It's More Complex than You Think:
A Chief's Guide to DNA

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COPS
COMMUNITY ORIENTED POLICING SERVICES
U.S. DEPARTMENT OF JUSTICE

POLICE EXECUTIVE RESEARCH FORUM

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This project was supported by Grant Number 2008-CK-WX-K010 awarded by the Office of Community Oriented Policing Services, U.S. Department of Justice. The opinions contained herein do not necessarily represent the official position or policies of the U.S. Department of Justice or the members of the Police Executive Research Forum. Rather, the references are illustrations to supplement discussion of the issues.

The opinions expressed are generally those based on the consensus of executive session attendees; however, not every view or statement presented in this report can necessarily be attributed to each participant.

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Published by the Police Executive Research Forum
Washington, DC 20036

U.S. Department of Justice
Office of Community Oriented Policing Services
Washington, DC 20530

September 2010

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Foreword

The U.S. Justice Department's Office of Community Oriented Policing Services (COPS) and the Police Executive Research Forum (PERF) are pleased to issue this law enforcement executives' guide to the use of DNA evidence in criminal investigations.

Every day, DNA evidence becomes more useful, not only in the identification and prosecution of criminal offenders, but also in ruling out innocent persons and in some cases exonerating persons who have been falsely convicted. Once a tool used mainly in cases of homicide, sexual assault, and other violent crimes, DNA increasingly is being used in the investigation of property crimes as well.

Furthermore, scientists continue to make advances in the technology of DNA testing, allowing useful information to be produced even in cases where DNA samples from crime scenes are extremely small or degraded.

However, the rapid expansion in the use of forensic DNA has come at a price: large backlogs of evidence wait to be tested in many jurisdictions.

This book is a practical guide that aims to help police chiefs and other law enforcement executives manage their DNA testing needs and capabilities, as they look forward to ever-increasing demand for DNA evidence in coming years. With support from the COPS Office, PERF gathered information for this book by interviewing police chiefs, crime lab directors, and other experts in this field; conducting site visits to DNA labs; surveying law enforcement agencies; and holding an Executive Session in September 2009 to discuss the challenges facing police executives regarding DNA evidence.

We found that there is significant variation from one jurisdiction to the next in how DNA evidence is collected and tested. Some police departments run their own in-house crime labs with DNA analysis capabilities; others use labs run by their state, county, or regional government agencies, or they contract with private labs for DNA testing

services. Some DNA labs have a civilian director who reports directly to the police chief or sheriff, while others have layers of command staff between the two. And there are differences regarding who does the actual collection of DNA evidence at crime scenes—a dedicated crime scene unit, patrol officers, or some combination of both.

Different options suit the needs of different agencies. This book identifies the key questions that law enforcement executives should ask themselves in making these decisions, such as: Should my department have its own DNA lab? How does that decision affect costs? What are the implications of using a private lab regarding use of the FBI's CODIS database? Why is lab accreditation absolutely essential? What is the size of my DNA backlog? How do I make sure that the DNA lab that I use is responsive to police requests for expediting high-priority cases, while also ensuring that that privilege is not overused? What are the implications of the National Academy Sciences 2009 report on forensic science, as well as the Supreme Court's 2009 decision in the Melendez-Diaz case?

This book answers those questions, and many others, in layman's terms. The COPS Office and PERF hope that law enforcement executives will find this book useful as they manage the highly technical, complex, and important issues regarding DNA forensics.

Bernard K. Melekian
Director
Office of Community Oriented Policing Services

Chuck Wexler
Executive Director
Police Executive Research Forum

Acknowledgments

The authors would like to thank the COPS Office for providing us with the opportunity to explore such a timely issue. The use of DNA as an investigative tool has tremendous implications in the successful conviction or exoneration of individuals. As we look to the future of this rapidly-changing field, it is our hope that this guidebook will help chiefs to understand many of the significant opportunities and challenges with this technology. As was highlighted in a discussion during our executive session: It's more complicated than you think.

We would like to offer our thanks to the COPS Office for recognizing the importance of this issue, and we appreciate the support of Director Bernard Melekian, as well as that of former Acting Director Dave Buchanan. Our program manager, Nicole Scalisi, was enthusiastic and patient as we navigated through the project.

We thank those chiefs, lab directors, and other professionals who were able to join us for the *DNA: Challenges and Opportunities* Executive Session held in Washington, D.C., in October 2009 (see Appendix C for a list of all attendees). We would particularly like to thank the following presenters: Greg Matheson, Director, Criminalistics Laboratory, Los Angeles Police Department; Peter Marone, Director, Virginia Department of Forensic Science; Alan Chalkley, DNA Services Manager, Metropolitan Police Service (UK); Rick Gauthier, Staff Superintendent, Toronto Police Service; Ken Melson, Deputy Director of the Bureau of Alcohol, Tobacco & Firearms; Mark Stolorow, Director, Office of Law Enforcement Standards, National Institute of Standards and Technology; Michael Sheppo, Chief , Investigative and Forensic Sciences Division, National Institute of Justice; and Nicole Scalisi, Social Science Analyst, COPS Office.

A number of individuals made significant contributions to this project and publication, and we are entirely appreciative of the many individuals who helped us to navigate the complexities of DNA labs. This publication would not have been possible without the insight and candor of the numerous individuals interviewed for the project, and the

agencies that graciously hosted us during site visits (see Appendix B for a comprehensive list). Sidebars were authored by Dr. Karl Williams, Medical Examiner, Allegheny County (PA); Chief Richard Myers and Dr. Ian Fitch, Colorado Springs Police Department; and Richard Conway, Assistant Commonwealth's Attorney, Prince William County (VA). We especially thank Commander Bill Peters, Mesa Police Department and Jody Wolf, Assistant Crime Lab Administrator, Phoenix Police Department, who not only authored sidebars, but also hosted us at their agencies and provided useful feedback on drafts of this publication.

