and whether (and the degree to which) they leak information prior to an attack.[11] NIJ has funded other comparative studies of extremists and gang members, as well as extremists and human traffickers, among others.[12]

NIJ has also funded program evaluations, most notably an evaluation of the first Muslim-led, community-based countering violent extremism (CVE) program.[13] Researchers at the University of Massachusetts Lowell found that peers were the most likely to notice early signs of radicalization, but they had a reduced likelihood of reporting due to a reluctance bias. The research team developed a metric tool called a "suite of measures" that pertains to various types of psychological processes, motivations, states, and social circumstances; the tool can be readily adapted to CVE program evaluations.

Although many of the questions NIJ originally sought to answer have been addressed to some degree, many uncertainties remain. For example, we have learned about many of the drivers of radicalization and the similarities and differences between terrorism and other forms of violent crime. We have also learned that a majority of recruitment and radicalization occurs

via the internet and social media. However, one of the most important findings may be that there is no one-size-fits-all approach to these questions. There is no single checklist that determines whether someone is on the path to becoming a terrorist. Additionally, although there have been many takeaways from NIJ-funded evaluations of intervention and prevention programs, the implementation, replication, and evaluation of such programs are still lacking in this field.

Advancing Knowledge

Forthcoming awards and publications in NIJ's portfolio will help further advance the field of terrorism and radicalization studies. NIJ-funded researchers at the University of Virginia are studying women who have been involved with violent extremism to identify strategies used by the Islamic State group to recruit and radicalize Western women.[14] Another project is using post-September 11 era geocoded, terrorism-related precursor data to identify where people radicalize versus where terrorist events actually take place.[15] This is especially important as some of NIJ's previously funded research has found that approximately 60% of terrorists lived more than 30 miles away from their terrorist target.[16]

NIJ-funded researchers at the RAND Corporation are conducting interviews with the families and close friends of individuals who have radicalized.[17] These interviews will offer unique insights and perspectives from the people who were closest to the radicalized individual because they are the ones most likely to detect changes in behavior.

A recent NIJ grant will build on landmark studies from Australia and the United Kingdom to understand the dynamics of and barriers to community reporting in the United States.[18] NIJ hopes that the study resulting from this grant will bridge a large research gap by attempting to understand the triggers, thresholds, facilitators, and barriers to reporting terrorism involvement. Further, the results could potentially inform the broader issue of reporting about violence in

general, as the study will compare perspectives about reporting involvement in terrorism versus involvement in nonterrorist mass violence. The potential impact on the field is expected to be high, as it would be the first study of its kind to allow for direct comparison of sentiments and issues surrounding reporting by family and close friends in the United States, the United Kingdom, and Australia.

Lastly, in 2017, NIJ began a new publication series called Notes From the Field.[19] This series serves as a platform for leading criminal justice practitioners to share promising practices and lessons learned on pressing issues. It is part of an effort by NIJ to better connect with and learn from law enforcement. Notes From the Field recently launched a series on terrorism prevention to help fill gaps in knowledge and remain on the forefront of the most cutting-edge research in the field.

NIJ's Role at the Federal and International Levels

NIJ also plays a large role in advancing radicalization and terrorism research at the federal and international levels. The Institute is one of the leading federal agencies that fund research on this topic.

Through meetings, project collaborations, and working groups, NIJ has established successful working relationships with its national and international partners. For example, NIJ has coordinated with DHS and other federal partners through the Countering Violent Extremism Task Force. As a member of the Task Force's Research and Analysis Working Group, NIJ shares research findings with the group and stays abreast of research priorities, gaps, and progress made across entities within the federal government. NIJ also organizes expert panels at conferences, such as the annual meetings of the International Association of Chiefs of Police and the American Society of Criminology, which helps to translate research findings directly into law enforcement practice and target and enhance future research efforts.

On an international level, NIJ is involved with the Five Country Research and Development (5RD) Network, which includes government agency representatives from Australia, Canada, New Zealand, the United Kingdom, and the United States. The group works to cooperate, collaborate, and exchange information to ensure efficiency and coordination of applied research and development work relevant to a variety of domestic security topics. The DHS Science and Technology research team leads the group, which first met in 2015 to discuss best practices and lessons learned from international partners in efforts to counter violent extremism. The 5RD participants communicate regularly to share information and coordinate efforts to develop new technologies to prevent crime, ensure security, and protect citizens.

The 5RD Network has commissioned systematic reviews of research and evaluation efforts from all five countries to build a "global evidence-base for terrorism prevention, policy, strategy, and activity."[20] These systematic reviews will cover subtopics such as common factors leading to radicalization, online indicators of radicalization, the role of the media in the radicalization process, and how community support and societal connections influence the prevention of radicalization. Recognizing that the threat of terrorism transcends all borders and ideologies, NIJ is hopeful that the rigorous and high-quality scientific findings from these reviews will help guide policymakers and practitioners in their decision-making.

Looking Forward

NIJ's focus for the future will be to continue funding rigorous evaluations, developing stronger baseline knowledge of radicalization processes, and informing policy and programming through research to better understand how and why people radicalize, and which programs and policies work best to prevent radicalization from occurring.

Further, NIJ hopes to address significant research gaps in the field, such as gaps in understanding disengagement and deradicalization processes and what programs can be developed and delivered to incarcerated terrorist offenders. While it is vital to understand the "push" (forcing) and "pull" (attracting) factors behind why individuals become terrorists to help inform prevention and intervention policies and programs, it is equally important to understand these factors to inform disengagement and deradicalization efforts. If we do not understand what makes terrorism attractive to certain individuals and how terrorism is unique from other forms of violence, we will not be able to prevent, intervene with, deradicalize, or reintegrate those susceptible to this phenomenon. Bridging this gap would not only complement NIJ's previous investments, it would lead to future opportunities for rigorous comparative research initiatives in conjunction with other topics, such as mass shootings and gangs.

By understanding disengagement and deradicalization, NIJ hopes to inform policy and practice around programming for terrorist offenders in confinement as well as post-release. In the United States, it is estimated that 275 individuals have been convicted of terrorism-related charges since the September 11 terrorist attacks.[21] Although some of these offenders are serving life sentences, many others are expected to be released. For example, as of December 1, 2018, 168 individuals have been charged with offenses related to the Islamic State group alone (not including offenders motivated by any other type of terrorist ideologies); their average sentence is 13.2 years.[22] A majority of these offenders will be released, often sooner than we would expect. Hundreds of other offenders are incarcerated for terrorism offenses or terrorism-related charges across the country, and there is still much to be learned about how these offenders should be reintegrated back into society, what the recidivism rate for these offenders will be, and to what extent their ideologies have changed after incarceration. Questions about the effectiveness of prison programming, offenders' access to services, and success with reintegration remain. Terrorist offenders are a relatively new and niche population that has been under-studied; immediate research and programming attention are needed to keep up with

the growing number of individuals being released on such charges. This is a widely recognized concern in the field of terrorism research, and NIJ hopes to play a key role in fulfilling this urgent research need.

Overall, NIJ funding has allowed for valuable contributions to the field of domestic radicalization and terrorism research. However, there are still many uncertainties around how to intervene before an individual radicalizes or mobilizes to violence. NIJ intends to remain engaged in combating the constantly evolving threats presented by violent extremism through soliciting rigorous research, engaging with stakeholders, and informing policymakers.

About the Author

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For More Information

Learn more about NIJ's domestic radicalization and terrorism portfolio at NIJ.ojp.gov/dr-research.

This article discusses the following grants:

- "Across the Universe? A Comparative Analysis of Violent Radicalization Across Three Offender Types with Implications for Criminal Justice Training and Education," grant number 2013-ZA-BX-0002
- "Evaluation of a Multi-Faceted, U.S. Community-Based Muslim-Led CVE Program," grant number 2013-ZA-BX-0003
- "Social Media as a Platform for Crafting Gender-Specific Interventions for the Domestic Radicalization of Women," grant number 2016-ZA-BX-K002
- "Research on Domestic Radicalization to Violent Extremism: Insights from Family and Friends of Current and Former Extremists," grant number 2017-ZA-CX-0005
- "Innovative Methodologies for Assessing Radicalization Risk: Risk Terrain Modeling and Conjunctive Analysis," grant number 2017-ZA-CX-0004

- "Community Reporting Thresholds: Sharing Information with Authorities Concerning Terrorism Activity," grant number 2018-ZA-CX-0004

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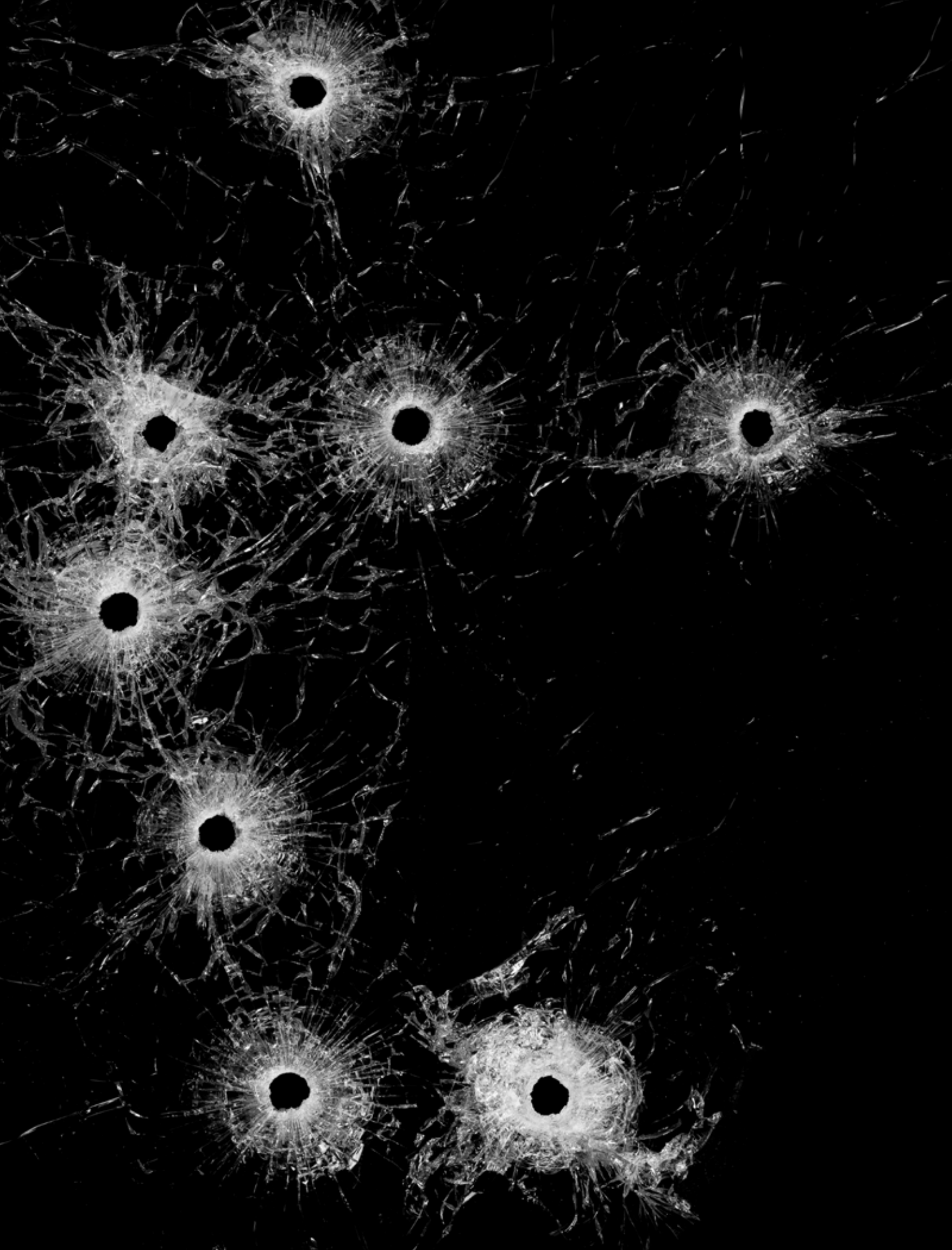
ADVANCING MASS SHOOTING RESEARCH TO INFORM PRACTICE

BY **BASIA E. LOPEZ, DANIELLE M. CRIMMINS,** AND **PAUL A. HASKINS**
NIJ's findings point to the adoption of uniform definitions and comprehensive databases as logical next steps for improving research and practice to prevent mass shootings.

Few events in American life evoke stronger reactions across society than mass shootings. They are part of the broader phenomenon of mass violence that includes, for example, terrorist attacks and war-related events. But mass shootings are distinguishable from those categories of mass violence in that their underlying motive sometimes appears to be unknown. Typically, mass shootings occur in a public place, with a single shooter, and most victims are killed or wounded indiscriminately.[1]

Because mass shootings have a severe impact on victims and society, they are a national criminal justice priority. As the frequency of mass shootings has increased in recent years, law enforcement and researchers have intensified their efforts to understand and prevent this form of firearms violence.[2] But their efforts are being held back by two systemic deficiencies: (1) the absence of a uniform definition of mass shootings and related concepts, and (2) the absence of consistent databases that gather, sort, and share essential facts on attempted and completed mass shooting incidents.

In an effort to improve understanding of mass shootings, NIJ science staff carried out a systematic literature review to identify the current state of knowledge suitable for use in preventing these incidents. They uncovered apparent inconsistencies in researchers' definitions of mass shooting incidents. Moreover, they found that the analyses supporting the definitions often rely on open-source data that are unreliable, inconsistent, or both.[3] These inconsistencies may lead to mixed — or even contradictory — findings, suggesting a need to align data and definitions in a more unified, coherent approach.

NIJ also convened leading researchers and law enforcement practitioners to gain additional insight into the challenges surrounding mass shooting studies and prevention strategies. The experts offered recommendations on how the field should move forward to advance both the research on and the prevention of mass shootings. All of these insights will help guide NIJ's leadership of mass shooting research and data management going forward, as key elements of its larger role in directing scientific investment to address violent crime and inform prevention efforts.

Wide variability in mass shooting definitions casts serious doubt over the field's ability to accurately capture all of the cases and analyze trends.

Inconsistencies in Definitions

To better understand the state of knowledge and identify gaps in research on mass shootings, NIJ science staff systematically reviewed the literature from 1997 through 2016.[4] Their analysis encompassed 44 research studies on mass shootings. Results revealed both consistencies and inconsistencies in the literature. Collectively, studies have yielded a number of high-utility insights on shooter characteristics, choice of targets, weapons, and other variables. Generally, however, the scholarship has been hampered by a lack of agreement on definitions of critical terms, such as "mass shootings" and "mass murders," and by the absence of consistent sources of data on mass shootings.

The literature does not define "mass shooting" consistently, or even in similar contexts. The federal criminal code lacks a distinct mass shooting offense; this may help explain why researchers use different terminology, or types of criminal offense, in their analyses of the same phenomenon.[5]

Among the 44 studies analyzed, the most common definition of a mass shooting is an incident in which four or more victims are killed with a firearm in a public place (48%). Several studies defined the offense as an event during which as few as two (5%) or three (9%) victims are killed, whereas more than one-third of the studies more broadly defined the term as an incident in which multiple victims are killed (38%). Others either defined a mass shooting incident as having a minimum of five victims or did not specify a victim threshold.

The definitions in the analyzed studies include incidents that take place in publicly accessible spaces such as schools, workplaces, places of worship, and businesses. The incidents are also defined as a single, continuous event within a short time frame, but the specific time frame can vary. The definitions often exclude ideologically motivated terrorist acts as well as gang, drug, and other shooting incidents that resulted primarily from the commission of other crimes, such as aggravated robbery, familicides, and domestic violence. Some of these studies, however, do not specify whether certain types of offenses were excluded from the definition.

This lack of consistency in defining mass shooting events is reflected in contradictory findings across a number of studies. The differences noted appear to contribute to varying conclusions about offenders' average age, motives, personality, suicidality, and target selection (i.e., victim, or victims, and place). Other notable differences in findings relate to the choice of firearms as well as the possible influence of news media coverage on mass shooting events and perpetrators. Importantly, wide variability in mass shooting definitions — in terms of the requisite minimum numbers of individuals shot and killed — casts serious doubt over the field's ability to accurately capture all of the cases and analyze trends.

Limited Access to Consistent Databases

Compounding the problem is the lack of uniform, reliable data sources. The literature reviewed used 10 types of data sources, and the majority of the studies used more than one type of data source. Of the 122 distinct data sources used in the 44 studies, 65% came from secondary, open-source data. Open-source data refers to publicly available and accessible information such as databases, news and media accounts, or other widely available sources. Thirty-three percent came from official records that are publicly accessible for the most part, and 2% came from interviews with offenders (see exhibit 1).