Several others provided significant review and advice regarding the draft of this book. We appreciate the thoughtful comments from Chief John Timoney (Ret.); NDIS Custodian Doug Hares and CODIS Unit Chief Jennifer Luttman, Federal Bureau of Investigation; Cecelia Crouse, Chief Science Officer and Forensic Biology Manager, Palm Beach County Sheriff's Office (FL); Chief Robert McNeilly, Elizabeth Township Police Department (PA); and Gary Pugh, Director of Forensic Services, Metropolitan Police Service (UK).

Finally, this project would not have been possible without the support and efforts of the PERF staff. Executive Director Chuck Wexler provided guidance throughout the project, providing insight and moderating the executive session. Craig Fisher and Dan Kanter reviewed drafts and offered thoughtful editing. Bruce Kubu and Nate Ballard were invaluable to the survey process, providing support with the design and administration of the survey. Shannon McFadden, Rebecca Neuburger, and Kevin Greene helped to coordinate the conference and provide organizational assistance.

Introduction

The use of DNA analysis in criminal investigations is a relatively new practice. The first criminal conviction based on DNA evidence occurred in Florida in 1987, and the admissibility of DNA testing in that case was upheld by the Court of Appeals one year later.[1] In 1989, the Virginia Department of Forensic Science became the first crime laboratory to offer DNA analysis to law enforcement agencies and created a state-wide database containing DNA profiles of convicted sex offenders.[2] One year later, in 1990, the Federal Bureau of Investigation (FBI) began a pilot program for its Combined DNA Index System (CODIS). Through the DNA Identification Act of 1994, the United States Congress codified the national DNA database and appointed the FBI as its custodian.[3]

The last census of publicly funded crime laboratories in the United States was conducted in 2005 by the U.S. Department of Justice Bureau of Justice Statistics. At that time, there were 389 crime labs operating in the United States, and just over half of the labs had DNA analysis capabilities.[4] The field is young and has experienced rapid growth, particularly as technology has advanced in recent years. The use of DNA evidence in investigations has led to many breakthroughs, but today's law enforcement leaders still have much to learn on this subject. This publication is not meant to simply be a guide for the small number of chiefs and sheriffs in the United States who oversee their own labs. It is intended as a primer for all police chiefs and sheriffs on the effective use of DNA evidence in their agencies' criminal investigations.

1. *Andrews v. State,* 533 So. 2d 841 (Fla. Dist. Ct. App. 1988).
2. Virginia Department of Forensic Science. www.dfs.virginia.gov/about/index.cfm
3. The DNA Identification Act of 1994 [contained within H.R. 3355 – 103rd Congress: Violent Crime Control and Law Enforcement Act of 1994] (1993). http://thomas.loc.gov/cgi-bin/bdquery/z?d103:HR03355:%7CTOM:/bss/d103query.html%7C
4. *Census of Publicly Funded Forensic Crime Laboratories 2005.* Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics, 2008. http://bjs.ojp.usdoj.gov/index.cfm?ty=pbdetail&iid=490

It is easy for a chief or sheriff to leave the science to his command staff or civilian lab supervisors and never make a concerted effort to keep up with advances in forensic science. There are few things, however, that can break public trust and bring controversy to a department more quickly than an indication that forensic evidence has been handled improperly by the police. To prevent this, it is imperative that all law enforcement leadership understand the basics of forensic DNA evidence, sample collection, and analysis. They must also understand what labs need to be successful and how a good working relationship with key stakeholders is essential to any forensic science program.

The PERF DNA project

With funding from the U.S. Department of Justice Office of Community Oriented Policing Services (the COPS Office), the Police Executive Research Forum (PERF) examined law enforcement's use of DNA in criminal investigations. The project was comprised of several different components that identified current practices, challenges, and innovative approaches to the collection, analysis, and use of DNA evidence throughout the country.

We first conducted a survey on the topic, which was completed by 216 PERF member agencies (see Appendix A). As noted above, the majority of law enforcement agencies in the United States do not have in-house crime labs with DNA analysis capabilities. This was reflected in the PERF survey results, as only 31 of the 216 responding agencies reported that they have the ability to perform DNA analysis in-house. It became clear that most law enforcement agencies outsource DNA analysis, and this was considered in our subsequent research and in shaping this publication.

PERF SURVEY RESULTS
(216 Responding Agencies)

Does your agency have an in-house crime lab with DNA analysis capabilities?

Yes - 31 agencies (14%)

No - 185 agencies (86%)

If you don't have in-house DNA analysis, what types of labs do you use?

State lab	118 (64%)
Local lab	59 (32%)
Private lab	10 (5.4%)
Federal Lab	3 (1.6%)

The second component of the project was to gather information through interviews with police chiefs, lab directors, and topic experts. We also conducted site visits at several labs throughout the country (see Appendix B). The goal of the interviews and site visits was to further explore innovative practices, specific challenges overcome by an agency, or some other unique aspect of an agency that had been brought to the attention of PERF. The locations and experts were selected, in part, by agency survey responses, Executive Session participation (see next paragraph), or recommendations from others in the field.

On September 23, 2009, an Executive Session was held in Washington, D.C. The meeting, *DNA: Challenges and Opportunities,* brought together a diverse group of stakeholders including lab directors, police chiefs, sheriffs, prosecutors, and international guests (see Appendix C). Participants discussed the challenges of managing crime labs and effective outsourcing programs. They considered examples of how various agencies have approached issues in their own labs and crime scene units. Meeting participants also addressed the potential impact of the 2009 National Academy of Sciences report, *Strengthening Forensic Science in the United States: A Path Forward* ("NAS Report"), particularly as it applies to DNA and law enforcement oversight of forensic labs.

The culmination of the project is this publication, which is meant to provide chiefs and sheriffs with guidance as they work to assess their agencies' forensic DNA needs and make forward-looking policy. Law enforcement leadership needs to be aware of the various challenges and approaches toward managing DNA evidence throughout the entire process—from collection to exoneration or conviction.

Throughout this publication, we will identify the major policy considerations for chiefs and draw upon the successful practices of several agencies to provide examples of what works and what doesn't. When practical, we will highlight specific recommendations for all law enforcement agencies to consider. However, due to the fast-paced developments in the field, definitive guidance is not available for some policies and practices. When guidance is not practical, the publication will pose the most salient questions that chiefs should consider for their agencies.

The publication is comprised of the following chapters and topics:

1. Leadership and case management in a law enforcement crime lab
2. Starting at the beginning: DNA evidence collection
3. Backlogs, evidence storage, and other challenges in managing a law enforcement crime lab
4. Be an effective consumer of forensic services: Optimizing your agency's relationship with public and private labs
5. Post-analysis and DNA profile databases
6. Recent developments in the use of DNA analysis
7. The chief's checklist

Chapters 1 and 3 focus on in-house crime lab management by law enforcement leaders. While we recognize that most agencies do not have in-house forensic DNA capabilities, the majority of the issues are applicable to any law enforcement agency. These chapters on in-house DNA labs will also help inform police executives who use outside forensic labs about the issues they need to consider.

Each section of the publication will conclude with a number of important questions for chiefs to ask of themselves, their staff, and their stakeholders. While the questions may appear to be simple, their ramifications can be significant. It is important that their impact not be minimized or ignored by law enforcement leaders. Examples of the "big picture" questions that chiefs need to consider are:

- **How well informed are your officers about DNA?** Chiefs need to evaluate what their officers and investigators actually know about DNA and DNA evidence collection. Frequently, officers receive only minimal training and information pertaining to forensic DNA evidence during their days in the academy. This information, if retained by the rookie officer at all, quickly becomes outdated. Agencies should have adequate systems in place to ensure that officers remain up to speed on this crucial investigative tool.

- **Who collects DNA evidence for your agency?** Many law enforcement agencies maintain a dedicated crime scene unit, but few have a formalized policy in place for situations in which the crime scene unit cannot respond or the infraction is minor, making it difficult to justify calling out the crime scene truck. Effective, efficient, and consistent crime scene evidence collection protocols should be a priority regardless of who is responsible for processing the scene. Whether your agency uses crime scene specialists, patrol officers, or investigators for DNA evidence collection, all need to be provided with adequate tools and training to meet these goals.

- **What is the most effective model for your agency's DNA analysis?** Once DNA evidence has been collected, a decision must be made regarding where to send it for analysis. Common choices include an agency's in-house lab, a local or county lab, state lab, private lab, and sometimes a federal lab, such as the Federal Bureau of Investigation. Whether using your own lab or outsourcing the work, there are a number of factors that should be considered in making the decision, including the cost, the type of analysis to be done, the availability of resources, and the possible turnaround time.

- **What do you know about lab accreditation – and why should you care?** Lab accreditation by a reputable national body (e.g., American Society of Crime Laboratory Directors/Laboratory Accreditation Board or Forensic Quality Services International) impacts the credibility of the lab, the necessary budgetary and personnel resources devoted to the lab, and the lab's ability to be eligible for access to the national DNA database through the FBI CODIS program. Accreditation also has a huge effect on an agency's ability to utilize private labs. Many police departments have been disappointed to realize that, after entering into lengthy contract negotiations with a private lab, the lab could not actually deliver a final product that could be used by the police department for databasing and prosecution purposes. Lab accreditation is a seemingly tedious process filled with regulations, audits, and various requirements that may or may not be easily understood by the non-scientist. It is important, however, to have a basic understanding of the accreditation status of the lab(s) used by your agency and how any loss or change in accreditation might impact your investigations.

- **Do you really know the size and content of your DNA backlog?** Most of the law enforcement agencies surveyed by PERF were confident that they currently have a backlog of DNA evidence. What was surprising, however, was that few agencies were able to articulate even the basic unit of measurement for that backlog (e.g., cases, samples, items, etc.) much less the size of the backlog. Few law enforcement agencies have an accurate understanding of the size or composition of their DNA backlog. In fact, several agencies that undertook large scale projects to assess their backlogs found large numbers of cases that should not have been there at all! Those cases had either reached the statute of limitations or had already been adjudicated and there was no need for further DNA analysis.

- **How closely do you follow new developments in DNA and forensic science?** The year 2009 was an important one in the field of forensic science, particularly with the release of the NAS Report. The NAS Report made a number of recommendations regarding the field of forensic science, including removal of labs from the control of law enforcement. Law enforcement needs to have a place at the table to express its views and provide guidance as the forensic science and legal communities work through the recommendations of the NAS Report. Without an understanding of the issues, meaningful contribution to the process of improving forensic science will be impossible.

Law enforcement leaders need to consider these and other issues in order to implement effective programs for the use of DNA evidence in their agencies, regardless of whether an in-house or outside lab is used. Leaders must formulate a clear strategic vision for how they will approach the challenges of DNA analysis as technology continues to advance and DNA evidence becomes a necessary component of an increasingly wide array of criminal investigations and prosecutions.