It is evident that there is no single, primary source of data used across the research on mass shootings. Some of the official records, such as the FBI's Uniform

Exhibit 1. Sources of Data Used in 44 Analyzed Studies on Mass Shootings

Secondary Data (News Accounts, Literature, Previous Research Data Sets, Monographs, Books, Advocacy Groups, International Sources, Press Data Sets, Internet, Other)
65%

Interviews
2%

Official Records (FBI SHR, UCR, NIBRS, and Other; BJS; ATF; CIA WFB; ED NCES; NYPD; Police Records; Courts; Other)
33%
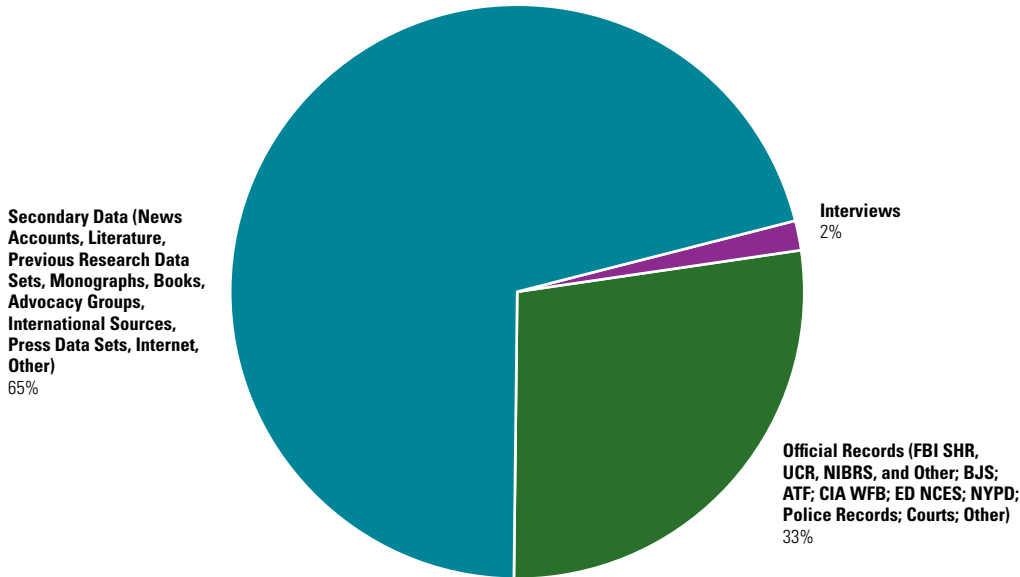
Note: Acronyms used in official records are Federal Bureau of Investigation (FBI); Supplementary Homicide Reports (SHR); Uniform Crime Reports (UCR); National Incident-Based Reporting System (NIBRS); Bureau of Justice Statistics (BJS); Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF); Central Intelligence Agency (CIA); World Fact Book (WFB); U.S. Department of Education (ED); National Center for Education Statistics (NCES); and New York Police Department (NYPD).

Crime Reports, Supplementary Homicide Reports, and National Incident-Based Reporting System, are often based on case files developed for the purposes of investigation and prosecution. Many times, however, they lack information on a wide range of variables that could advance prevention research. Such limitations often lead researchers to supplement the data with information from open sources or to rely solely on secondary data. Moreover, even if those standard, official reports were factually rich and complete, it is highly unlikely that they would be able to address many of the questions that are relevant to informing practices around preventing mass violence. For example, they generally do not include data on what the shooter did to prepare for the shooting, whether the shooter expressed some form of grievance, or whether the shooter had a history of mental health issues or had experienced a recent loss.

The factual limitations of official reports complicate the task of assessing the reliability of sources, raising questions such as how each data source defines the

phenomenon, what specific information the source provides, and — in the case of databases — what the time frame is for including events. As with inconsistencies in the definition of mass shootings in terms of the number of victims killed, the use of different data sources obfuscates trends and the impact of policies. This is not to say that no study has produced valuable results and recommendations. But without a thorough analysis of the research design by a trained eye, the end users of research, such as policymakers and practitioners, may arrive at conclusions that are erroneous and that may produce more harm than good.

There are a number of ongoing efforts by researchers and the federal government to build or enhance mass shooting databases. However, the research community must identify the challenges in this line of research and determine a set of characteristics that would make any given mass shooting database more reliable and useful in informing prevention.

Heeding the Experts

In the latter half of 2018, NIJ held directed discussions with subject matter expert groups of law enforcement officials and scholars as part of its initiative to assess existing mass shooting research and gauge its shortcomings. Insights gained at those sessions can inform and refine research going forward.

The primary objectives were to:

- Assess the need for uniform definitions in mass shooting data collection and analysis.

- Discuss the benefits of establishing data collection techniques to consistently catalog all of the pertinent mass shooting information.

Law enforcement discussants (practitioners) were current and former members of federal and local law enforcement agencies. Researcher discussants (researchers) were a multidisciplinary collection of scientists from several U.S. universities.

Points of Broad Agreement

The practitioners and researchers agreed on certain discrete research and practice needs. For example, they reached general agreement that a universal definition of mass shootings would not solve all ambiguity problems but would be an important first step. A common definition of mass shooting should be broad but not tied to any fixed minimum number of victims (for instance, a rule that a mass shooting means the killing, by firearm, of four or more people). Some samples of relevant comments by discussants include:

- Researcher: "The number of people killed can be happenstance. … If you focus too much on [a] happenstance outcome, things might get lost. It seems arbitrary to say three or four or five victims minimum. That seems to be missing the big picture."

- Practitioner: "That number [four] seems arbitrary. It should have less to do with efficiency, [that is, the]

number of people in the room, etc., than the intent of the offender."

- Practitioner: "You have to include nonfatal injuries. They all intend to kill, but if they are a poor shooter, you still have the same dynamics and personality — they just didn't know how to operate the weapon."

They also agreed that a mass shooting event is an incident where there is an evident premeditated *intent* to shoot to kill, regardless of the number of actual fatalities or injuries.

- Researcher: "But with the definition, I think we can discern that what we're trying to get at is this event with this person who had the intent to kill large numbers of people."

- Practitioner: "I think numbers are arbitrary and don't matter. If the intent was to kill a bunch of people, it doesn't matter. It would be counterproductive for prevention to exclude them."

- Practitioner: "So, we get to the intent of the individual when they came to the incident. If they did [intend harm to a lot of people], it's in; if not, it's out. The reality is that if you include cases with only two or more victims, the offender in those cases might have been trying to kill more but didn't."

Points of Difference

On other issues, there was notable divergence between the practitioners and researchers. For one, practitioners tended to favor reliance on data and data sources that are objective and verifiable, whereas researchers tended to be more receptive to open sources as well as more subjective data related to, for instance, health factors. Key examples of where practitioners and researchers diverged include desired data sources for mass shootings and the time range for including an incident.

It is important to note that different data sources are designed for different purposes. Official data sources are often developed for investigations and prosecutions. Such sources have high value for answering some investigative questions, but may

not be at all responsive to others. Official sources tend to focus on proximal factors related to the crime (e.g., time, place, manner, demographics, and other information that describes the criminal act and perpetrator). On the other hand, media accounts (an example of an open source) are more likely to trace back further in time and look more broadly at other possible factors that influenced the offender. That is, they may include information that is absent from official sources but is valuable for prevention purposes. At the same time, compared with official records, media sources may be more influenced by subjective judgments and errors.

Researchers tended to support a research approach that includes open-source data, such as media accounts. Several researchers said that because of a lack of access to official records and sensitive data, they often relied on open sources to fill the gaps and triangulate data. It should be noted that, if given the choice, these researchers said they would prefer to use official data sources. But they also see the value of triangulating information from multiple types of data sources for research purposes.

Practitioners tended to be strongly opposed to an open-source approach and to reliance on media accounts. Several practitioners said that in their view, media accounts are largely unreliable as primary data sources on mass shootings.

The sharp divergence in views between researchers and practitioners on data source preferences may reflect the distinct nature of their respective professions. Practitioners in the law enforcement field are accustomed to using official data, and their interest in determining accountability and culpability for criminal acts is often best served by data attributable to official sources. Researchers tend to seek answers to a broader range of questions, calling for broader data sources.

Some researchers and a local-level practitioner said they valued the collection of retrospective data (e.g., from the preceding 50 years) on qualifying incidents that were not sourced from media reports. They also emphasized the importance of collecting the same kind of data prospectively. Some practitioners, on the

other hand, recommended a focus on data from 2000 forward, given the limited access to information prior to the implementation of internet technology.

Recommendations for Future Research

A primary purpose of the expert discussion groups convened by NIJ was to produce guidance on developing further mass shooting studies to improve prevention. Researcher and law enforcement participants voiced support for a series of recommendations:

- Partner with law enforcement agencies (both local and federal) and associations to better access official data on mass shootings through sources that include prisoner interviews, police investigations, and mining of information on multiple-victim shooting incidents that were not covered in any depth by the media.

- Examine data on averted attacks.

- Compare mass shootings with other forms of mass violence.

- Help identify and debunk misconceptions with scientific evidence (e.g., weapon choice, mental health, motivation, planning and preparation).

- Estimate costs of mass shootings and victim impacts over time.

- Develop guidelines and resources for identifying and managing people of concern.

- Create an analytical model to enable practitioners to engage in predictive analysis of mass shootings. The model would be based on the time (including date), place, and modus operandi of studied mass shooting events.

- Create models for information exchange among local and federal stakeholders.

Moving Forward

NIJ's analysis of mass shooting literature and its structured engagement of experts point to the advisability of certain major action items for mass shooting research and law enforcement practice. First, there appears to be broad sentiment in favor of

moving away from a number-based system of rigidly defining mass shootings and related phenomena, and toward defining mass shootings more flexibly. An incident should not be entirely omitted from a mass shooting data set where, for example, a shooter with evident intent to kill multiple persons opens fire in a park where 10 individuals are present, with several resulting gunfire injuries but three or fewer fatalities.

Law enforcement should have a more active role in the study of mass shootings and in translating research to practice — for example, developing detection methods and tips and educating and training bystanders, school counselors, and others. Beyond an expanded research role, law enforcement officers will remain the last, crucial barrier between prospective shooters and their intended victims. Law enforcement must enhance its capability to detect and intercept mass shooters, and educate members of the public to detect and report any warning signs of prospective shooters in their communities, if the threat to society is to be reduced.

Criteria should be developed to facilitate adopting uniform definitions and data characteristics across all databases. NIJ recognizes that uniform, consistent cataloging of past mass shootings designed to support future data entry is an essential first step in advancing research and prevention efforts. Additionally, NIJ hopes to glean insights from analogous fields that study rare incidents (e.g., terrorism) to replicate and improve on established data collection methods and sustainability.

Preparedness for mass shootings — deeply traumatizing social phenomena as elusive as they are disruptive — will require an increasingly focused and coordinated effort by the research and practice communities as we move forward.

About the Authors

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For More Information

Learn more about NIJ research awards on mass shootings at NIJ.ojp.gov, keyword: mass shooting.

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4. A synthesis of the literature published through 2016 was completed in preparation for the topical meetings with experts described in this article. Before this article was published, NIJ science staff reviewed subsequent mass shooting studies published from 2017 through July 2019 and found no discrepancies with previous research with respect to the definitional and database-related issues.

5. On January 14, 2013, the 112th Congress amended the Investigative Assistance for Violent Crimes Act of 2012 Public Law 112–265 to define the term "mass killings" as three or more killings in a single incident, and the term "place of public use" as it is defined under Section 2332f(e)(6) of Title 18, United States Code. The act does not specify the weapon used, nor does it account for injured victims.

NCJ 254469

SERIAL KILLER CONNECTIONS THROUGH COLD CASES

BY **ERIC MARTIN, DAWN ELIZABETH SCHWARTING,** AND **RUBY J CHASE**

Cold case investigations have revealed that, in many cases, the offenders are responsible for multiple crimes. Therefore, prioritizing cold case investigations can assist in both resolving crimes and preventing future ones.

There is a cold case[1] crisis in the United States. In 1965, approximately 80% of homicide cases were cleared, according to the FBI's Uniform Crime Reports, but in 2017 only about 60% of homicide cases were resolved.[2] An estimated 250,000 unresolved homicides exist in the United States, and more than 100,000 have accumulated in the past 20 years alone (see exhibit 1).[3]

In part, limited resources have caused the crisis. Law enforcement agencies are stretched thin and often lack the personnel to adequately work cases as they happen. Cold cases are also difficult investigations, sometimes because of a lack of evidence. If there were easy solutions, resolution would have occurred at the time of the offense. As time passes, the likelihood of losing case file information, evidence, and witnesses increases.

Another likely contributor to the country's current cold case crisis is the number of serial killers operating in the United States. A serial murder is the unlawful killing of two or more victims by the same offender(s)

in separate events.[4] Estimates vary, but one estimate of the number of serial killers in the United States who have never been prosecuted for their crimes was as high as 2,000.[5] Another study suggests that up to 15% of homicides are the result of serial killers.[6] Meanwhile, estimates of the number of victims of serial killers, from a research study out of Indiana University-Purdue University Indianapolis, range from fewer than 200 to almost 2,000 each year.[7] The study notes that quantifying the estimated number of victims is difficult, and generalizing and extrapolating data has created a wide range of estimates — but even the low end of the range is alarming.

NIJ had several robust programs that have helped law enforcement agencies solve cold cases over the years. (Recently, nonresearch support for cold case investigations was transferred to one of NIJ's sister agencies, the Bureau of Justice Assistance.) In the process, NIJ-sponsored research has discovered a number of important connections between cold cases and serial offenders, the most alarming of whom are serial killers.

Investigating and resolving cold cases benefits law enforcement agencies, the communities they serve, and society as a whole.

Helping Resolve Cold Cases

NIJ has a long history of supporting the scientific, technical, and capacity needs of the forensic community, particularly as the demand for forensic testing has grown.[8] NIJ recognizes the value of analyzing evidence from older, unresolved cases (see sidebar, "The Costs and Benefits of Cold Cases"). From 2005 to 2014, the Institute provided funding for law enforcement agencies to review cold cases and submit their evidence for DNA analyses through its Solving Cold Cases With DNA program. This resulted in the resolution of more than 2,000 cold cases (see exhibit 2).

In 2019, NIJ initiated the Prosecuting Cold Cases Using DNA and Other Forensic Technologies program.[9] There was also a need to address the growing accumulation of unidentified remains and missing persons cases. As a result, the Using DNA To Identify

the Missing program and the National Missing and Unidentified Persons System (NamUs) evolved.[10] As of February 2019, NamUs reports that foul play is *not* suspected in only 7% (approximately 1,000) of its published missing persons cases (see exhibit 3). The approximately 14,000 remaining cases could have or are suspected to have resulted from foul play, and some fraction of these cases are likely to have serial killer connections. Likewise, some portion of the more than 7,000 unidentified persons cases published in NamUs (comprising more than 2,000 known homicide victims and more than 5,000 unidentified persons whose manner of death remains undetermined) are also likely to be the result of serial killers (see exhibit 4).

Potentially more staggering is the number of missing persons who are unaccounted for. These people — often immigrants, foster children, and transient people such as homeless individuals and prostitutes — are not reported missing for a variety of reasons. Even when they are reported missing, law enforcement does not routinely investigate such cases until there is cause to believe that foul play has occurred.[11] In interviews, many serial killers have noted that they preyed on these vulnerable populations and disposed of their victims' bodies in places and manners unlikely to be discovered; thus, their crimes could go unnoticed and they could continue killing.[12] (See

Exhibit 1. Twenty Years of Cold Case Accumulations

Legend: Accumulated Cold Cases — Arrested — Murder and Nonnegligent Manslaughter
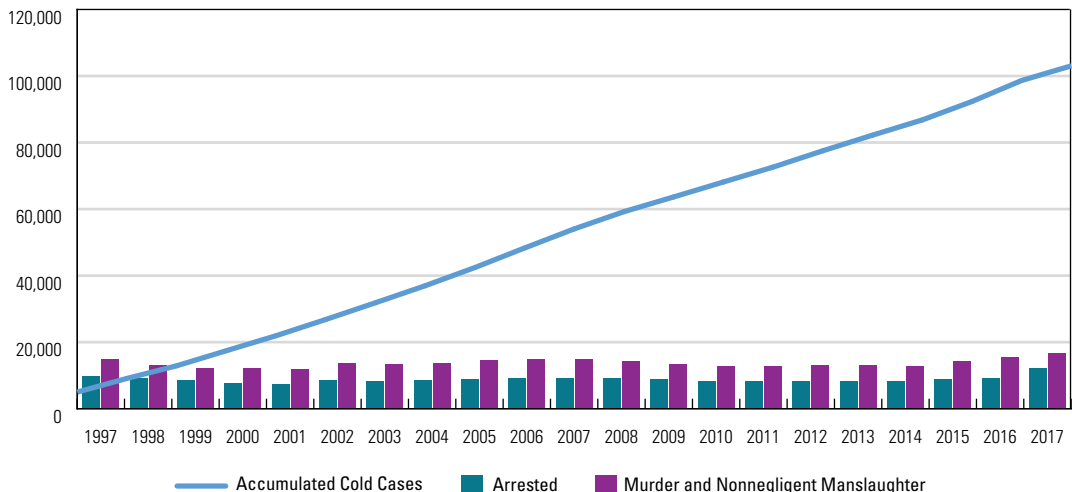
Exhibit 1. Twenty Years of Cold Case Accumulations (continued)			
Year	Cases of Murder and Nonnegligent Manslaughter	Percentage Cleared by Arrest	Arrested	Cold Cases
1997	14,759	66.1%	9,756	5,003
1998	13,134	68.7%	9,023	4,111
1999	12,266	69.1%	8,476	3,790
2000	12,291	63.1%	7,756	4,535
2001	11,982	62.4%	7,477	4,505
2002	13,561	64.0%	8,679	4,882
2003	13,373	62.4%	8,345	5,028
2004	13,662	62.6%	8,552	5,110
2005	14,430	62.1%	8,961	5,469
2006	14,948	60.7%	9,073	5,875
2007	14,811	61.2%	9,064	5,747
2008	14,225	63.6%	9,047	5,178
2009	13,242	66.6%	8,819	4,423
2010	12,760	64.8%	8,268	4,492
2011	12,706	64.8%	8,233	4,473
2012	13,092	62.5%	8,183	4,910
2013	13,075	64.1%	8,381	4,694
2014	12,879	64.5%	8,307	4,572
2015	14,392	61.5%	8,851	5,541
2016	15,556	59.4%	9,240	6,316
2017	16,617	61.6%	12,208	4,409
TOTAL	287,761		184,700	103,061

Exhibit 2. NIJ's Solving Cold Cases With DNA Program

Year	Number of Awards	Amount of Funding	Number of Cases Reviewed	Number of Cases Where Biological Evidence Remained
2005	38	$14,245,153	7,767	1,305
2007	21	$8,485,130	33,897	4,174
2008	42	$16,119,105	50,813	7,371
2009	27	$12,263,938	14,087	6,475
2010	27	$10,148,219	11,885	5,522
2011	11	$4,355,843	7,610	3,545
2012	22	$7,580,191	9,834	4,536
2014	25	$4,742,222	5,498	1,361
Total	**213**	**$77,939,801**	**141,371**	**34,289**

Note: Data are reported to NIJ only during the funded project period, and all 213 of the Solving Cold Cases With DNA awards are closed. Most activities related to cold case investigations occur after the grantees no longer provide project progress reports. DNA results and uploads to the FBI's Combined DNA Index System (CODIS), for example, often happen after the project period. Thus, CODIS hits and closed cases resulting from NIJ-funded projects reported here are considered to be conservatively low.

sidebar, "NIJ Programs Help Support Cold Case Investigations.")