1

Leadership and case management in a law enforcement crime lab

Overseeing an agency with a crime lab can be a daunting task for any law enforcement executive. Effective forensic science leadership is critical, however, particularly with regard to the use of DNA technology in your agency's investigations. It is imperative that chiefs make themselves knowledgeable about the department's in-house lab. It is through the effective leadership of the chief and lab supervisors that an effective case management plan can be implemented.

This chapter will begin with an examination of forensic leadership by considering the following three areas:

- Knowledge – Make an effort to understand the complex needs and challenges that affect your crime lab.
- Daily lab management – Promote strong and effective leadership of the lab by both sworn and civilian supervisors.
- Accreditation – Maintain a working understanding of the benefits and requirements of national accreditation.

The second part of the chapter will explore effective case management through the following topics:

- Types of cases for which an agency may routinely analyze DNA
- The implications of formal case expediting procedures
- Establishing a "gatekeeper" as a single point of contact in the lab
- Using your lab as a resource
- Case meetings with stakeholders
- The importance of computer system interoperability

Leadership

What do you really know about your lab?

Most of the police chiefs and civilian lab directors who participated in the project agreed that chiefs and sheriffs need to have an understanding of the complexity of the issues affecting forensic crime labs. "Have a plan for your lab," said Los Angeles Police Department Chief Charlie Beck (who, at the time of his interview, was the Chief of Detectives under Chief Bill Bratton). "Realize that many of the lab's issues are very different than those on the sworn side." Beck stressed that certification, accreditation, staffing, facilities, and budgets have different ramifications for civilian-staffed crime labs and an effective chief needs to understand those processes.

Chief Bill Lansdowne in San Diego, CA, noted that one of the biggest fears for police chiefs is a crime lab scandal. He said, "You can prevent this through lab leadership and culture, accreditation, and assigning your best analysts and investigators to cover major cases."

Chief Harold Hurtt (Ret.) from Houston, TX, would likely agree with Chief Lansdowne. In his September 2009 testimony before the United

States Senate Committee on the Judiciary, Chief Hurtt outlined various challenges within the Houston Police Department's crime lab (see Appendix D). When convictions and the validity of lab results were called into question, the Chief hired a competent lab director to help guide the lab through the challenge of getting the lab back online. He also made the bold move of bringing in an independent investigator to review the lab and property room. In his testimony, Chief Hurtt asserted that accreditation and professionalism are important in forensic science. "High standards are necessary to protect both public safety and individual rights," he testified.

Throughout the project, lab managers and DNA analysts frequently echoed the same desire—police chiefs and sworn command staff should use their labs as a resource for everything from consulting with detectives on crime scenes and investigations to providing training for sworn personnel. By having open lines of communication between investigators, the command staff, and the lab, many issues can be tackled effectively as a team.

Crime lab managers also said that it would be extremely helpful for chiefs to have a working knowledge of "big picture" lab issues regarding the importance of accreditation, technical leadership, and the grant process. For example, in order to receive certain federal funds or have access to the FBI CODIS program, labs must maintain the proper accreditation and also have a technical leader who holds very specific educational and professional credentials. Chiefs need to ensure a proper funding source for necessary lab functions in order to make certain that this occurs. They need to be able to articulate to the public and local government leaders the need for such crime lab support.

Several crime lab managers also highlighted the importance of having a chief with an open mind to innovative approaches to process and productivity challenges within the crime lab. For example, the Palm Beach County (FL) Sheriff's Office crime lab brought in consultants

to conduct process mapping of the crime lab's DNA operations. This eventually led to significant changes that not only improved the facility's productivity, but also greatly improved the DNA lab staff morale. In the Kansas City (MO) Police Department, the lab is pursuing a review through an innovative project that will draw expertise from a consultant from the Forensic Science Services in the United Kingdom. The Allegheny County (PA) Medical Examiner's Office brought in Max Houck, Director of the Forensic Science Initiative at West Virginia University, to evaluate the crime lab's operations. Houck's project, "FORESIGHT," evaluates crime labs using business and economic principles and includes a review of metrics such as budget, turnaround time, backlog, and output expectations.[5]

Who should run the crime lab on a daily basis?

There are few labs with a civilian director who reports directly to the sheriff or chief – generally there is at least one layer of sworn command staff between the two. The majority of the lab directors and chiefs who participated in this project agreed that the relationship between the lab director and the sworn commander is critical to the success of a crime lab and its DNA analysis capabilities. Not only is it logical for a lab to have a civilian director with a strong forensic science and quality control background, but in many cases accreditation standards require it. The presence of civilian leadership in the lab helps to bring a sense of stability in the department's forensic science program and policies, as sworn commanders frequently rotate through positions overseeing forensic labs (on average, every two to four years).

Several lab directors noted the potential for power struggles when the chain of command and delegation of power between sworn and civilian forensic leadership are not strictly delineated. In many of the successful models reviewed for this project, the civilian lab director reported to a sworn commander who also oversees several other divisions within

5. Foresight Overview. West Virginia University. www.be.wvu.edu/forensic/foresight.htm

the department. Many of the civilian lab directors attributed their successes with DNA to the support and assistance they receive from their immediate sworn command supervision. In many instances, it is the relationship that the chief has with both the lab director and commander that has led to crime lab initiatives and advances in department forensic programs.

As Chief of Detectives at LAPD, Chief Beck directly oversaw the crime lab. He quickly learned the importance of delineating the roles and responsibilities within the lab's chain of command. "You need a sworn commander who can shield the lab from political pressures and fight their battles," he said. "The lab needs political cover and a sworn commander can be that buffer." However, civilian lab directors and sworn commanders alike must realize that it can be a difficult transition for a law enforcement commander to be thrust into the world of forensic science.

> **Example.** In recent years, the LAPD forensic lab was moved from under the umbrella of the Administrative and Technical Services Bureau to the leadership of the Chief of Detectives. What would seem to many a counterintuitive shift in leadership, particularly today as there is a call for greater crime lab autonomy within departments, has been deemed a positive shift in the LAPD.
>
> Both Chief Beck and Criminalistics Lab Director Greg Matheson agree that this shift allowed the police department to have a more centralized decision-making process with regard to prioritization. Chief Beck said, "Scientists and detectives speak different languages." The priorities of the lab before the shift were to simply get the cases done in the order they were submitted. Because the scientists, detectives, and prosecutors all "spoke different languages," the lab needed help to prioritize the work in a manner that best served the investigators and the prosecutors.

Through improved communication, this started to happen. Chief Beck explained, "The prioritization scheme now reflects the detectives' needs. Previously, things were extremely siloed. Now we have analysts attending homicide meetings with detectives and prosecutors." As a result, the detectives began to realize that the lab is a limited resource and they began to better understand the evidence they were submitting to the lab. According to Chief Beck, "The prioritization scheme now gives a context to the science."

The prioritization scheme from the Chief of Detectives also allows for ease in shifting lab priorities based upon the needs of the department. One example of this demonstrated the improved availability of resources to the lab. In 2008 and 2009, the lab came under scrutiny because of its backlog of untested sexual assault kits. The lab needed to quickly get a handle on the number of cases in the backlog and their status. Chief Beck was able to coordinate resources under his command and assign over fifty detectives to count and review the status of each of the cases so that the lab had the correct information to address the backlog.

Example. When John Timoney was appointed Police Commissioner in Philadelphia in 1998, he took a hard look at the organization. One of the major changes he made was to remove the crime lab from the Detective Division and place it under the supervision of the Chief of Administration, in the Science and Technology Division. The lab remained under the direction of a civilian lab director and sworn supervisors, but it was removed from the sworn command staff who also oversaw investigations. This distinction was critical to the decision by Commissioner Timoney at the time. "The job of the lab is science. It is not to please or help the detectives with their case," he said. Under the revised organizational structure, the Chief of Detectives continued to have input into the prioritization of cases, while the lab leadership did not have to be concerned with reporting directly to their chief consumer of their work.

According to Mesa (AZ) Police Department Commander Bill Peters, "It takes a while to get up to speed not just with lab management issues, but with understanding the science as much as possible." In the Palm Beach County (FL) Sheriff's Office, Major James Stormes said, "The sworn commander who is effective is the one who takes the time to understand the science, the environment, the demands, and the challenges of the lab." Stormes explained that from the beginning, a sworn commander should ask the lab director two essential questions: "Why should I support you?" and "How can I support you?"

THE ADVANTAGES AND CHALLENGES IN SETTING UP AN IN-HOUSE FORENSIC DNA UNIT

By Chief Richard Myers and Dr. Ian Fitch, Crime Lab Supervisor Colorado Springs Police Department (CO)

Since 1996, the Colorado Springs Police Department has included the Metro Crime Lab, which employs 14 civilian forensic scientists and support personnel, and serves the city of Colorado Springs and surrounding El Paso County. The lab has historically provided such forensic services as crime scene analysis and reconstruction; bloodstain pattern analysis; latent fingerprint processing and comparisons; footwear impression analysis; blood alcohol and drug analysis; and fire debris analysis. In 2005 the lab added a Firearms Examination unit, and in October 2008 it opened a state-of-the art serology and forensic DNA unit.

The idea of a DNA unit within the lab dates back to 2001–2002, and the main driving force was the desire to eliminate some of the long turn-around times in DNA testing by our backlogged state lab. It is doubtful that anyone within the department at that time fully appreciated the commitment, effort, cost or timeline to make the DNA unit a reality. Overall, the process included: securing federal funding, performing the necessary crime lab renovations, hiring qualified personnel, purchasing equipment, validating methods and instrumentation, writing standard operating procedures and implementing a quality assurance system, and finally getting the lab accredited to an international standard so that the DNA unit could participate in the Combined DNA Index System (CODIS). The total cost was $1.6 million by the time the DNA unit opened in 2008.

ADVANTAGES OF AN IN-HOUSE CRIME LAB/DNA UNIT

The day the DNA unit opened, it was obvious to laboratory management that offering rapid casework turn-around times was imperative. It was clear that the unit could not process voluminous DNA work requests with only two DNA analysts. Case management therefore became paramount. The best way to prioritize cases and minimize the amount of unnecessary or redundant work is through communication between lab

personnel and their sworn colleagues who request the work. With an in-house crime lab, this communication is easy, and our lab welcomes and encourages meetings between lab management/personnel and investigators prior to the submission of a work request in order to evaluate the probative value and priority of the evidence items at the outset of a specific investigation, and also throughout the analysis process to monitor the progress. These meetings allow analysts and investigators to build healthy working relationships where mutual understanding and negotiation are key. This is in contrast to working with off-site crime labs where investigators and lab analysts may never meet. So far, this approach has proven effective: in its first year of operation, the DNA unit worked over 220 DNA cases with an average turn-around time (from the receipt of a request to the submission of a lab report) of 30 days. In that time, eight cases were aided through CODIS hits.

Another advantage of an in-house crime lab, particularly one with a DNA unit, is the opportunity to apply for and manage grants. There are numerous federal and state forensic improvement and backlog reduction grants available to local law enforcement agencies. In January 2009, the CSPD was awarded a substantial "Solving Cold Cases with DNA" grant for the investigation and analysis of cold homicide and sexual assault cases. Such grant opportunities are not necessarily available to departments utilizing state or private labs.