NIJ's Role in High-Profile Investigations

Through administration of these NIJ programs, several serial killers[13] and their victims have been identified. Below are a few examples of high-profile serial killer cases that were solved with the assistance of NIJ programs.

Boston Strangler

Albert DeSalvo admitted to killing 13 women in the Boston area between 1962 and 1964. Several of the victims were strangled, thus earning DeSalvo the moniker the "Boston Strangler." However, DeSalvo recanted his confession of the murder of Mary Sullivan, and controversy arose over his culpability in that case. DeSalvo — sentenced to life in prison

in 1967 — was killed in prison in 1973. In 2013, the Boston Police Department used funds from the Solving Cold Cases With DNA program[14] to confirm that DNA recovered from Mary Sullivan was a statistically relevant match to DNA from DeSalvo's remains, which were exhumed that same year.

Killer Clown

In 1978, 30 bodies were recovered at the Chicago home of John Wayne Gacy, a part-time clown entertainer. As of 2011, 14 victims remained unidentified, but two of those victims have since been identified using forensic technologies. Facial reconstructions performed on the unidentified victims and DNA profiles obtained through NIJ's Using DNA To Identify the Missing program led to the identification of William Bundy in 2011.[15] In 2017, NamUs assisted in identifying Jimmy Haakenson.[16]

Exhibit 2. NIJ's Solving Cold Cases With DNA Program (continued)

Year	Number of Cases Where DNA Was Tested	Number of Cases That Yielded a Profile	CODIS Uploads	CODIS Hits	Number of Cases With Trials, Arrests, Closed
2005	2,236	677	704	261	206
2007	1,573	786	530	158	328
2008	3,691	2,049	1,493	576	353
2009	2,278	1,369	956	365	333
2010	1,711	723	598	248	358
2011	640	378	445	197	176
2012	1,218	497	432	138	245
2014	1,024	513	422	118	86
Total	**14,371**	**6,992**	**5,580**	**2,061**	**2,085**

Green River Killer

During the 1980s, Gary Ridgway killed numerous women along the Green River in Washington state. In 2003, Ridgway — called the "Green River Killer" — was convicted of killing 49 women; he is suspected in as many as 90 homicides. In 2001, the King County Sheriff's Office used DNA laboratory equipment purchased with NIJ funds from the Crime Laboratory Improvement Program to link evidence found on four of the victims to Ridgway.[17]

In addition to not knowing the actual number of Ridgway's victims, the identities of some victims remain unknown. In 2012, through two separate awards from NIJ's Using DNA To Identify the Missing program, Bode Cellmark Forensics and the University of North Texas Health Science Center used reference DNA provided by siblings to confirm that the victim once known as "Jane Doe B16" was Sandra Major.[18]

Long Island Killer

Eleven sets of human remains were recovered along a beach in Long Island, New York. Several of the victims were dismembered and only partially recovered. Through NIJ's Using DNA To Identify the Missing program, New York City's Office of Chief Medical Examiner helped determine the identities of six victims. It also matched two sets of remains recovered from separate locations to one victim, who remains unidentified.

The medical examiner's office also obtained a partial familial DNA match between DNA samples collected from two victims found on Long Island and the brother of John Bittrolff. Bittrolff was confirmed as an exact match to the DNA from the victims and was subsequently convicted. His case was the first homicide conviction in New York based on a partial DNA match — although it still remains unclear whether Bittrolff is the "Long Island Killer" or only one of perhaps multiple killers who disposed of their victims in that area.[19]

Grim Sleeper

A single source of DNA connected several homicide victims from the 1980s and 2000s, but no suspect

Exhibit 3. Foul Play in Active Missing Persons Cases in NamUs
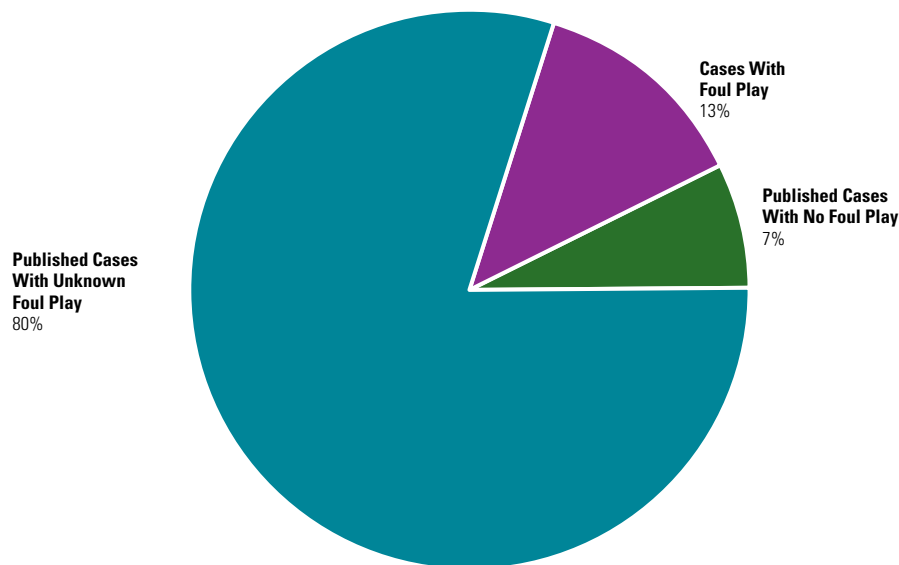
Cases With Foul Play
13%

Published Cases With No Foul Play
7%

Published Cases With Unknown Foul Play
80%

Note: NamUs publishes cases for which its staff have verified the information and posted the information in the publicly accessible database files. These data were calculated in August 2018.

Exhibit 4. Manner of Death in Active Unidentified Persons Cases in NamUs
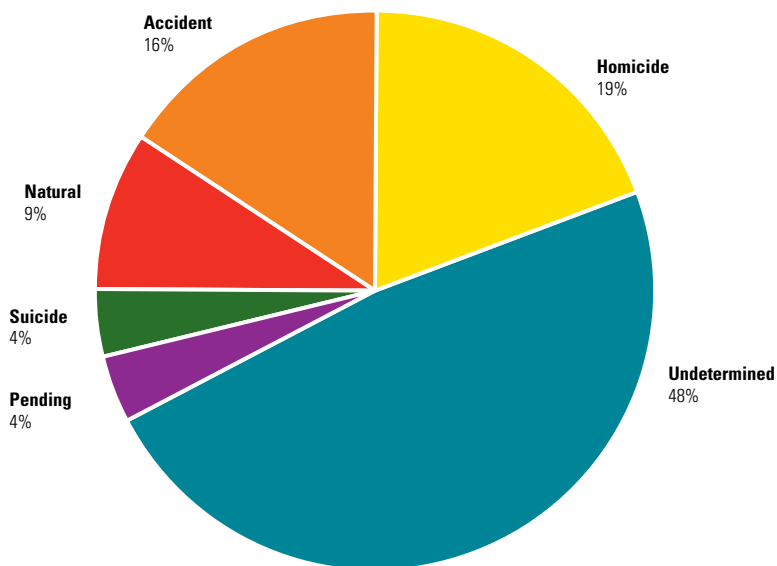
Accident
16%

Homicide
19%

Natural
9%

Suicide
4%

Pending
4%

Undetermined
48%

Note: NamUs publishes cases for which its staff have verified the information and posted the information in the publicly accessible database files. These data were calculated in August 2018.

The Costs and Benefits of Cold Cases

In numerous ways, investigating and resolving cold cases benefits law enforcement agencies, the communities they serve, and society as a whole. First and foremost is the safety of the community. When offenders are incarcerated, the community is spared their crimes and residents feel safer. Safety is both real and perceived. With respect to the latter, unresolved crimes can lead to mental health and financial costs — for example, businesses might suffer when customers avoid particular times and locations because they are afraid. Serial offenders contribute to these fears — their crimes are compounded by notoriety, and with each unsolved case there is a growing sense of prevalent danger in the community.

Secondly, and no less important, is the sense of justice that survivors feel when perpetrators are apprehended.[1] Survivors often feel that law enforcement has given up on them and that the lives of their loved ones are no longer a priority.[2] Law enforcement has a moral obligation to fulfill its mission; because cold cases capture public interest, resolving them inspires public confidence in law enforcement.

In addition to promoting safety and justice, preventing future crime and clearing active cases result in enormous financial savings. Although very difficult to calculate, the costs of crime are generally believed to be extremely high, ranging from $690 billion to $3.41 trillion annually.[3] Many variables determine the costs of crime: crime prevention efforts, direct consequences of crimes such as medical and funeral costs for victims, crime responses, and investigations, as well as the costs of moving suspects through the legal system and incarcerating them. Even harder to quantify are the intangible costs to victims and the community. Fear and post-traumatic responses may be somewhat quantifiable if psychological help and physical security enhancements could be calculated; however, the emotional costs can never be measured.

Notes

1. The term "survivors" refers to victims and their circle of family and friends who are also affected by the victimization from the crime (e.g., family members are affected by the loss of a murdered loved one). These people are considered to be survivors of the crime, just as the victims of nonhomicides are considered to be survivors.

2. The Office for Victims of Crime, in coordination with the National Sheriffs' Association and the National Organization of Parents of Murdered Children, created a guide to assist law enforcement in understanding survivors and to provide strategies for working with survivors. National Sheriffs' Association, Justice Solutions, and National Organization of Parents of Murdered Children, *Serving Survivors of Homicide Victims During Cold Case Investigations: A Guide for Developing a Law Enforcement Protocol,* Washington, DC: Justice Solutions, August 2011, NCJ 236082, https://www.ncjrs.gov/app/publications/abstract.aspx?id=258071.

3. U.S. Government Accountability Office, "How Much Does Crime Cost?" *WatchBlog,* November 29, 2017, https://blog.gao.gov/2017/11/29/how-much-does-crime-cost/.

NIJ Programs Help Support Cold Case Investigations

The Postconviction DNA Testing Assistance program (Postconviction DNA Testing To Exonerate the Innocent) is designed to review evidence in cases where DNA analysis may substantiate claims of a potential wrongful conviction.[1] Grantees have reported that, in some cases, not only were those convicted not responsible, but also the true culprits appeared to be serial killers. For example, in North Carolina, Leon Brown and Henry Lee McCollum were convicted for the murder of Sabrina Buie, but subsequent DNA testing exonerated them and revealed that Roscoe Artis, a convicted rapist and killer, was Buie's likely killer.[2]

NIJ also tracks the outcomes of criminal justice programs, including those related to cold cases and repeat violent offenders, and supports behavioral and social science research through its Social Science Research on Forensic Science (SSRFS) portfolio. SSRFS was born out of a need to understand both the potential and the limits of forensic science in bringing offenders to justice. Its diverse topics have included studying the effectiveness of an innovative forensic method,[3] understanding the perception of forensics in the courtroom,[4] and assessing the benefits of expanding the use of DNA testing beyond serious violent crime.[5] SSRFS's research has identified effective practices for the apprehension of serious violent criminals,[6] which include pursuing cold cases, employing alternative DNA searching technologies, and investigating property crimes. This program gives agencies an understanding of the full spectrum of investigative opportunities open to them through the use of forensic methods.

Notes

1. In 2020, the Postconviction DNA Testing To Exonerate the Innocent program was moved from NIJ to the Bureau of Justice Assistance, Office of Justice Programs, along with other capacity enhancement programs.

2. The National Registry of Exonerations, "Henry McCollum," Newkirk Center for Science & Society at the University of California Irvine, University of Michigan Law School, and Michigan State University College of Law, updated September 2, 2015.

3. Sara Debus-Sherrill and Michael B. Field, *Understanding Familial DNA Searching: Policies, Procedures, and Potential Impact, Summary Overview,* Washington, DC: U.S. Department of Justice, National Institute of Justice, August 2017, NCJ 251043, https://www.ncjrs.gov/pdffiles1/nij/grants/251043.pdf.

4. N.J. Schweitzer, *Communicating Forensic Science,* Washington, DC: U.S. Department of Justice, National Institute of Justice, May 2016, NCJ 249804, https://www.ncjrs.gov/pdffiles1/nij/grants/249804.pdf.

5. John K. Roman et al., *The DNA Field Experiment: Cost-Effectiveness Analysis of the Use of DNA in the Investigation of High-Volume Crimes,* Washington, DC: U.S. Department of Justice, National Institute of Justice, April 2008, NCJ 222318, https://www.ncjrs.gov/pdffiles1/nij/grants/222318.pdf.

6. National Institute of Justice, *Social Science Research on Forensic Science Topical Working Group Meeting,* Washington, DC: U.S. Department of Justice, National Institute of Justice, January 2013, NCJ 244261, https://www.ncjrs.gov/pdffiles1/nij/244261.pdf.

was identified in the FBI's Combined DNA Index System (CODIS). The lag between the associated killings led to the moniker the "Grim Sleeper."

NIJ's Solving Cold Cases With DNA program enabled detectives to review and analyze DNA evidence in several of the unsolved homicides. A familial DNA search in CODIS led investigators to the son of Lonnie David Franklin Jr. NIJ funding assisted in analyzing DNA from Franklin, which was confirmed as a match to DNA recovered from the murders.

In 2016, Franklin was convicted of killing 10 women, and he is suspected of killing an additional 25 women. More than 100 photographs of unknown women were found among Franklin's possessions, leading to speculation that he may have been responsible for many more killings.[20]

Golden State Killer/East Area Rapist

In the 1970s and 1980s, at least two separate serial offenders were thought to be operating in California: the "Golden State Killer" and the "East Area Rapist." These unknown offenders were also known as the "Original Night Stalker," the "Visalia Ransacker," the "East Bay Rapist," and the "Diamond Knot Killer."

Funding through NIJ's Solving Cold Cases With DNA program helped link a double homicide in Ventura to a common suspect in 10 homicides and three sexual assaults throughout California — including in Orange County, where a separate NIJ award allowed investigators to work on unsolved sexual assaults and homicides attributed to the Golden State Killer and the East Area Rapist.[21] Once investigators from multiple counties realized that the separate offenders were in fact the same person, they calculated that the suspect had possibly committed more than 50 sexual assaults. Armed with the case-to-case connections, investigators tried a new DNA investigative approach: forensic genetic genealogy, which is the identification of suspects through DNA matches to family members. In 2018, Joseph James DeAngelo was identified as a suspect, and a confirmatory DNA match led to 13 rape charges and 13 murder charges against him.

Truck Drivers and Other Cases

Truck drivers travel great distances regularly, which provides ideal opportunities to commit crimes that are difficult to resolve.[22] With funding from NIJ's Using DNA To Identify the Missing program, the University of North Texas was able to connect truck driver William Reece to the deaths of one girl in Oklahoma and two young women in Texas.

In addition to the high-profile cases listed above, NIJ grantees have reported other serial killers who were identified as a result of their projects. For a more comprehensive list of serial killer investigations aided by NIJ funds, see the appendix of this article at NIJ.ojp.gov/serial-killer-cold-cases.