CHALLENGES OF AN IN-HOUSE CRIME LAB/DNA UNIT

Perhaps the biggest challenge for a law enforcement agency with its own DNA facility is cost. Opening the DNA unit resulted in a doubling of the lab's operating costs due to the expense of DNA supplies, consumables, and instrument service contracts. Critics often argue, why operate such a facility when the state lab can perform the work for free? Some of the answers are discussed in the prior discussion of advantages. Assuming that manageable case backlogs and rapid turn-around times are maintained, the cost of running a DNA unit needs to be considered in the context

of the cost associated with longer turn-around times, such as those offered by a state lab, which can cause court proceedings to drag on or allow perpetrators of violent crimes to re-offend.

An associated challenge, not specific to DNA, is how to provide a civilian Crime Lab Director sufficient authority and resources to manage a crime lab within the hierarchy of a traditional police culture. In the interest of efficiency and operational momentum, it is occasionally necessary to decline certain lab requests at the discretion of the Lab Director, and this of course can create conflict and friction. At the CSPD, one way this challenge has been addressed is to elevate the Crime Lab Director position to the civilian equivalent of a lieutenant, thus granting greater access to higher-level decision making within the department. Placing the Crime Lab Director in this position also provides greater opportunity for senior command staff to gain a better understanding of the inner workings of the crime lab.

Ultimately, if the police chief understands the critical need for a level of operational autonomy to maintain the integrity of a scientific crime lab, and the lab's leadership embraces the value of communication between internal "customers" and the lab staff, the resulting success will benefit the entire community.

Why is lab accreditation important?

One area where the police chief or sheriff can have the greatest impact on an agency's forensic science program is crime lab accreditation. Accreditation requirements can be confusing for the non-scientist, but it is imperative that chiefs have a working knowledge of accreditation standards and can coordinate with crime lab managers in order to achieve and maintain accreditation status. While there are certain types of accreditations in law enforcement that are "nice to haves" (e.g., CALEA and certain state-level certifications), national accreditation for a crime lab is a "must have," particularly if the lab is to have access to the CODIS software and the national DNA database.

According to the FBI Quality Assurance Standards, in order to have access to the CODIS database, a forensic DNA laboratory must be accredited (see Appendix E). Likewise, any vendor lab whose analysis is to be reviewed by the databasing lab for upload into CODIS must also be accredited. The FBI definition of accreditation is as follows:

> **Accredited laboratory** is a DNA laboratory that has received formal recognition that it meets or exceeds a list of standards, including the FBI Director's Quality Assurance Standards, to perform specific tests, by a nonprofit professional association of persons actively involved in forensic science that is nationally recognized within the forensic science community in accordance with the provisions of the Federal DNA Identification Act (42 U.S.C. §14132) or subsequent laws.[6]

Two of the most common accrediting bodies are the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB) and Forensic Quality Services International (FQS-I). Both accreditation programs integrate the ISO/IEC 17025:2005 requirements, which are set by the International Organization for Standardization regarding the competence of testing and calibration for laboratories. In addition to requiring that the ISO standards be met, the ASCLD/LAB accreditation requires that crime labs' technical operations and management systems meet the requirements set forth by ASCLD/LAB.[7] FQS-I will accredit forensic service providers who are in conformity with three standards: ISO/IEC 17025:2005, ILAC Guide 19:2002, and the National QA Standards for DNA Testing.[8]

6. *Quality Assurance Standards for DNA Databasing Laboratories.* Federal Bureau of Investigation, 2009. http://www.fbi.gov/hq/lab/html/databasinglab.htm; See also *Quality Assurance Standards for DNA Testing Laboratories.* Federal Bureau of Investigation, 2009. www.fbi.gov/hq/lab/html/testinglab.htm
7. American Society of Crime Laboratory Directors/Laboratory Accreditation Board. www.ascld-lab.org
8. Forensic Quality Services Inc. www.forquality.org/accreditation.htm

As a prerequisite for accreditation, programs generally require that specific competencies are met by analysts and management, and that the lab meet stringent requirements regarding the way in which potential errors or lapses are handled. Each type of accreditation has its own nuances and specific standards that must be met. It is imperative that chiefs, sheriffs, and sworn commanders who oversee crime labs have a working understanding of the basic requirements of the accreditation held by their in-house lab. Chiefs who are currently working with non-accredited labs should consult with their in-house scientific leadership and representatives of accrediting bodies in order to determine which accreditation standard would be the most appropriate for the lab and agency.

The comments of lab directors during the course of this project illustrated the importance of having this basic accreditation education. A number of lab directors noted that the trust of their chief or sheriff, and the good working relationship between the lab and sworn command staff, have helped them to maintain accreditation status and successfully pass audits. When resources are needed to maintain the lab's status, these lab directors have confidence that a simple explanation will net them what they require. No law enforcement executive wants his crime lab to fail because he did not provide the lab with requested resources.

Conversely, several lab directors noted past experiences in which well-meaning command staff ordered equipment or arranged for resources which, had they been used, would have been problematic to the efficiency of the lab and could have had a negative impact on the lab's accreditation status. For example, in an attempt to extend the lab's strained budget, a commander may authorize the purchase of a cheaper reagent for use in DNA analysis. However, the new reagent will need to be validated on the equipment. This has the potential to incur a significant overtime expense and also to contribute to the growth of the DNA backlog. Again, this underscores the need for the chief and command staff to collaborate and communicate with lab management, as well as the benefits that come from taking the time to understand the needs of the in-house lab.