Catching Serial Offenders Early

Understanding patterns of behavior along with criminal and psychological profiles can help identify and catch prolific serial killers — and perhaps even prevent some before they start. For example, studies have shown that compared to other criminals, serial violent offenders start committing crimes earlier; offend over a longer period of time; and have more employment, interpersonal, and substance abuse problems.[23] Moreover, research suggests that offenders who engage early on in a diverse criminal career are likely to commit more violent offenses later.[24]

Armed burglary in particular is associated with further increases in violent crime, such as armed robbery, armed rape, kidnapping, assault with intent to murder, and even first-degree murder. Researchers have found that sex offenders were most likely to transition quickly from conventional profit-motivated burglaries to sexual assaults in homes without engaging in fetish-motivated burglaries or voyeurism.[25]

Some serial killers exhibit a three-part progression from burglary to sexual assault to murder. Sexual assault does not necessarily predict further escalation to violent crime or serial killing,[26] but some examples of this pattern include the following cases:

- Albert DeSalvo (the Boston Strangler) began with shoplifting and stealing. He progressed to burglary and eventually to sexual assault and murder.[27]

- Joseph DeAngelo (the Golden State Killer) committed a string of burglaries from April 1974 to December 1975. He then progressed to a series of sexual assaults between June 1976 and July 1979 and was dubbed the "East Area Rapist." He progressed to murder in October 1979 and was called the "Original Night Stalker" before investigators finally linked him to the burglaries, sexual assaults, and homicides.[28]

- John Wayne Gacy (the Killer Clown) engaged in petty theft as a child, graduated to sexual assault in his 20s, and then began to murder in his 30s, preying on a vulnerable population of teenage boys.[29]

These findings are important because they suggest that the seriousness of any one offense should not drive where law enforcement directs resources for investigating and clearing cases. Such strategies are understandable, but they can lead to the perception that there are classes of offenders based on specialty. This belief, in turn, may lead law enforcement to prioritize cases related to "violent" offenders over cases involving "property" offenders.

It would be worthwhile to reconsider the way agencies investigate cold cases — that is, it would be beneficial to include a wider range of offenses when seeking investigative leads for homicides. Indeed, research on the careers of serial killers justifies paying increased attention to burglaries when investigating violent criminal careers and cold cases.

To help law enforcement understand the nexus of property crimes and more violent offenses, NIJ funded the Urban Institute to conduct a randomized controlled trial examining the impact of using DNA testing to investigate burglary cases in five separate jurisdictions. Researchers found that in 67% of cases in which a DNA sample was obtained, the sample was entered into CODIS; 41% of these cases yielded a match.[30] Overall, this led to twice as many suspects

identified when using DNA than through conventional burglary investigations.[31]

Of particular interest, suspects identified through DNA evidence from burglaries had double the number of felony arrests and convictions than suspects identified using conventional methods.[32] This finding does not guarantee that using DNA methods to investigate burglaries will lead law enforcement to serial violent offenders (known or unknown), but it does show that these investigative methods help police discover and apprehend more prolific offenders.

Addressing the Crisis

Focusing investigative efforts on cold cases and apprehending repeat offenders can prevent future crimes and protect possible victims, thus saving the community the immense cost of these crimes. Clearing cases also frees agency resources, and resolved crimes equate to a sense of a safer community, lessening the need for "boots on the ground" and reactive policing.

The future looks bleak when seeing numbers like a quarter of a million unresolved homicides and 2,000 serial killers. But today's agencies have numerous tools on their side, including research on best investigative practices, advancements in science and technology, and increased information exchange. As evidenced by the serial killer case examples reported through NIJ's programs — and the knowledge that criminals tend to be repeat offenders — many unresolved homicides are likely to lead to perpetrators responsible for multiple killings. Thus, solving one case is likely to solve multiple cases. For example, one detective seeking to identify the remaining victims of John Wayne Gacy resolved 11 other missing persons cases in the process, several of which were homicides.[33]

Investigative Practices

One NIJ-funded study examined effective investigation practices for cold cases. Researchers found that cold cases were usually opened because new witnesses came forward or DNA tests were conducted on

NamUs-FBI Fingerprint Collaboration Partnership

In 2017, the FBI and the National Missing and Unidentified Persons System (NamUs) entered into a partnership in which the friction ridge impression records for missing and unidentified persons that NamUs collected were searched against the FBI's Next Generation biometric database. As of September 30, 2019, 259 identifications of unidentified persons have been made through this partnership. Most notably, 28 of those identified are confirmed homicide victims.

A significant number of the unidentified human remains in NamUs have a cause of death that is undetermined or unlisted. The probability that at least some of these NamUs cases are homicide victims means that the partnership with the FBI is likely to turn up many additional homicide leads. Recognizing a homicide and identifying a victim is a major first step in resolving cold cases and identifying serial killers.

retained physical evidence (some of which was collected before the most current DNA technologies became available).[34]

They also found that the amount of resources dedicated to cold case investigations, particularly the level of funding, significantly affected the cold case clearance rate.[35] More recent cases were more likely to be solved than older ones. Also, if the victim was found inside his or her own home, chances of solvability increased. The justification for opening the cold case investigation mattered as well: Cold cases were most likely to be cleared if the cases were initiated by investigators through new evidentiary leads.[36] In sexual assault cases, victim cooperation was found to be related to a successful conviction rate.[37]

Science and Technology

Advancements in science and technology have helped solve cases that were once unsolvable. DNA — an unknown evidence source in the 1980s — can now be analyzed with a fraction of the sample size needed merely five years ago. Meanwhile, upgraded computer search algorithms[38] are realizing connections between friction ridge impressions[39] that were not identifiable during previous searches (see sidebar, "NamUs-FBI Fingerprint Collaboration Partnership").

Tapping into technology can propel a stalled cold case investigation forward. For example, innovations in DNA databases' search capabilities are connecting crimes to other crimes and to offenders.[40] The Golden State Killer alone was connected to 12 homicides, more than 50 sexual assaults, and hundreds of incidents of burglaries, peeping, stalking, and prowling[41] through DNA database connections.

In conventional practice, DNA database searching consists of seeking an exact match at 20 DNA loci between evidence and samples in the CODIS database from other crime scenes or convicted offenders or arrestees. Some jurisdictions are finding success through less precise (lower stringency) searching, giving them the ability to find individuals related to the suspect. This can be done by simply noting partial matches, or through specific software algorithms designed to identify family members (i.e., familial searching).[42]

ICF International, in an NIJ-funded study, found that 11 states allowed familial DNA searching and that 24 states and Puerto Rico disclosed DNA hits based on partial matches. The labs that engaged in familial DNA searching were starting to see arrests leading to convictions, albeit in a small number of cases. ICF also found that key stakeholders who championed the use of familial searching along with establishing

DNA and Cold Case Investigations

Emerging DNA analysis applications that may assist in cold case investigations include DNA phenotyping, forensic genetic genealogy (FGG), and DNA mixture interpretation. DNA phenotyping is the use of DNA information to predict the physical features of a person (their phenotype), such as eye, skin, and hair color. A sketch of a person's appearance can be generated by combining the information from several phenotypically important genes. NIJ research has included projects such as identifying genetic markers in DNA that contribute to skin pigmentation.[1]

FGG is a process whereby DNA profiles are used in conjunction with genealogy investigations to identify relatives of an unknown donor of a DNA sample. It should be noted that the DNA profiles used in law enforcement databases differ from the DNA profiles obtained through the commercial DNA genealogy sites that FGG relies on. The U.S. Department of Justice published an interim policy on the use of FGG in September 2019 to ensure that law enforcement practices continue to protect the rights of people who use public genealogy resources while also incorporating FGG to identify potential investigative leads.[2] The use of FGG led to the identification of the Golden State Killer.

Because violent crimes involve the interaction of two or more people, multiple DNA profiles may be mixed together in evidence. Using probabilistic software in DNA analyses has allowed analysts to separate or interpret individual DNA profiles from such mixtures where previous analyses provided inconclusive results. In addition, NIJ-funded research is applying machine learning to DNA mixture interpretation, improving results by incorporating data from previous analyses.[3]

NIJ continues to fund research and development for advancing new DNA technologies. Many of these technologies, however, are still evolving and may not provide solutions in the near future. But in cold cases, where there may be little evidence and few to no investigative leads, new technologies may, in time, provide just enough information to propel a cold case investigation toward its next steps.

Notes

1. National Institute of Justice, "Genomewide Association of Quantitative Pigmentary Traits in Admixed US Populations," award to the University of Cincinnati, grant number 2013-DN-BX-K011, https://nij.ojp.gov/funding/awards/2013-dn-bx-k011.

2. U.S. Department of Justice, "Department of Justice Announces Interim Policy on Emerging Method to Generate Leads for Unsolved Violent Crimes," press release, September 24, 2019, https://www.justice.gov/opa/pr/department-justice-announces-interim-policy-emerging-method-generate-leads-unsolved-violent.

3. Michael A. Marciano and Kevin S. Sweder, "Hybrid Machine Learning Approach for DNA Mixture Interpretation," report to the National Institute of Justice, grant number 2014-DN-BX-K029, June 2016, NCJ 251804, https://nij.ojp.gov/library/publications/hybrid-machine-learning-approach-dna-mixture-interpretation; and Forensic Technology Center of Excellence and RTI International, "Success Story: Improving DNA Mixture Interpretation With the Help of Machine Learning," Research Triangle Park, NC: Forensic Technology Center of Excellence, March 2019, NCJ 252783, https://nij.ojp.gov/library/publications/success-story-improving-dna-mixture-interpretation-help-machine-learning.

clear policies led to greater use of this technique.[43] As use of this technique becomes more familiar, and as more cases are cleared through partial-match and familial searching, it is foreseeable that this practice may expand or lead to other innovative DNA searching methods.

In addition, information is more accessible today. Investigators can connect suspects to crimes using the vast amount of information available through the internet and electronic records, as illustrated by recent news stories of cold cases that were resolved through genealogy databases (see sidebar, "DNA and Cold Case Investigations").

Auditing the Evidence

Cold case investigators and laboratories across the country have realized that auditing cold cases may help clear them. As with any process, there can be gaps and oversights, and many investigators have learned that these may exist in evidence databases.

For example, capturing DNA from criminals, according to the locality's defined offense criteria, is a common practice and has been occurring for decades, but many offenders have managed to avoid it. Investigators routinely submit evidence to labs, hoping that their unknown DNA profile matches an entry from a known person in CODIS. This is possible if the suspect was previously convicted (and, in some states, arrested). But what if the suspect was arrested or convicted prior to DNA collection laws? What if the suspect was committed for mental observation and the DNA collection process was circumvented? What if the suspect died without DNA being collected? Investigators may identify a suspect in a cold case merely by auditing the evidence, case files, and associated databases and recognizing a gap or oversight.[44]

Cold cases also have the benefit of time. Situations change, relationships change, and barriers — such as the previously uncooperative spouse who is now an ex-spouse, willing to share his or her knowledge — can help resolve cold cases. Scientific processes also evolve with time. Having the ability to patiently and thoroughly investigate a cold case, rather than acting reactively or responding only to recent situations, affords investigators the ability to research and apply all available tools for resolving today's cold cases, preventing future crimes, and potentially catching a serial killer. Agencies need only apply resources to capitalize on these assets.

There has never been a better time to address cold cases. With the advantages of research, technology, and time, agencies can greatly benefit from addressing the cold case crisis in the United States and, as a consequence, serial killings can be identified, solved, and prevented.

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For More Information

Read NIJ's *National Best Practices for Implementing and Sustaining a Cold Case Investigation Unit* at NIJ.ojp.gov, keyword: 252016.

Learn more about NamUs at www.NamUs.gov.

Watch a video on the impact of NIJ's Solving Cold Cases With DNA program at NIJ.ojp.gov/coldcaseimpact.

Read the related *NIJ Journal* article "Cold Cases: Resources for Agencies, Resolution for Families" at NIJ.ojp.gov, keyword: cold case resources.

Watch a video on the importance and impact of cold case units at NIJ.ojp.gov/coldcaseimportance.

Notes

1. "Cold case" is a term used by the media to describe a criminal case that has remained unresolved for an extended period of time. It is not clearly defined, and definitions vary between agencies. For example, the state of Arizona defines a cold case as one that remains unsolved after one year, while Los Angeles, California, uses five years as its homicide cold case threshold. NIJ uses "cold case" because of the term's prevalence and acceptance in most agencies, even though it realizes that this term can be perceived as insensitive; it is not NIJ's intention to diminish the seriousness of any crimes nor the resolve of law enforcement to provide justice for all crimes. Arizona Cold Case Task Force, "A Report to the Governor and the Arizona State Legislature," 2007, https://www.azag.gov/sites/default/files/publications/2018-06/ColdCaseTaskForceReport2007.pdf; and Los Angeles Police Department [LAPD], "Robbery-Homicide Division," Los Angeles: LAPD.

2. Data for 1965 are from the Federal Bureau of Investigation's Uniform Crime Report for that year, cited in Murder Accountability Project, "Clearance Rates," www.murderdata.org/p/blog-page.html. A Bureau of Justice Statistics report notes that 72% of homicides were cleared in 1980: Alexia Cooper and Erica L. Smith, *Homicide Trends in the United States, 1980-2008,* Washington, DC: U.S. Department of Justice, Bureau of Justice Statistics, November 2011, NCJ 236018, https://www.bjs.gov/content/pub/pdf/htus8008.pdf. Data for 2017 are from Federal Bureau of Investigation, Uniform Crime Report, *Crime in the United States, 2017,* Washington, DC: U.S. Department of Justice, Federal Bureau of Investigation, 2018, https://ucr.fbi.gov/crime-in-the-u.s/2017/crime-in-the-u.s.-2017/topic-pages/clearances.

3. Information surmised by calculating the number of homicides reported to the FBI since 1980 minus the total number of homicide cases reported to have been cleared.

4. Federal Bureau of Investigation, *Serial Murder: Multi-Disciplinary Perspectives for Investigators,* Washington, DC: U.S. Department of Justice, Federal Bureau of Investigation, Behavioral Analysis Unit, 2005, https://www.fbi.gov/stats-services/publications/serial-murder.

5. A 2018 article in *Live Science* notes that the number of serial killers who have not been captured can be determined by calculating the number of cases linked through evidence connections in evidence databases that have not been adjudicated. Stephanie Pappas, "How Many Uncaptured Serial Killers Are Out There?" *Live Science,* April 28, 2018.

Mike Aamodt of Radford University collected serial killer data from 1992 to 2016 and calculated that 54 serial killers were operating during the years 2010 to 2015. Aamodt's research was the basis for the data reported in the *Live Science* article. Mike Aamodt, *Serial Killer Statistics,* Radford, VA: Radford University, Serial Killer Information Center, September 4, 2016. One former investigator for the FBI stated that he believed that at any one time there are between 25 and 50 active serial killers in the United States. John E. Douglas, *Mind Hunter: Inside the FBI's Elite Serial Crime Unit* (New York: Pocket Books, 1995).

6. The authors of a study from Indiana University-Purdue University Indianapolis apply a formula based on data analyzed through a study from Washington state to estimate that serial killers are responsible for approximately 15% of all homicides. The study further describes how this estimate may be conservative, since there are many unknown cases. Kenna Quinet, "The Missing Missing: Toward a Quantification of Serial Murder Victimization in the United States," *Homicide Studies* 11 no. 4 (2007): 319-339, doi:10.1177/1088767907307467.

7. Quinet, "The Missing Missing."

8. Gerald LaPorte, Heather Waltke, Charles Heurich, and Ruby J Chase, *Fiscal Year 2017 Funding for DNA Analysis, Capacity Enhancement, and Other Forensic Activities,* Washington, DC: U.S. Department of Justice, National Institute of Justice, April 2018, NCJ 251445, https://www.ncjrs.gov/pdffiles1/nij/251445.pdf.

9. Section 2 of the Justice Served Act of 2018 provides funding for prosecutors to increase the capacity of state and local prosecution offices to address cold cases involving violent crime where suspects have been identified through DNA evidence. In 2020, this program moved to the Bureau of Justice Assistance, Office of Justice Programs.

10. NamUs is a national, central repository and resource center for the records of missing and unidentified persons. It consists of three primary databases: the Missing Persons Database, the Unidentified Persons Database, and the Unclaimed Persons Database, a database of people whose identities are known but who remain in the custody of a medical examiner or coroner until next of kin are identified. For more information, go to www.namus.gov.

11. Connecticut, Michigan, New Jersey, New York, and Tennessee require law enforcement agencies to enter missing persons into NamUs, and Oklahoma has proposed Francine's Law, whereby all missing and unidentified persons must be entered into NamUs within 30 days of the initial report. Office of the Oklahoma Attorney General, "Attorney General Hunter, Local, State Leaders Announce Initiative to Help Solve Cold, Missing and Unidentified Person Cases," press release, Oklahoma City: Office of the Oklahoma Attorney General, August 16, 2018, https://www.oag.ok.gov/articles/attorney-general-hunter-local-state-leaders-announce-initiative-help-solve-cold-missing-and.

12. "I picked prostitutes as victims because they were easy to pick up without being noticed. … I knew they would not be reported missing. I picked prostitutes because I thought I could kill as many of them as I wanted without getting caught," Gary Ridgway explained. James Allen Fox, "Serial Killers Find Prostitutes Easy Prey," *USA Today,* October 23, 2014.

13. 28 U.S.C. § 540B defines serial killing as a "series of three or more killings, not less than one of which was committed within the United States, having common characteristics such as to suggest the reasonable possibility that the crimes were committed by the same actor or actors."

14. Phil Bulman, "Solving Cold Cases With DNA: The Boston Strangler Case," *NIJ Journal* 273, April 2014, https://nij.ojp.gov/topics/articles-solving-cold-cases-dna-boston-strangler-case.

15. National Institute of Justice, "The University of North Texas Center for Human Identification Project: Using DNA Technology To Identify the Missing, FY 2010," award to University of North Texas Health Science Center at Fort Worth, grant number 2010-DN-BX-K206, https://nij.ojp.gov/funding/awards/2010-dn-bx-k206.

16. Aamer Madhani, "DNA Test Confirms Teen Missing Since 1976 Was John Wayne Gacy Victim," *USA Today,* July 19, 2017.

17. National Institute of Justice, "Crime Laboratory Improvement Program (CLIP)," award to King County Sheriff's Office, grant number 2004-RG-CX-K011, https://nij.ojp.gov/funding/awards/2004-RG-CX-K011.

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40. A pilot project in the United Kingdom noted that some cold cases can be resolved and some serial offenders can be identified through small investments in upgrading DNA analyses and the use of DNA databases. The same study notes the prevalence of repeat offenders, justifying the resources expended to resolve the cases. Cheryl Allsop, "Motivations, Money and Modern Policing: Accounting for Cold Case Reviews in an Age of Austerity," *Policing and Society* 23 no. 3 (2013): 362-375, doi:10.1080/10439463.2013.782211. One innovative DNA tool is the use of familial DNA. The DNA of a serial killer's relative may be in a DNA database, and law enforcement can search DNA databases to seek potential DNA relationships. A recent NIJ study notes that 11 states (California, Colorado, Florida, Michigan, Minnesota, Pennsylvania, Texas, Utah, Virginia, Washington, and Wyoming) use familial DNA searches. Several Solving Cold Cases With DNA grantees reported familial DNA successes, such as in the case of the Grim Sleeper. Sara Debus-Sherrill and Michael B. Field, "Familial DNA Searching — An Emerging Forensic Investigative Tool," *Science & Justice* 59 no. 1 (2019): 20-28, doi:10.1016/j.scijus.2018.07.006.

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USING FORENSIC INTELLIGENCE TO COMBAT SERIAL AND ORGANIZED VIOLENT CRIMES

BY **BASIA E. LOPEZ, JONATHAN G. MCGRATH,** AND **VERONICA G. TAYLOR**
Integrating forensic evidence into the intelligence process is an evolutionary next step in reducing, disrupting, and preventing violent crime.

Long-established forensic techniques and advancements in forensic technologies are making a difference every day in criminal courts. Nascent successes in the implementation of these forensic technologies, as well as software and storage capabilities for large data sets and intelligence-led policing, show equal promise for improvements at the onset of investigations at the state and local levels.

The term "forensic science" describes the place where science and law intersect. Data developed by forensic crime laboratories are called forensic data, and are typically collected, analyzed, and reported on a case-by-case basis for criminal investigations and for presentation in criminal court proceedings.

Forensic intelligence,[1] on the other hand, involves gathering and using data earlier in the criminal inquiry cycle and across cases to help detect, prevent, investigate, and prosecute crime, concentrating mainly on serial and violent crime. Incorporating forensic data into crime analysis can also help identify links, patterns, and trends or correlate other information pertinent to the criminal activity; resulting actionable

intelligence can then be used to disrupt and prevent crime, particularly serial and violent crime.

Though well-incorporated and utilized in investigative and intelligence processes at the national level in the United States, forensic case data that are useful for investigative purposes are scarcely integrated at early stages in the intelligence and crime analysis cycle at the state and local levels. There may be instances in which information contained within forensic case data could have been used to solve a case faster or to identify linkages and trends across cases. However, limited collaboration and communication between regional or local forensic laboratories and law enforcement agencies hinders detection and linking of serial crimes and organized crime activities leading to violent offenses.[2]

Research shows that integrating forensic data into the intelligence and crime analysis processes — and using forensics to proactively reduce, disrupt, and prevent crime — could yield a paradigm shift in criminal justice system applications and crime prevention.[3] Forensic intelligence can be integrated

Bringing a forensic intelligence approach to state and local law enforcement operations has the potential to advance the detection, investigation, and prosecution of serial and organized violent crimes in jurisdictions across the United States.

into intelligence-led policing and other policing approaches to serve as a force multiplier and help identify people who are responsible for crime as well as illegal tactics, techniques, and procedures. This strategy may be especially helpful in instances of serial violent crimes (e.g., murder, aggravated assault, robbery, and rape) as well as nonviolent offenses such as property crimes (e.g., burglary and arson).

Forensic intelligence approaches can also serve as a feedback loop for crime laboratories to help them identify and prioritize the analysis of certain types of evidence that may best develop investigative leads. Modifying crime lab workflows in this way can make them more efficient, free up resources and personnel, and help reduce backlogs.[4]

Bringing a forensic intelligence approach to state and local law enforcement operations has the potential to advance the detection, investigation, and prosecution of serial and organized violent crimes in jurisdictions across the United States. As part of its mission to reduce crime and advance justice through basic and applied research, particularly at the state and local levels, NIJ is committed to examining and communicating the potential of forensic intelligence tools for law enforcement agencies.

Applying a Forensic Intelligence Approach

In the United States, forensic laboratories typically report results only after they have been fully processed and reviewed for use in court proceedings in accordance with stringent quality management protocols. The forensic intelligence approach, however, provides an opportunity to use existing forensic data (both preliminary and confirmed results) together with existing situational and other pertinent crime data to produce case leads, link cases, or inform investigative and proactive tactical, operational, and strategic policing. The forensic data produced for forensic intelligence may not necessarily be the complete forensic report needed for presentation in court, but it can potentially inform investigations if integrated in a timely manner. For example, an investigator may be able to link crime A to crime B based on a unique modus operandi and further link crime B to crime C based on a similar set of shoe prints. Through the introduction of forensic data, the investigator now has a more holistic view of these crimes.

Federal agencies and other countries are already integrating forensic data into criminal intelligence. Though no rigorous evaluation of this approach has been undertaken to date, some research suggests potential benefits of incorporating forensic intelligence into the daily operations of law enforcement agencies, including:

- Crime disruption and prevention

- Time and cost efficiency

- Early identification of suspects

- More effective use of forensic traces that inform policing and security actions

- General tangible benefits of related intelligence products, such as threat and risk assessments and situation reports

- Better understanding of criminal activity as a whole[5]

Importantly, these activities may enhance situational awareness and help inform strategic planning and resource allocation.[6]

Forensic data sets are typically compared only within their respective discipline, such as DNA, fingerprints/latent prints, firearms, footwear, drugs, and toxicology. However, recent advances in information technology and increased digitization that allow massive quantities of forensic data to be stored, indexed, searched, and cross-referenced have made it possible for some common types of forensic data to be cataloged and compared between cases at an evidence-to-evidence level. This capability is especially valuable for comparing data from cellphone and other digital and multimedia evidence, which may include terabytes of data.

Recent advances in scientific technologies can also provide actionable information at key decision points in the investigation process. For example, more sensitive, field-portable drug detection tools can accelerate the identification of illicit materials. Rapid DNA technology, developed through NIJ-funded forensic science research, processes biological samples and produces DNA profiles in less than two hours, allowing police to search the national DNA databases while a suspect is still in custody at a booking station.[7]

The forensic intelligence approach combines disparate silos of evidence into an integrative data set that can link series of crimes and organized crime activities through associations based on forensic evidence and other data, such as situational information, in a timely manner. Exhibit 1 shows a model of data integration used by a group of states in western Switzerland. Information from state police and forensic databases is collated into a shared regional intelligence platform that is available to all law enforcement analysts. The platform allows analysts to link situational information (i.e., descriptive and other information provided in a police incident report) and forensic information, including evidence that provides probative value to a singular case and evidence collected for the purpose of potentially identifying connections across cases.

One study examined crime data in Switzerland and the role of forensic data in the intelligence process for serial crimes. The study found that situational information accounted for 62% of case linkages and forensic evidence accounted for 38% of linkages. This highlights how connecting situational evidence with forensic information can further support serial crime investigation.[8]

Intelligence-Led Policing and Forensic Intelligence at the Local Level

The widely used model of intelligence-led policing by state and local law enforcement agencies sets a solid base for incorporating forensic data into data analysis and crime intelligence. The model has been found to be an objective decision-making framework that facilitates crime reduction, disruption, and prevention. This is accomplished through both strategic management and effective enforcement strategies that target prolific and serious offenders, as well as through proactive approaches for combating persistent local and organized crime.[9] Another model of information sharing can be found in the operations of fusion centers. Originally, fusion centers were established as terrorism-only intelligence centers, but many have expanded to detect, prevent, investigate, apprehend, and respond to criminal activities.[10] Thus, fusion centers are well positioned to "provide analytic resources to forensic laboratories that may not otherwise have such a capability."[11]

As the benefits of linking forensic evidence across cases become increasingly apparent, the forensic intelligence approach could help prevent and solve crimes, including cases of gun violence, sexual assault, controlled substances (e.g., opioids, fentanyl, fentanyl analogues, and other emerging drugs), and human trafficking. Integrating information from readily available, but often disconnected, data sources and linking situational evidence with related forensic data may be particularly beneficial to local law enforcement agencies and adjacent forensic laboratories in identifying organized or serial crimes.

Exhibit 1. Forensic Intelligence Approach Used in Switzerland

Fully automated integrated process
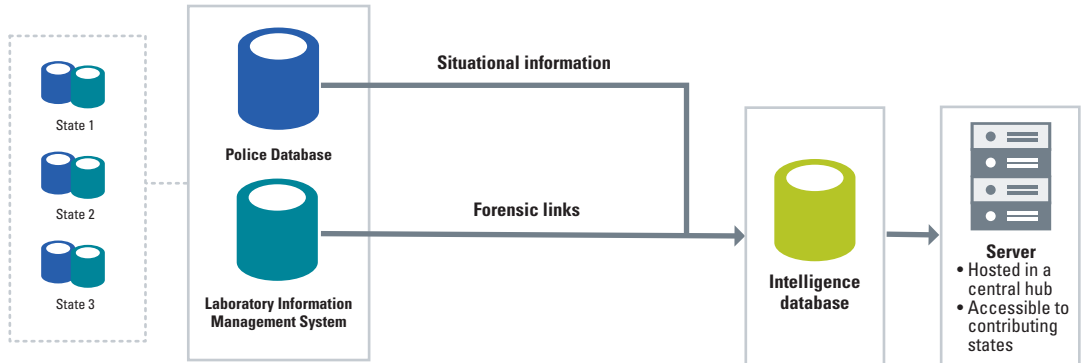
Semi-automated process
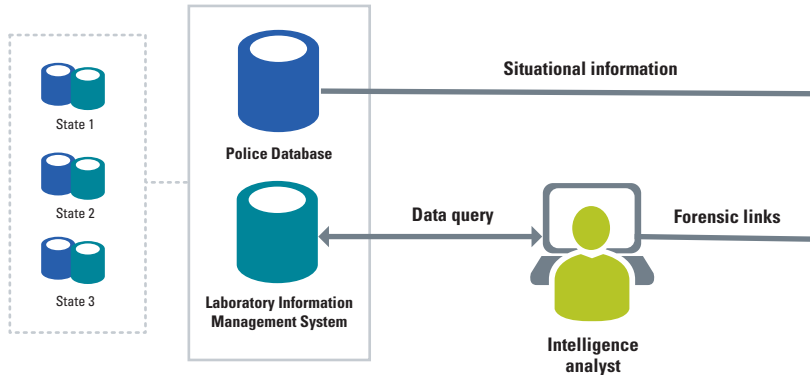
Note: Exhibit 1 shows a model of data integration using an example of three states. Information from each state's police and forensic laboratory information management system databases is collated into a shared intelligence database that is accessible to law enforcement analysts from the contributing states. The intelligence database, accessible via a secured server, allows analysts to link situational information (i.e., descriptive and other information provided in a police incident report) and forensic information, including evidence that provides probative value to a singular case and evidence collected for the purpose of potentially identifying connections across cases.

Source: Modeled after figure 1, page 139, in Quentin Rossy et al., "Integrating Forensic Information in a Crime Intelligence Database," *Forensic Science International* 230 (2013): 137-156.

Gun Violence

In 1999, the Department of Justice's Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) established the National Integrated Ballistic Information Network (NIBIN) to provide an automated ballistic imaging network to local, state, and federal law enforcement partner agencies. This national database consists of digital images of fired bullets and cartridge cases that were found at crime scenes

or test-fired from confiscated weapons. Since 2017, the Bureau of Justice Assistance (BJA) has supported a National Crime Gun Intelligence Center Initiative project[12] that allows local law enforcement agencies to collaborate with ATF in gun-related evidence analyses. As part of this project, ATF implemented a model for integrating data from NIBIN into the criminal intelligence process across several jurisdictions in the United States.[13] The goal is to quickly identify armed violent offenders and suspects, detect potential

associations between evidence and seemingly unrelated criminal cases, disrupt criminal activity, and prevent future gun violence through data correlation techniques.[14]

Linking NIBIN data to law enforcement intelligence enabled police in Portland, Oregon, to match shell casings from a gun seized during a traffic violation stop to casings from four previous unsolved shootings. A second gun later recovered from the same owner produced shell casings that matched those from two additional unsolved shootings in and around Portland. To make these connections, the Oregon State Police crime lab analyzed casings from the guns and uploaded digital images of the casings into NIBIN. Analysts from the ATF NIBIN Correlation Center were then able to make direct comparisons in the national database and find links to the other firearm cases.[15]

Additional types of forensic data can be aggregated with situational data to allow for a more extensive investigation of firearm-related incidents. For example, several federal databases track other evidence, such as data on DNA, fingerprints, and other biometric evidence (see exhibit 2). The FBI, with support from NIJ, is currently exploring ways to store and compare footwear data sets with the ultimate goal of creating a national footwear database.[16] Other platforms capture nonforensic data, including situational information, case information, criminal histories, and background checks. Additionally, software can now analyze police incident reports and identify written information that may link different crimes.[17]

Forensic data with great potential utility for crime gun intelligence may include information related to drug cases, local and transnational gang cases, and human trafficking cases (both sex and labor trafficking), along with situational information from incident and investigative reports and gunshot detection data with spatiotemporal evidence. Integrating crime gun evidence with these types of data has the potential to produce comprehensive actionable intelligence on serial offenders and organized violent crime rings and can lead to the disruption, prevention, and ultimately, reduction of violent crime.[18]

Applying firearm-related forensics to the criminal intelligence process through correlation techniques can help link crime guns to serial violent offenders and connect seemingly unrelated criminal cases that also involve a firearm (e.g., homicides, aggravated assaults, home invasions, hijackings, and robberies). These connections can mitigate further harm and facilitate prosecutions of firearm-related serial offenses. Although such correlations can be used for tactical or case-specific purposes, they can also be applied to achieve a longer-term strategic outcome — they may help identify crime regions associated with one particular gun market, seller, or distributor, as well as patterns of gun violence outbreaks, allowing for the development of proactive strategies.

Serial Sexual Assault

A sexual assault kit (SAK) contains evidence gathered from a victim, such as swabs of the victim, hairs and fibers found on the victim, and the victim's clothing. Although analyzing the contents of a SAK can yield DNA evidence from the perpetrator, SAKs might not be sent to labs for testing for cases in which the victim knew the perpetrator. However, NIJ recommends that when there is victim consent for testing, all SAKs should be sent to labs for DNA analysis, regardless of whether the perpetrator is known.[19] Testing these kits may provide a link to an unsolved SAK in which the victim did not know the attacker. Moreover, connecting forensic evidence from SAKs can help identify serial rapists. This type of evidence can be linked in the FBI's Combined DNA Index System (CODIS), enabling the apprehension of serial criminals. Nonbiological evidence, such as fingerprint, toxicology, or cellphone evidence, can also be used to link sexual assault cases.[20]

Between early 2015 and January 2019, the Sexual Assault Kit Task Force of Cuyahoga County, Ohio,[21] analyzed 7,001 untested SAKs. They found that a small percentage of suspects were implicated in the majority of the analyzed backlogged kits.[22] Out of all the analyzed backlogged cases, 70% of the investigations had been closed and 14% of the closed investigations resulted in the opening of a prosecution.[23] Out of these reopened investigations, 712 defendants were indicted, 61% of the

Exhibit 2. Federal Forensic Evidence and Criminal Investigation Databases			
Host	Database Abbreviation	Database Full Name	Database Description
FBI	CODIS	Combined DNA Index System	DNA profiles and Rapid DNA analysis technology
ATF	NIBIN	National Integrated Ballistic Information Network	Ballistic evidence
FBI	IAFIS/NGI	Integrated Automated Fingerprint Identification System/Next Generation Identification	Fingerprint evidence
DHS	IDENT/HART	Automated Biometric Identification System/Homeland Advanced Recognition Technology	Biometric evidence
FBI	ViCAP	Violent Criminal Apprehension Program	Information allowing for correlation and matching of possible connections related to violent crimes
FBI	NCIC	National Crime Information Center	Crime data
FBI	NICS	National Instant Criminal Background Check System	Firearm-related background checks
ATF	NTC	National Tracing Center	Firearm tracing
FBI	III	Interstate Identification Index	Automated criminal history record information
NIJ	NamUs	National Missing and Unidentified Persons System	Case information and forensic services to advance missing and unidentified persons cases

prosecutions reached disposition by the court, and 92% of those dispositions resulted in convictions of the defendants.