Case Management

Effective case management begins with a review of the lab's workload. For what crimes does the lab perform DNA analysis on a regular basis, and how is the work dispersed among the DNA analysis workforce? How is the lab's prioritization scheme communicated to consumers of the lab, whether those consumers are the agency's own investigators or members of other local law enforcement agencies that use the lab? Integral to the communication process is the initial point of contact for all submissions to the lab. Frequently, this is the evidence coordinator or lab director. Communication between the lab and key stakeholders must also be maintained throughout the process.

Some of the most prominent case management concerns are outlined below in two sections—prioritization and communication. The first topic deals with prioritizing work within the crime lab. This includes determining what types of crimes will undergo routine DNA analysis in the lab and how cases will be prioritized and expedited. The second case management issue is communication. This section will outline the benefits of having a single point of contact in the lab, using the lab as a resource beyond simply analyzing evidence (e.g., offering officers' training or guidance on evidence collection techniques), coordinating meetings with stakeholders, and having computer system interoperability.

Prioritization within the lab

For what crimes do you perform DNA analysis?

With the rapid progression of technology in the field of forensic DNA analysis, many chiefs must determine whether they have the resources to collect and analyze all potential DNA evidence found at crime scenes. In the majority of jurisdictions, DNA evidence is being collected whenever it exists, regardless of the severity of the crime. This means two issues must be considered: whether the lab will place evidence in the queue for future DNA analysis, and whether the lab actually has the resources to perform analysis for that particular piece of evidence.

Most agencies agree that DNA evidence should be collected and analyzed in the investigation of violent crimes, and that those cases should receive priority. However, there is some controversy and variation in case analysis protocol with regard to property crimes and certain sexual assault cases.

Property Crimes

The variability in the treatment of property crimes by different agencies is generally based on their crime labs' capacity. For example, one jurisdiction's lab may be able to handle a DNA caseload filled with burglaries and stolen auto cases, while a nearby lab is so overwhelmed by more serious crimes that it doesn't even bother to collect DNA evidence for property crimes. Still other agencies may collect for all crimes, but evidence from property crime scenes will sit in storage indefinitely because the lab cannot handle the work.

The San Diego Police Department reports success with DNA analysis for property crime cases. Lab Director Mike Grubb estimates that 30 to 40 percent of the DNA profiles from property crimes have resulted in CODIS hits. The Miami-Dade (FL) Police Department, which outsources the analysis of most property crime DNA evidence, currently has a similar CODIS hit rate. When that department first started to use DNA for property crimes in the early 2000s, the hit rate was even higher—around 50 to 60 percent. Also in southern Florida, the Palm Beach County Sheriff's Office has had success with outsourcing most of its property crime DNA analysis. DNA analysts in that agency reported that their experience with property crime hit rates has been so positive that they are amazed that all departments haven't begun to make property crimes a priority.

Many agencies would like to test for all property crimes, but cannot do so due to constraints on budgets and lab resources. At the LAPD, for example, Chief Charlie Beck understands the importance of using DNA for a wide array of criminal investigations. "Chiefs need to understand that DNA is about more than just rape and murder. It is extremely

effective for property crimes," he said. According to LAPD Criminalistics Lab Director Greg Matheson, agency resources only permit the lab to conduct DNA analysis for a property crime if it is a serial or major case. Sometimes these cases are also used for DNA analysts in training to "cut their teeth" on cases that are less serious or complex.

Rape Kits

In recent years, the country's large rape kit backlog has caught the attention of the media, human rights organizations, and federal lawmakers. Some of the most publicized backlogs have been in Los Angeles, Los Angeles County, Detroit, and Houston. While a number of cases in the backlog were not tested because of neglect or investigator error, many of the samples have remained untested because the identity of the perpetrator was not an issue in the case. For example, there were cases in which consent was in question, not identity; in other cases, the perpetrator had been otherwise identified. In these situations, DNA evidence was not necessary for the case to be adjudicated. In fact, for many years the LAPD had a policy that cases which depend on consent rather than identification would not be tested. That policy has since changed, and all rape kits must now be tested.

Many groups, particularly victims' advocates, argue that even cases in which the identity of the assailant is not at issue should have the evidence tested to see if the DNA profiles are a match for any unknown perpetrator profiles. The rationale is that an individual who sexually assaults an acquaintance (a situation in which the assailant's identity is already known) is more likely to also sexually assault a stranger, and those matches can only be found if all rape kits are tested. Similar to the LAPD, other law enforcement agencies have begun to create new policies so that these cases will be tested.

Case Prioritization

Once an agency has determined what cases are eligible for routine DNA analysis, a clear and logical case prioritization strategy is crucial for the crime lab to function efficiently on a day to day basis. The most effective policies include input from the lab director and lab personnel, and should be in written form. Policies should also include guidelines for situations that require departure from the ordinary prioritization schedule—for example, in the case of high profile crimes or other exigent circumstances. Laying out the policy in advance will decrease the likelihood of confusion, stress, and tension between investigative and lab personnel when they are faced with challenging circumstances.

Routine Prioritization Policies

In a number of labs, routine prioritization is on a first come, first serve basis. Others take into consideration discovery and trial deadlines, as well as the type of crime. Chief Beck stressed that the LAPD's model of placing the crime lab under the umbrella of the Chief of Detectives allows for the lab's priorities to align with the priorities of the department's investigators. Chief John Timoney (Ret.) noted that even though the crime lab was independent of the investigative division while he was Philadelphia's Police Commissioner, the lab director still worked closely with the Chief of Detectives to determine priorities for DNA analysis.