Interestingly, 6% of indicted defendants were implicated in two or more of the assault kits, and 24% of those identified through the SAK analysis were both a stranger and an acquaintance to separate victims. Additionally, an examination of criminal records showed that many of these serial offenders were generalists with respect to the types of crimes they committed, meaning many had been arrested for crimes such as domestic violence and felony drug charges either before or after the SAK was logged. However, some of them may not appear to be serial offenders based on sexual assaults alone. Based on the analysis of other SAKs and other types of forensic evidence, links to other cases may be found. Although

such offenders may be linked through the applications of DNA databases such as CODIS, for example, there are limitations to relying on DNA databases alone due to the stringent requirements for uploading DNA profiles. A forensic intelligence approach can make connections between a variety of evidence from various databases and types of crime and can help apprehend these offenders.

The Sexual Assault Kit Initiative (SAKI) is a BJA grant program that began in 2015; it aims to address the issue of unsubmitted SAKs in law enforcement custody. SAKI grantees can inventory, test, and pursue further investigation and prosecution efforts related to previously unsubmitted SAKs when appropriate. In 2018, BJA began requiring SAKI grantees to enter information from opened sexual assault investigations into the FBI's longstanding Violent Criminal

Apprehension Program (ViCAP) database, which maintains the largest investigative repository of major violent crime cases in the United States. The added forensic DNA evidence provided by the kits — in addition to data already commonly found in the ViCAP database, such as descriptive data, court records, and statements — increases the chances of connecting cases, finding criminals, and possibly preventing future offenses. Recently, information from SAKI helped link 34 of prolific serial killer Samuel Little's confessions to unsolved crime cases.[24]

Similarly, NIJ's National Missing and Unidentified Persons System (NamUs) offers free tools for storing and sharing information on missing and unidentified persons cases and provides forensic services — such as forensic anthropology and DNA analysis, forensic odontology, and fingerprint examination — to advance investigations. Again, by connecting case information to forensic data and making comparisons across jurisdictions, investigative leads can be provided quickly and crime can be solved, if not prevented.

Illicit Drugs

Linking descriptive information from law enforcement incident reports with the physical or chemical profiles of intercepted drugs, including synthetic opioids and designer drugs or analogues with ever-changing chemical structures, can help uncover the coordinated activities of criminal organizations.

The Drug Signature Programs of the Drug Enforcement Administration's Special Testing and Research Laboratory and the Australian Forensic Drug Laboratory's Drug Profiling Program analyze characteristics of high-volume drugs, such as geographical origin, processing method, impurities, and isotope signatures.[25] Seizures with similar characteristics may be traced to the same organization or cartel and may help identify drug trafficking routes and networks. These programs focus mainly on border seizures, but there may be value in establishing similar state or local drug signature programs to identify trends and link seizures within the United States.

Similarly, integrating forensic laboratory data into CompStat could help enhance the capabilities of law enforcement's performance management system.[26] With opioid abuse at crisis levels, jurisdictions are implementing city and regional data-sharing models that incorporate information from both public safety and public health agencies. These data-sharing models can provide real-time surveillance to detect and respond to patterns of opioid overdose, such as identification of an overdose outbreak epicenter, which can mitigate further harm (e.g., targeted naloxone distribution) and facilitate drug surveillance strategies and fatal overdose homicide prosecutions.[27]

Human Trafficking

The United Nations Office on Drugs and Crime encourages investigators to include forensic personnel early in the investigation of human trafficking cases by seeking technical advice and aligning investigative goals with a forensics strategy.[28] Forensic document examinations, for example, could be critical for human trafficking investigations, and document evidence could include multiple forms of evidence, such as fingerprints, trace (or "touch") DNA, handwriting or signatures, and unique marks on forged documents that can be traced back to printing machines or typewriters.[29]

Other types of forensic evidence, such as digital and multimedia evidence (including cellphones), could play a role in human trafficking cases, thus making these types of investigations compatible with a forensic intelligence approach. The Center for Forensic Investigations of Trafficking in Persons at the University of New Haven recommends that human trafficking investigations become more proactive and focus on dismantling illicit networks.[30] The forensic intelligence approach aligns with these recommendations, as it incorporates forensic evidence into the early stages of crime analysis to prevent crime, especially in cases of serial and organized crime. Additionally, the forensic intelligence approach can serve as a feedback loop, helping agencies identify the best types of evidence to submit to crime labs for these types of investigations, which may not involve a specific crime scene.

The center also advocates for policies and practices that allow for and expand the use of forensic and biometric tools, such as genealogy databases, Rapid DNA collection for kinship verification and SAKs, iris recognition, and forensic DNA phenotyping (predicting physical appearance and traits). The center further recommends investigating connections between human trafficking crime and other commonly associated types of criminal activity, such as organized crime, money laundering, and transnational crime. A forensic intelligence approach synthesizes forensic evidence from individual cases and various types of crime to identify investigative leads and, when applied at the local level, could advance investigative and intelligence capacities.

Guiding Principles for Forensic Intelligence

Efforts to develop a forensic intelligence approach in Australia and Switzerland have established guiding principles for successful implementation.[31] For example, forensic intelligence involves a collaborative approach to case investigation and may require increased collection and more timely testing of evidence from crime scenes. Reinforcing this effort with appropriate technology that facilitates rapid assessments and comparisons at the crime scene and supports interagency and interdepartmental data integration through the aggregation of information will advance not only the investigation of high-profile cases but also the production of actionable intelligence.

Applying a forensic intelligence approach to preliminary testing protocols (e.g., field screening) can provide timely and actionable information to law enforcement and support investigations. A forensic intelligence approach can also inform laboratory drug confirmations and toxicology testing strategies in illicit drug investigations. Nontraditional investigative techniques, such as pollen analysis, can point to the original geographical source and routes taken for drug trafficking cases and provide additional leads for firearm-related investigations and other homicide, sexual assault, and human trafficking cases.[32]

In addition to applying forensic intelligence to existing data sets, crime and intelligence analysts and crime lab scientists should collaborate to identify analytical testing methodologies that go beyond routine analysis, such as the identification of cutting agents (diluents) and adulterants in seized drugs[33] and trace evidence analysis (e.g., forensic glass analysis for hit-and-run cases or property crimes). These methodologies could provide valuable data to inform the investigative and intelligence processes and link crime patterns, exonerate the innocent, and identify perpetrators of crime for cases other than the highest priorities.

Some U.S. jurisdictions have already developed databases that allow analysis of footwear and tire impressions recovered from crime scenes.[34] Crime and intelligence analysts can use these data in a link analysis of high-volume and serial crimes, such as suspect-to-scene and scene-to-scene linkages. Although footwear prints can often be recovered from burglary and violent crime scenes, this tool is underused because investigations tend to focus on the characteristics of evidentiary value to make single-source identifications rather than the class characteristics that are an untapped source of intelligence.[35] The use of footwear class characteristics has the potential to complement closed-circuit TV video or eyewitness statements and connect footwear evidence to a perpetrator of a crime or series of crimes. Implementation of footwear collection and comparison strategies in the booking station environment can also complement Rapid DNA initiatives and help link perpetrators and cases more quickly and efficiently. As such, NIJ is funding a working group — through an interagency agreement with the FBI Laboratory — to explore the development of a national footwear reference database.[36]

Using forensic evidence in these new ways raises questions about how forensic lab accreditation and quality management system policies will apply to the implementation of forensic intelligence approaches. Forensic accreditation bodies could work more closely with labs to facilitate data access for an authorized law enforcement agency by enabling new types of reporting mechanisms, with an emphasis

on preliminary findings that are for investigative or intelligence purposes only and are subject to further quality system reviews and/or confirmatory testing.

The forensic intelligence approach is an innovative method with the potential to aid state and local law enforcement agencies in the United States in criminal investigations and further enhance their crime and criminal intelligence capacities to address local crime issues. Widespread use will transform the intelligence process for investigating crimes, especially violent serial and organized crime, and potentially reduce criminal activities through advanced disruption and prevention strategies.

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For More Information

Read *Promising Practices in Forensic Lab Intelligence: Sharing Lab Intelligence to Enhance Investigations and Intelligence Operations* to learn about promising practices and recommendations on how to build agency intelligence efforts at https://it.ojp.gov/GIST/1211/Promising-Practices-in-Forensic-Lab-Intelligence.

This article discusses the following OJP grants:

- "Reducing Gun Violence Through Integrated Forensic Evidence Collection, Analysis and Sharing," grant number 2019-R2-CX-0066
- "The Sexual Assault Kit Initiative: National Training and Technical Assistance," grant number 2015-AK-BX-K021
- "Cuyahoga County Sexual Assault Kit Task Force Capacity Building Initiative," grant number 2016-AK-BX-K016
- "Cuyahoga County Sexual Kit Task Force Owed DNA Initiative," grant number 2016-AK-BX-K011

Notes

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FUNCTIONAL FAMILY THERAPY–GANGS: ADAPTING AN EVIDENCE-BASED PROGRAM TO REDUCE GANG INVOLVEMENT

BY **MARY POULIN CARLTON**

NIJ-supported studies are examining whether an evidence-based delinquency prevention program can be modified to prevent gang involvement and reduce the criminal activities of gang members.

Gang-involved youth are responsible for a disproportionate share of crime in communities.[1] Successfully tackling gang involvement and associated criminal activities should result in a substantial reduction of crime — including violent crime — in affected neighborhoods. To that end, many programs and strategies have been developed to prevent gang involvement, reduce the criminal activities of gang members, and help individuals disengage from gangs.

Yet gang crime and violence remain pressing problems. It is clear that meaningful inroads on gang-related crime will require, among other initiatives, investments in rigorous research and evaluation studies to identify effective anti-gang programs and strategies that can be readily implemented.

In 2009, researchers began exploring whether Functional Family Therapy (FFT), an evidence-based program demonstrated to reduce delinquency and substance abuse in a general delinquency population, could be modified for a population at risk of gang involvement or currently involved in gangs. They developed and implemented the new program,

Functional Family Therapy–Gangs (FFT-G), and NIJ-funded researchers conducted a randomized controlled trial to determine whether the new FFT-G program reduced gang involvement and whether positive outcomes could be sustained over time.

In 2018, the researchers concluded the study with encouraging results: FFT-G significantly reduced delinquency for program participants and cost less than treatment as usual. Positive results were more pronounced for those at highest risk of gang involvement, and differences in official recidivism outcomes were large and clinically meaningful.

The findings came with certain caveats, however. The study was limited to a single location, and the data were insufficient to demonstrate the program's impact on gang involvement as distinct from delinquent activity. In addition, there were issues associated with the contamination of the control group and remaining questions about the long-term effects of the gang-specific therapy program and why the program brought about observed outcomes. A new, second-phase study funded by NIJ aims to address some of these unanswered questions.

FFT-G Development

Researchers Terence Thornberry and Denise Gottfredson from the University of Maryland and their colleagues took note of the absence of anti-gang programs that had been rigorously evaluated and found to be effective. In 2009, with funding from the Office of Juvenile Justice and Delinquency Prevention and the Centers for Disease Control and Prevention, they began developing an evidence-based program to demonstrably prevent and reduce gang membership and the negative impacts of gangs.

The team chose an approach that would both address the weaknesses of and build on the knowledge gained from previous research and program implementation efforts. Their work involved a number of steps: identifying an existing evidence-based program not directly focused on gang involvement; seeking the insight of a group of experts; modifying and implementing the program to focus on gangs; and evaluating the program using scientific principles to compare the participants with a control group of individuals who did not receive the program.

The team first searched for an appropriate existing program model that a rigorous evaluation had shown to be effective. They sought a program that satisfied the exacting evaluation standards of the Blueprints for Healthy Youth Development project.[2] An advisory board of researchers from various backgrounds systematically reviewed Blueprints programs to narrow the candidate list. The team and board members consulted with program developers about the programs on the list.

Functional Family Therapy, first developed by James F. Alexander at the University of Utah, was considered the most likely of all Blueprints programs to effectively address two key populations: those at risk of gang involvement and those already involved in gangs. FFT was also desirable because it had undergone several rigorous evaluations, including randomized controlled trials, which provided strong support of its effectiveness. A meta-analysis of studies of FFT further substantiated its effectiveness.[3]

Adapting FFT for use as an anti-gang program required many steps; ultimately, modifications were limited though still significant. From 2010 to 2011, the team and advisory board members collaborated with Alexander and other program developers to adapt the program for youth who are gang-involved or at risk of gang involvement. Given the previous success of the FFT program, the team kept the FFT clinical model and time in treatment (12 to 15 sessions over about three months) for the new FFT-G program.[4] However, they modified the training and guidance provided to therapists. The training manual was supplemented to cover gang-related risk factors and group processes associated with gangs.

In addition, they added gang-related examples to the program design to demonstrate how to apply the clinical approaches of FFT to FFT-G. Finally, FFT-certified therapists received 12 additional hours of training on the new FFT-G model and greater supervision and feedback from the national FFT office on their FFT-G cases. Discussions during therapeutic sessions emphasized the impact of gang membership on youth's behavior and development.

Together, carefully devised changes to the program model were expected to better address the risk factors associated with gang affiliation and challenges associated with engaging the families of gang-involved youth. The team designed FFT-G to reduce participants' involvement in delinquency and substance abuse by addressing negative peer relationships, normative beliefs about rules and laws, constructive use of time, unhealthy family functioning, and negative parent behavior and substance abuse.

Implementing and Evaluating FFT-G

The team chose to implement and evaluate the new program in the Philadelphia Juvenile and Family Court. This gave them access to the city's chronically high levels of gang activity and to a sufficient number of youth who were eligible for FFT-G services.

Enabling a rigorous study in a real-world setting was a challenging task that required extensive discussion and negotiation with court staff, judges, and treatment

staff. The team faced concerns about the impact of labeling youth "gang members," resistance to the notion that a gang problem exists in Philadelphia, apprehension about the public safety implications of increasing reliance on community-based services such as FFT-G, and challenges with recruiting a sufficient number of eligible youth.

Ultimately, the team addressed these concerns and undertook a rigorous study to determine whether FFT-G can reduce delinquency and substance abuse among a population at risk of involvement or currently involved in gangs. Among other arrangements, the team secured a commitment from a judge that permitted them to undertake a randomized controlled trial of FFT-G.

Program implementation and evaluation began in 2013.[5] Implementation of the FFT-G program generally proceeded as planned, and the team gathered the data needed to evaluate the program.[6]

Eligible youth included 11- to 17-year-old males from across the city whose court cases were assigned to the judge participating in the study, who had been adjudicated delinquent and ordered by the judge to receive family services, and who had not been referred to FFT in the previous year. Due to challenges with recruiting youth for the program, eligibility criteria did not include a measure of gang involvement — although the neighborhoods from which most of the participants were drawn were known to have elevated gang activity. Youth and families amenable to study participation were randomly assigned to receive probation and FFT-G or treatment as usual. Treatment as usual included probation and the Family Therapy Treatment Program (FTTP). FTTP — developed for a general, non-gang-involved population — has goals and a dosage that are similar to those in FFT and FFT-G, but it has not been rigorously evaluated. While participating in their assigned program, study participants continued to be eligible for other social services from the city.

A total of 129 families participated in the study. Of those assigned to FFT-G, 80% received at least one FFT-G session and just over half completed the program. Unfortunately, few of the families assigned to FTTP actually received any services from FTTP (only 11 of 63). It appears that FTTP staff had problems engaging with the assigned families, and as a result few participated in the program. Consequently, the judge reassigned some of the families from FTTP (about 20%) to FFT to improve the likelihood that they would receive family services.

Encouraging Results

The study used data from multiple sources to assess the extent to which FFT-G accomplished its goals. The study measured youth gang involvement and offending, beginning when the participants were enrolled in the study and concluding 18 months later. In addition, the researchers collected information on program fidelity and participant involvement in the assigned programs (either FFT-G or FTTP) along with other community services that participants received following random assignment.

To measure gang involvement, the researchers interviewed youth at study enrollment and again six months later — the time at which involvement in FFT-G or FTTP was scheduled to end and when the researchers expected to begin observing desirable changes. To measure offending, they used youth self-reports of delinquency, violence, and alcohol and substance abuse obtained during the two interviews, as well as Philadelphia juvenile and adult court records from initial court involvement until 18 months following study enrollment. Researchers also used parent and caregiver interviews to measure adolescent substance abuse.

Using data from the city's Community Behavioral Health office, the team tracked the type and costs of additional community services that these youth received for the six months following study enrollment. Program administrative data were the source of information on fidelity and involvement in FFT-G and FTTP.[7] Together, these data showed which services the study participants actually received and how these services affected their behavior over time.

The study results[8] indicated that FFT-G reduced delinquency for program participants and cost less than the usual treatment, FTTP. Importantly, those

at the highest risk of gang involvement had the best results.[9]

Though there was little indication that FFT-G produced desired results within the first six months that participants were in the program, favorable results emerged by 18 months. By that point, those assigned to FFT-G were significantly less likely to have drug charges (11% vs. 22%) or to be adjudicated delinquent (23% vs. 38%) than those assigned to FTTP.

Results were even more robust for FFT-G when:

- The cases of those reassigned from FTTP to FFT were removed from analysis.

- Analysis was limited to those study participants at highest risk of gang involvement.

At 18 months following assignment to FFT-G (i.e., 12 months after program enrollment concluded), FFT-G participants at high risk of gang involvement had better outcomes regarding arrests (prevalence and number) and charges for felonies, crimes against persons, and property crimes. They were also less likely to be adjudicated delinquent. In general, differences between the treatment and control groups in official recidivism measures were large and clinically meaningful.

The team found that receipt of other community services was common regardless of whether participants were assigned to FFT-G or FTTP. However, there was variation in the types of concurrent services received: Those assigned to FTTP (whether or not they participated) were more likely to receive residential services. Those assigned to FFT-G spent fewer days in residential placements (135 vs. 191 days) and were more likely to receive other community-based services. Because residential services were more expensive than FFT-G or FTTP, the cost per youth served within six months of assignment to FFT-G or FTTP, for all services received, was lower for FFT-G youth than for those assigned to the usual FTTP treatment ($10,197 vs. $12,368). Thus, the team concluded that FFT-G did a better job of replacing more expensive services than FTTP.

Though these results are encouraging, there are reasons to be cautious and to continue exploring questions around the effectiveness of FFT-G. This study tested the program in one location, where it faced some challenges. Perhaps most significantly, there was insufficient information to report on whether FFT-G reduced gang membership. In addition, as discussed earlier, there were concerns that the study did not test the program exclusively on a gang-involved population as well as issues with the contamination of the treatment group and weak implementation of aspects of FTTP. Finally, there are questions associated with the outcomes of FFT-G, including what its long-term effects will be and why it led to the observed outcomes.

Unanswered Questions

An NIJ-supported follow-up study, which began in 2019, is exploring some of the questions left unanswered from the first FFT-G study. Among other things, the team hypothesizes that FFT-G is responsible for reducing involvement in gangs. The new study will address the following questions:

- Does participation in FFT-G result in reduced gang involvement?

- Will reductions in offending — including violent offending, drug abuse, drug sales, and negative attitudes and behavior — be sustained up to five years following assignment to FFT-G?

- Which factors are responsible for the positive outcomes identified in the initial study?

The follow-up study will take place in Philadelphia, building on the relationships already developed with the Juvenile and Family Court, program participants, and others in the city. The researchers will interview the youth from the original study, who are now at least 18 years old, to gather information on their gang involvement and membership, if any; perceptions of the services they received; physical and behavioral health; educational attainment; employment; housing; and relationships with family, partners, and peers. They will also review juvenile and adult court records on arrests, offense types, case dispositions, and

instances of incarceration occurring up to five years following assignment to FFT-G or FTTP. In addition, the researchers will convene focus groups of program stakeholders, including probation officers and therapists, to explore their perceptions of FFT-G and how best to work with gang-involved youth.

As with any longitudinal study, the researchers expect to face challenges in finding and reengaging study participants after a substantial period of time. However, they have already successfully overcome challenges to advance their goal of identifying an effective anti-gang program. For example, they have navigated multiple funding streams and partners to support program development and evaluation, and they have conducted a randomized study in a juvenile court setting.

The study has strong potential to contribute to our understanding of what works and why in the effort to reduce gang involvement and associated criminality. NIJ is pleased to fund this next stage in the process to help advance this important public safety issue.

About the Author

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For More Information

To learn more about the initial FFT-G study, go to NIJ.ojp.gov, keyword: 251754.

To learn more about the follow-up study, go to NIJ.ojp.gov, keyword: 2018-75-CX-0027.

This article discusses the following OJP grants:

- "Reducing Gang Violence: A Long-Term Follow-Up of a Randomized Trial of Functional Family Therapy," grant number 2018-75-CX-0027

- "Reducing Gang Violence: A Randomized Trial of Functional Family Therapy," grant number 2014-R2-CX-0001

- "Blueprints for Gang Prevention," grant number 2009-JV-FX-0100

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WHAT DO THE DATA REVEAL ABOUT VIOLENCE IN SCHOOLS?

BY **NADINE FREDERIQUE**

A review of the most commonly cited sources of school safety data indicates that although crime and violence in schools have generally been decreasing for some time, multiple-victim homicide incidents have been increasing.

Marjory Stoneman Douglas High School, Sandy Hook Elementary School, and Santa Fe High School, among others, are now synonymous with a particularly insidious form of violence in our nation — mass violence and school shootings. School shootings like these heighten the perception that schools are dangerous places for youth. Although no amount of school violence is ever acceptable, nationally available data on trends in violence and victimization at school reveal that levels of overall violence declined from 1992 to 2017.[1] How do we reconcile these trends with the pervasive sense that the number of school shootings is increasing and that schools are becoming increasingly dangerous places? This article explores that paradox by reviewing the trends in school violence from the most often cited sources of school safety data. It also discusses how we can explore this paradox further through an NIJ-funded study on school shootings and a federal effort to improve federal data and its implications for school safety.

At this time, there is no single data collection that captures the complete picture of the frequency,

incidence, and trends in violent crime[2] in U.S. schools. Rather, government agencies and nongovernmental organizations employ numerous data sources and surveys. Some of this information is presented in *Indicators of School Crime and Safety* (the *Indicators* report), which is published regularly by the U.S. Department of Education's National Center for Education Statistics and the U.S. Department of Justice's Bureau of Justice Statistics. The report establishes reliable indicators of the current state of school crime and safety across the nation and is helpful in tracking specific indicators over time; however, it also contains an amalgamation of information on school safety that is not easily interpreted. This is compounded by the lack of agreed-upon focus and definitions across the sources from which the *Indicators* report draws its data, the irregularity of the data collections, the different populations surveyed (e.g., students versus principals), and differences in how questions are phrased.

A review of the most widely used and well-known data sources reveals that incidents of multiple-victim

Although overall violent crime in schools has decreased steadily in the last few decades, multiple-victim homicides are increasing, and we do not know why.

youth homicides in schools started declining in 1994 but have been increasing since 2009.[3] Thus, the public's perception that there is an increased likelihood of a school shooting is grounded in an increase in multiple-victim, school-associated deaths. Despite this increase, however, the rates of violent victimization and serious violent victimization at school are low and have been decreasing since the 1990s. This disconnect raises the question of whether we are collecting the right indicators for understanding trends in school violence.

To help answer this question and improve school safety data collection, NIJ funded researchers to create an open-source database for tracking shootings on K-12 school grounds. This research may help uncover why multiple-victim homicide incidents have been increasing. In addition, in 2019 the Office of Management and Budget released the Federal Data Strategy, which presents an opportunity to examine and rethink the way the federal government collects data on school safety. Both efforts have the potential to help us better understand the nature and extent of violent crime that occurs in schools — and ultimately how best to prevent future incidents.

Understanding the Scope of Violent Crime in Schools

Following is a review of data and current trends in school crime and violence. The data sets included in this review — though by no means an exhaustive list — are perhaps the most widely used and well-known national data sources for violence in schools.

School Crime Supplement to the National Crime Victimization Survey

The School Crime Supplement (SCS) to the National Crime Victimization Survey (NCVS) is sponsored by the Bureau of Justice Statistics and the National Center for Education Statistics. It collects data on alcohol and drug availability, bullying and cyberbullying, disorder and rule enforcement, extracurricular activities, fear and avoidance behaviors, fights, gangs, graffiti, hate words, school characteristics, school security, school transportation, social bonding, and weapons in school. It is a nationally representative household survey. The respondents to the SCS are students ages 12-18 in NCVS households who are enrolled in U.S. public and private elementary, middle, and high schools. Since 1989,[4] student data reported to the SCS have been the primary source of data used to generate national estimates of criminal and bullying victimization in schools and to evaluate differences in the prevalence of victimization over time and among different student groups.[5]

According to the latest SCS data collected in 2017, being the victim of a violent crime at school is rare. About 1% of students surveyed reported experiencing a violent victimization in the six months prior to survey completion and less than 0.5% reported a serious violent victimization.[6] Serious violent victimizations include rape, sexual assault, robbery, and aggravated assault. Violent victimizations include all of the serious violent victimizations as well as simple assault. Between 2001 and 2017, the percentage of students who reported being victimized at school during the six months prior to survey completion decreased for both violent victimizations (from 2% to 1%) and serious violent victimizations (from 1% to less than 0.5%).[7]

Bullying is also a serious concern in schools. Bullying can be verbal (being threatened, called names, or insulted) and physical (being pushed, shoved, tripped, or spit on). Bullying may occur in various ways, including in person and virtually through social media. We know that some school shooters felt bullied, victimized, persecuted, or injured by others prior to their attacks. In some instances, the attacker

experienced bullying that was long-standing and severe.[8] According to the SCS, about 5% of students surveyed in 2017 reported being subject to this physical bullying behavior.[9]

Students' fear of being harmed has also decreased in the past few decades.[10] The SCS asks students about their perceptions of safety and fear of attack at school during the school year. Between 2001 and 2017, the percentage of students who reported being afraid of attack or harm at school decreased overall (from 6% to 4%).[11]

School Survey on Crime and Safety

The School Survey on Crime and Safety (SSOCS) is administered by the National Center for Education Statistics and provides school-level data on crime and safety. First administered during the 1999-2000 school year, the SSOCS is a nationally representative, cross-sectional survey of approximately 4,800 public elementary and secondary schools in the United States. It is completed by school principals and other administrators, and provides information on school crime, discipline, disorder, programs, and policies.[12]

Of particular relevance to this review, the SSOCS collects and reports data on two overlapping categories of crime: violent crime and serious violent crime. Violent crime incidents can range from a threat of a physical attack to robbery or to a serious violent incident such as a physical attack, sexual assault, or rape. According to the SSOCS, a subset of violent crime incidents can be categorized as serious violent incidents. A serious violent incident may include rape, sexual assault other than rape, physical attack or fight with a weapon, a threat of physical attack with a weapon, and robbery with or without a weapon.

Although most schools report at least one incident of violent crime per year, the trends for violent crime and serious violent crime in schools have been decreasing. According to the latest available SSOCS data, 71% of schools reported at least one incident of a violent crime during the 2017-2018 school year.[13] This number seems to be decreasing — 66% of public schools recorded physical attacks or fights without a

weapon in 2017-2018 compared with 71% in 2009-2010. When serious violent crime is examined as a subset of violent crime, approximately 21% of schools reported at least one serious violent incident at school in 2017-2018.

The SSOCS also asks principals about bullying. In 2009-2010, approximately 30% of schools reported incidents of bullying in the past week. However, in the 2017-2018 survey, only about 14% of schools reported incidents of bullying in the past week.[14]

School-Associated Violent Death Surveillance System

Of all violent crimes, homicides are the most well-documented. The Centers for Disease Control and Prevention (CDC) has been collecting data on school-associated violent deaths since the early 1990s.

The School-Associated Violent Death Surveillance System (SAVD-SS) — sponsored by the U.S. Departments of Education and Justice as well as the CDC — tracks lethal violence (i.e., homicides, suicides, and legal intervention deaths) on school grounds or on the way to and from school. Researchers scan open sources of data, including computerized newspapers and broadcast media databases via LexisNexis, to identify incidents of death related to schools. Their searches use keywords such as "shooting, death, violent, strangulation, beating, attack, stabbing, and died," combined with phrases such as "primary, secondary, elementary, junior, high, middle school."

Once lethal violent incidents (i.e., cases) are identified, researchers apply a four-step verification process that includes the schools and law enforcement agencies involved in investigating the deaths. Copies of law enforcement reports also help confirm case details and whether the case meets the inclusion criteria. The cases included are ones in which a fatality occurred:

- On a public or private primary or secondary school campus in the United States.

- While the victim was on the way to or from regular sessions at school.

- While the victim was attending or traveling to or from an official school-sponsored event.

In the SAVD-SS, victims include students, staff members, and others.

The trends from July 1994 through June 2016 indicate that on average, school-associated violent deaths accounted for less than 3% of all youth homicides in the United States consistently throughout this time frame.[15] The most recent SAVD-SS data cover the period from July 1, 2015, through June 30, 2016. During this period, there were 38 student, staff, and nonstudent school-associated violent deaths in the United States; 30 of these were homicides, seven were suicides, and one death resulted from legal intervention. During this same period, there were 1,478 youth homicides and 1,941 youth suicides in the United States.

There are differences between single-victim homicide trends and multiple-victim homicide trends. From 1994 to 2016, there were approximately 423 school-associated homicide incidents, including 393 single-victim incidents and about 30 multiple-victim incidents.[16] According to SAVD-SS data, approximately 90% of school-related youth homicide incidents involve a single victim, which is contrary to the perception that most school-related youth homicides occur in the context of a mass shooting. Among homicides with known motives, gang-related activity (58.2%) and interpersonal disputes (44%) were the most common motives for single-victim, school-related homicides, suggesting that these homicides may reflect broader communitywide causes of violence.[17] The proportion of single-victim, school-related homicides hovers around or below 2% of all youth homicides occurring from 1994 to 2016.

The SAVD-SS provides evidence of an increase in the number of multiple-victim homicides in recent years. The homicides associated with multiple-victim incidents increased from June 2009 through the 2017-2018 school year.[18] Although likely related to only eight specific incidents occurring on or after July 2016, this increase has no clear explanations.

Synthesizing the Findings

The data sources examined above indicate that students are not often the victims of violent and serious violent crime in schools. These trends have been decreasing since 2001. Physical bullying victimization has also been on a downward trend since 2009-2010. Schools have reported fewer incidents of violent crime and serious violent crime, and these too have been on a downward trend since 2009-2010. School homicides, in comparison to other youth homicides, are relatively rare, with less than 38 deaths reported from July 2015 to July 2016. These are encouraging findings in the context of understanding trends in school safety.

While these findings give us a great deal of information, there is still much more to understand about school safety. In the midst of these trends pointing to decreases in violent crime, serious violent crime, and bullying in schools, one indicator has been increasing: multiple-victim associated deaths at schools. Single-victim homicide rates have remained relatively stable over time.[19] However, multiple-victim homicide incidents are increasing, and we do not know why.

NIJ's School Shooting Database

To help fill this knowledge gap, NIJ funded a project through its Comprehensive School Safety Initiative to create an open-source database that includes all publicly known school shootings resulting in at least one firearm death or injury that occurred on school grounds in the United States from January 1, 1990, to December 31, 2016. Joshua Freilich at John Jay College, Steven Chermak at Michigan State University, and Nadine Connell, formerly at the University of Texas at Dallas, are conducting this work. Once completed, the School Shooting Database (SSDB) will be used to document the nature of the problem and clarify the types of shooting incidents that occur in schools. It will also provide a comprehensive understanding of the perpetrators of school shootings; test causal factors to assess whether mass and non-mass school shootings are comparable; and compare fatal and nonfatal

shooting incidents to identify intervention points that could be exploited to reduce the harm caused by school shootings.

The method of data collection in this project has been intensive and painstaking. First, the researchers reviewed more than 45 sources, lists, and chronologies that already tracked school violence. This allowed the researchers to create their sample frame for school shootings during the study period. They also reviewed additional listings of specific cases that the media and other accounts of particular events included or referenced. The researchers then contacted organizations that might have a relevant database for information on incidents of school shootings. Through this outreach, they cross-referenced every school shooting incident reported on any currently available database. Second, they searched specific key terms across a series of search engines and media sources to identify additional incidents. For this database, school shootings that resulted in injury (not limited to homicide) and occurred on K-12 school grounds are included. For every incident identified, the researchers then systematically searched more than 20 additional search engines simultaneously looking for relevant data on the incident, the school, the victim(s), and the offender.

Though the SSDB is still in development, researchers to date have identified 660 incidents of school shootings that resulted in injury from 1990 to 2016.[20] Each incident is treated as a case study, and the goal is to collect all of the information available for each incident. To do this, the SSDB team uses a search protocol that includes more than 60 search engines or sites. These include media aggregators, web-based newspaper archives, legal research services, administrative sources (e.g., state Department of Corrections records, the FBI's National Incident-Based Reporting System and Supplementary Homicide Reports, and local police websites), academic sources, notable incident trackers, people searches and white pages, social media, public records, and criminal and background check services. These searches

lead to a trove of public information that includes published interviews (both scholarly and journalistic), obituaries, news articles, biographies, scholarly overviews, and social media. This information is then reviewed to fill in values of hundreds of attributes on the incident, school, offender, and victim levels. The SSDB also captures the reliability of the open source information in numerous ways and has addressed both inter-searcher and inter-rater (inter-coder) reliability issues; in the future, it will empirically investigate selectivity bias. In addition, the researchers will highlight key characteristics for each incident, victim, and perpetrator to help law enforcement and school administrators differentiate between various kinds of school shootings and develop appropriate prevention efforts and responses for individuals and the community. This research has the real potential to help us understand why multiple-victim homicide incidents have been increasing over the last 10 years.

Improving Federal School Safety Data Collections

Recently, the Office of Management and Budget — the federal agency that implements the administration's policy, budget, management, and regulatory objectives — released the "Federal Data Strategy – A Framework for Consistency."[21] This Federal Data Strategy (FDS) uses and manages federal data to best serve the public while getting optimal use from the data and protecting data security and privacy. Its purpose is to guide the federal government in practicing ethical governance, conscious design, and a learning culture.

The FDS describes several principles and practices that should guide the federal government's thinking about data. Several principles are particularly relevant to how the federal government collects, analyzes, and presents school safety data. For example, the strategy discusses the principle of conscious design, specifically that agencies should "harness existing data … to inform priority research and policy questions; reuse data if possible and acquire additional data if needed."[22]

As discussed in the introduction of this article, there has been an effort across some federal agencies to collect in one place data that inform interested stakeholders regarding school safety: the *Indicators of School Crime and Safety* report. This report, which is updated regularly, establishes reliable indicators of the current state of school crime and safety across the nation. It covers topics such as victimization, teacher injury, bullying and electronic bullying, school conditions, fights, weapons, availability and student use of drugs and alcohol, student perceptions of personal safety at school, and criminal incidents at postsecondary institutions. It is not meant to be an exhaustive compilation of school crime and safety information, nor is it meant to explore the causes of crime and violence in schools.

The indicators reported are based on information drawn from various data sources, including national surveys of students, teachers, principals, and postsecondary institutions. This provides opportunities for analyzing multiple aspects of crime and victimization in schools but also presents its fair share of unique challenges that limit the report's utility. For example, each data source used in the *Indicators* report has an independent sample design, time frame, data collection method, and questionnaire design — or it is the result of a universal data collection. This makes it difficult to compare indicators from one study with similar indicators from another data source. In addition, the time frame between data collections may range from every year to every five years. The *Indicators* report is released every year, and this time-frame issue may result in certain indicators being reported as the same year after year.

Although the *Indicators* report makes a valuable contribution to our overall understanding of school crime and safety, it is an aggregate of information from various school safety data sources, including some of those mentioned above. It is not a coordinated strategy across the federal government for collecting school safety data.

The FDS offers the federal government a unique opportunity to seize this moment in time and evaluate the school safety data that are being collected, how they are being used and by whom, and whether additional data are needed. In support of the FDS, agencies across the federal government can partner to develop a coordinated, thoughtful strategy for collecting school safety data that could resolve issues surrounding time frames, sample frames, comparability of results, and data analysis. The FDS also presents an opportunity for the federal government to create data thoughtfully, consider use by others, and plan for the future through data reuse. Finally, the FDS offers an opportunity for federal agencies to coordinate and share their data assets to advance progress on school safety, fulfill the need for broader federal information, and reduce data collection burdens.

Moving Forward

The review of these major data sets illuminates several interesting findings about the nature and extent of violent crime in schools. For example, physical bullying and threats to students have decreased over the last decades, and overall violent crime in schools has also decreased steadily, but there has been an increase in the number of multiple-victim homicides related to schools in recent years.

For educators, policymakers, and law enforcement officials to prevent these incidents in the future, we need to understand the factors that are contributing to this increase in multiple-victim homicides in schools. The school safety field would benefit from thoughtfully reconsidering data collections, guided by efforts such as the SSDB and the FDS. Specifically, the field should align the approaches taken to collect these important data with unanswered questions, while avoiding increased data collection burdens.

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For More Information

Learn about NIJ's Comprehensive School Safety Initiative at NIJ.ojp.gov, keyword: CSSI.

Read the *Indicators of School Crime and Safety* report at https://nces.ed.gov/programs/crimeindicators/.

This article discusses the following grant:

- "Understanding the Causes of School Violence Using Open Source Data," grant number 2016-CK-BX-0013

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2. In this article, a violent crime is one where a victim is harmed by or threatened with physical violence.

3. Kristin Holland et al., "Characteristics of School-Associated Youth Homicides – United States, 1994-2018," *Morbidity and Mortality Weekly Report* 68 no. 3 (January 25, 2019): 53-60, doi:10.15585/mmwr.mm6803a1.

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13. All data in this paragraph are drawn from Melissa Diliberti et al., *Crime, Violence, Discipline, and Safety in U.S. Public Schools: Findings From the School Survey on Crime and Safety: 2017-18,* Washington, DC: U.S. Department of Education, National Center for Education Statistics, July 2019, NCES 2019-061, https://nces.ed.gov/pubs2019/2019061.pdf.

14. Ibid.

15. All data in this paragraph are drawn from Musu et al., *Indicators of School Crime and Safety: 2018.*

16. All data in this paragraph are drawn from Holland et al., "Characteristics of School-Associated Youth Homicides."

17. These percentages do not add to 100% because one homicide may have multiple motives.

18. Holland et al., "Characteristics of School-Associated Youth Homicides."

19. Holland et al. demonstrate that although the victimization rate of school-associated, multiple-victim homicides per 100,000 fluctuated from 1994 to 2018, the incidence rate during that period remained relatively stable.

20. These estimates do not correspond to the SAVD-SS because the time frame of the SAVD-SS is from 1994 to 2018, while the SSDB covers 1990 to 2019. Also, the SSDB includes injuries as well as deaths.

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NEW APPROACHES TO POLICING HIGH-RISK INTIMATE PARTNER VICTIMS AND OFFENDERS

BY **CHRISTOPHER D. MAXWELL, TAMI P. SULLIVAN, BETHANY L. BACKES,** AND **JOY S. KAUFMAN**
NIJ supports research on law enforcement strategies that aim to protect victims of intimate partner violence.

According to the Bureau of Justice Statistics' annual victimization reports, approximately 691,000 nonfatal intimate partner violence (IPV) victimizations occurred annually in the United States between 2013 and 2017.[1] In a small number of incidents, the violence became lethal. Incident data reported by law enforcement agencies to the FBI over the past 15 years indicate that, each year, about 1,400 people were killed by their current or former intimate partners. In the majority of these homicides, the victim was a woman killed by her male (ex)partner.[2] As a result, there were approximately 6,400 more female intimate partner homicide victims than male victims over the past decade. While homicides in the United States predominately involve offenders and victims who are young adult males, intimate partner homicides largely involve men killing their female partners.[3]

Beginning in the 1980s, advocates and legal scholars sought to criminalize IPV by implementing pro-arrest and mandatory arrest policies, supporting preferred prosecution policies, enforcing protective orders, or requiring intervention programs for abusers.[4] They also sought consistent and coordinated responses across criminal justice and community-based organizations that were effective and focused on the safety of victims.[5] Over the past several decades, these efforts have ranged from establishing second-responder programs within law enforcement agencies, where crisis response teams make home visits following an initial police response, to instituting innovative pretrial strategies, such as increased involvement by the judge in managing IPV offenders during the pretrial period, restructured court procedures, and expanded victim services.[6]

A more recent development in how law enforcement responds to IPV incidents involves assessing the victim, offender, or both for risk and needs and then connecting one or both parties to appropriate resources regardless of whether an arrest occurs. In 2015, the Police Executive Research Forum (PERF) found that 42% of surveyed law enforcement agencies reported using a structured risk assessment to determine if a victim is in danger of future violence. The PERF report also indicated that 39% of U.S. agencies use a risk-assessment approach to identify repeat offenders.[7]

Although current evidence is promising, a more in-depth study is needed to establish these collaborative risk assessment models as evidence-based.

Currently, two victim-focused models of IPV risk assessment are used in the United States: the Lethality Assessment Program (LAP) and the Domestic Violence High-Risk Team (DVHRT) model. Although current evidence about these interventions is promising, particularly in terms of an LAP leading to women's use of more protective strategies, a more in-depth study is needed to establish these collaborative risk assessment models as evidence-based.[8] As a result, in 2012 NIJ and the Office on Violence Against Women (OVW) launched the Domestic Violence Homicide Prevention Demonstration Initiative to further expand the evidence base about how these models work in practice and how they impact survivors and the criminal justice and service systems.

Victim-Focused Models

LAP is a police-led model that largely follows the Lethality Assessment Program–Maryland Model, which was created in the early 2000s through a collaboration of advocates, researchers, and law enforcement practitioners.[9] The LAP assessment is based on Dr. Jacquelyn Campbell's Danger Assessment instrument, which she developed with the support of NIJ and other federal agencies to determine the likelihood that a man would kill his female intimate partner. The assessment instrument uses a calendar to guide the victim's recall and to document the frequency and severity of assaults over the past year, along with 20 questions about the offender's behaviors and threats or about other circumstances in the survivor's life, to calculate a weighted risk score for each victim. A validation study illustrated that danger levels or scores that resulted from the Danger Assessment instrument captured

more than 90% of potentially lethal cases.[10] This finding led others to assert that if IPV homicides are predictable, they are preventable — this has been the impetus behind OVW funding the implementation and testing of such tools.[11]

The LAP protocol — an 11-item screener conducted by law enforcement as well as other allied professionals — focuses on identifying those who are most at risk of becoming a homicide victim or experiencing a serious, lethal-like assault. Officers at the scene of an incident connect high-risk victims with an advocate by phone; the advocate has a brief discussion with the victim about safety planning. Following the incident, the law enforcement agency and service program personnel are encouraged to follow up with victims, particularly those who are most at risk, to connect them with services.

The immediate connection with an advocate — initiated by law enforcement — is likely a critical component, as victims who call the police do not often follow up with victim services. Although the rate of women who call the police to seek help increased from 40% in 1992 to 60% in 2014, the rate of victims across the United States who seek victim services remained at about 30% during this same period.[12] Thus, LAP aims to better connect victims who come in contact with law enforcement to victim advocacy services for assistance with safety planning, obtaining orders of protection, and shelter.

The second victim-focused model of IPV risk assessment, the DVHRT or high-risk team approach, has also gained traction across the country over the past decade.[13] Under this approach, law enforcement personnel seek to identify victims at high risk for lethal-like violence using the Danger Assessment–Law Enforcement tool.[14] They then forward information about the highest risk victims to their community's multidisciplinary DVHRT. These teams often include representatives from victim service organizations, law enforcement agencies, pretrial services, prosecutors' offices, corrections, and batterer intervention programs. They meet regularly to review the referred victims and decide, as a team, which victims warrant intensive assistance and monitoring.

Victims identified as needing intensive assistance must agree to share their information with the DVHRT. The staff then gathers more information about the victim and abuser from the team's member agencies — as well as from the victim — to develop a protection plan that allows each agency to contribute in a manner that fits its mission and resources. The team also collects case-level outcome information and reviews the status of existing cases each month to plan follow-up actions as needed. Prosecutors who are members of the team can use this information to inform bail and pretrial release recommendations. Eventually, the team decides if a victim's risk has decreased to a point where this level of monitoring is no longer indicated.

By design, the DVHRT serves many fewer victims than LAP, which serves all high-risk victims. At least one U.S. municipality is trying to implement both protocols simultaneously.

Offender-Focused Model

Several U.S. law enforcement agencies are adopting an IPV risk assessment approach built on the focused deterrence model that served as the framework for the U.S. Department of Justice's Project Safe Neighborhoods initiative.[15] This model — a problem-oriented policing initiative — seeks to prevent violence by directly contacting offenders and sending them a message that their "violence is no longer tolerated." When violence does occur, an enforcement strategy guided by state and federal statutes is used.[16]

With support from the Office of Community Oriented Policing Services, North Carolina's High Point Police Department and researchers evaluated whether an offender-focused approach reduces IPV homicides.[17] Their approach uses criminal history information to classify offenders into four groups organized by severity of risk. The lowest risk group includes offenders who have no criminal charge for IPV-related cases but have had a complaint filed against them. The second group is made up of those with one IPV-related charge. The third group includes offenders with a second IPV charge or offenders who were in the second group but have now

committed a court-prohibited behavior (e.g., violation of a protection order). The fourth group comprises offenders with three or more IPV-related charges, a violent criminal record that could include at least one IPV-related incident, a violation of a civil protection order, a weapon used during an IPV-related incident, or a prior felony conviction.

The department deploys a series of graduated tactics for each group, beginning with an offender-notification procedure — that is, those in the lowest risk group receive a letter stating that law enforcement sees them as a potential offender. The department then uses adaptable monitoring (e.g., an offender is flagged in the records management system) and service provisions such as referring the offender to mental health and substance abuse programs, and at the highest level, a series of increasingly swift and severe criminal justice sanctions (e.g., enhanced prosecution resources). This sanction regimen includes periodic call-in meetings, during which law enforcement officials and community members meet with selected offenders to review both the sanctions used to punish the most serious offenders and the community services available that may help them avoid these sanctions.[18]

The State of the Evidence

Over the last two decades, various federal agencies (including NIJ) have supported research that has led to the development and testing of programs to assess for serious and lethal violence, particularly among females.

For example, Campbell and colleagues — with support from NIJ, the Centers for Disease Control and Prevention, and the National Institutes of Health — completed a multicity study to assess which factors in relationships, beyond the occurrence of IPV, predict intimate partner femicide.[19] This research identified 11 factors that distinguished victims who were abused and killed by their partners from those who experienced abuse only. These factors include the abusers' employment status, the victim-offender relationship type, the presence of a child from the victim's previous relationship, the offender's use

of control tactics after separation, the offender's threatened or actual use of a weapon, and the lack of a prior arrest among active offenders. The findings suggest that criminal justice practitioners could combine these risk factors into a score that would identify more than 90% of potentially lethal IPV cases.[20]

In 2008, Jill Theresa Messing and colleagues — with support from NIJ — examined whether the use of the LAP screen decreased the rate of repeat, severe, lethal, and near-lethal violence and increased the rate of emergency safety planning and help-seeking.[21] Their research found that a majority of victims who were willing to participate in a study interview also spoke to the hotline advocate during their encounter with law enforcement. Their outcome analyses further indicated that women who spoke to the advocates reported using significantly more protective strategies over the next six months and experiencing significantly less victimization than women in a comparison group.[22] The women who participated in the LAP intervention were also significantly more satisfied with law enforcement's response and more likely to report that their advocate was at least somewhat helpful.[23]

These findings are promising, but more rigorous research is needed to determine the effectiveness of these IPV interventions. To fill in gaps and expand the knowledge base, in 2012 NIJ and OVW collaborated to launch the Domestic Violence Homicide Prevention Demonstration Initiative.[24] Through this initiative, NIJ supports a multidisciplinary team of researchers and practitioners who are examining the implementation of the LAP and DVHRT models across six sites. The project, which began in 2014, is seeking to validate previous findings related to LAP and to establish baseline evidence on the functioning and outcomes of the DVHRT model. The evaluation design includes collecting data about intimate partner incidents from each site's criminal justice system and linking these data with information from victim service providers and confidential victim interviews conducted in two sites. This data collection will allow policymakers to see how overlapping systems can manage risk and how this process influences further victimization.

In addition to studying how communities are implementing the interventions, the NIJ-supported evaluation team[25] is interviewing victims, victim service professionals, police officers, and key executive members of the local law enforcement communities at multiple points during the implementation process. These interviews will provide information about program implementation in each community and also reveal how implementation has affected the community's response to IPV.

"As a direct result of being part of the Domestic Violence Homicide Prevention Demonstration Initiative, I now incorporate much thought, along with specific conversations surrounding data collection and the potential for future research, into any decision that will impact our agency from the perspective of policy and/or practice," explains John Guard, Chief Deputy of the Pitt County Sheriff's Office in Greenville, North Carolina.

"The days of making agency decisions based on one's gut feeling are fleeing," Guard adds. "We need programs supported by solid research that can be replicated. This is why NIJ's support of research within the criminal justice system is so valuable to law enforcement agencies around the country."

Results from the multisite evaluation effort are expected to be available in 2021.

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For More Information

For more information on NIJ's IPV work, go to NIJ.ojp.gov, keyword: IPV.

Read more about the Domestic Violence Homicide Prevention Demonstration Initiative at NIJ.ojp.gov/dvh.

This article discusses the following grants:

- "Risk Assessment Validation Study," grant number 2000-WT-VX-0011

- "Police Department's Use of Lethality Assessments: An Experimental Evaluation," grant number 2008-WG-BX-0002

- "Evaluation of the Domestic Violence Homicide Prevention Initiative," grant number 2013-ZD-CX-0001

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