The crime lab in the Kansas City (MO) Police Department has integrated both court deadlines and crime classification into its prioritization policy. Detectives enter their DNA analysis requests into the Laboratory Information Management System (LIMS) computer system and the case is assigned a priority label. There are four standardized classifications, with one being the highest priority and four the lowest:

1. A violent crime with an unknown suspect or any offense with a trial pending in the next 180 days
2. A nonviolent crime without a suspect
3. A violent crime with a charged and in-custody suspect
4. A nonviolent crime with a charged and in-custody suspect

Several agencies include a special category in their prioritization scheme for cases that are likely to involve transient perpetrators and/or victims (for example, crimes involving communities with large numbers of traveling con artists or migrant workers). In Baltimore County, Maryland, for example, these cases are routinely moved up in the prioritization scheme because they generally involve a suspect who is not yet in custody and who is likely to remain in the jurisdiction for only a short period of time.

Expedited and High Priority Cases

There will always be cases that jump the line and are considered high priority for DNA analysis and investigation. The protocol for this prioritization should be explicit and well publicized to lab consumers. Many agencies use an informal process for expediting cases. Most rely on a case-by-case decision from the chief or command staff for unusually high priority cases. Pressures to expedite these cases may be due to the severity of the crime involved, officer involvement, demands by elected officials, or other circumstances.

At other times, a detective may approach an analyst to push through a case because of his personal interest in it or pressure from his immediate supervisors. However, allowing cases to be expedited informally at the analyst/investigator level can drain resources and result in a prioritization scheme contrary to the best interests of the department. Each case negotiated at this level pulls the analyst away from department-prioritized casework, and can lead to confusion and unnecessary stress on lab personnel.

The Mesa (AZ) Police Department has addressed this issue by establishing a chain of command for priority requests. Detectives place priority requests with their command staff, who must approve any requests before they are forwarded to the commander overseeing the forensics unit and crime lab. Commander Bill Peters works with his staff, including the civilian lab director and DNA supervisor, to efficiently

address the prioritization requests of the detectives. Since implementing this policy, the lab has reported a boost to analyst morale and a reduction in priority requests from investigators.

In other agencies, the working relationship between the command staff and crime lab management allows for cases at the highest level of priority to be identified and assigned quickly. Dr. Cecelia Crouse in the Palm Beach County (FL) Sheriff's Office was initially reluctant when Major Stormes asked her to attend the command staff meetings.
"I didn't want to spend my time listening to talk about patrol cars," she said. Dr. Crouse has since found the meetings to be very worthwhile, as they have improved her knowledge of patrol functions and facilitated communication between the civilian scientists and sworn officers.
Irv Litofsky, the director of the Baltimore County (MD) Police Department Crime Lab, agreed that communication between the chief, sworn command staff, and crime lab management is crucial to effective high level prioritization within the lab. "We need that relationship to decide what's important today."

Though not as common, some jurisdictions will routinely involve prosecutors in determining the prioritization of DNA analysis within the crime lab. This is the procedure in Allegheny County (PA) where the crime lab in the Medical Examiner's Office performs DNA casework for approximately 130 local and federal law enforcement agencies, including the city of Pittsburgh. The routine prioritization scheme at the lab is largely informal, but the process to designate an expedited or high priority case is extremely formalized. In order to have a case expedited, the prosecutor must approve the decision and send a letter to the lab.

> **Example.** Not long ago, the Palm Beach County (FL) Sheriff's Office (PBSO) crime lab was suffering from low morale and its backlog was growing exponentially. Major James Stormes was assigned to oversee the unit, and he began to work closely with Dr. Cecelia Crouse, Chief Scientific Officer and Forensic Biology Manager, to

understand the challenges and what the lab needed to succeed. Because they maintained open lines of communication, Dr. Crouse was able to approach Major Stormes to better understand the law enforcement perspective behind various requests and procedures.

Dr. Crouse credited Major Stormes with helping to bring in a process-mapping consultant to search for bottlenecks and other inefficiencies in the crime lab's systems. "It was the best thing we ever did," she said. The consultant helped them to identify several areas for improvement. Once the changes were implemented, they streamlined lab processes and improved both lab efficiency and staff morale. One of the key findings by the consultant was that Dr. Crouse had been spending the equivalent of nearly 16 working days per month tracking cases and communicating with investigators, prosecutors, and outside agencies regarding cases. When those tasks were delegated to another employee, she had time to better manage the DNA lab and work with Major Stormes on systemic improvements.

One of the major improvements has been the implementation of a case submission policy for DNA evidence in the PBSO lab. Dr. Crouse evaluated the agency's backlog and found just over 1,200 cases that either were ready to be assigned to an analyst or needed more information from the investigators. Dr. Crouse sent those cases back to the "customer agencies" that had originally submitted them to the PBSO lab. She asked that the agencies review the cases to determine whether the investigation was still pending and if work still needed to be done. Agencies were also asked to provide any missing information and re-submit the cases under a new PBSO case submission policy.

The new case submission policy requires investigators to take a much closer look at the evidence sent to the lab (see Appendix F). The policy outlines the amount of evidence that will be routinely accepted by the lab for different types of cases. For example, in a homicide case, the biology evidence is limited to nine probative samples. In a burglary or property crime case, that number drops to two. If further analysis is required after the first round of submitted evidence has been examined, officers may make additional submissions to the lab. The basic premise is that the investigators and crime scene specialists need to look carefully at their evidence and consider what to submit.

Dr. Crouse and the lab worked to train the various stakeholders (e.g., local police chiefs, investigators, and prosecutors) in how to implement and follow the new guidelines. The immediate reaction to the new submission policy was trepidation. Detectives were wary of new submission forms and feared that the requirements would stymie their investigations. Prosecutors feared that the restrictions would be challenged by the defense bar and that their cases would be weakened in the eyes of jurors, who have grown to expect more and more evidence be analyzed in cases.

The end result, however, has been an extremely effective policy. The lab's backlog is quickly decreasing and officers have been more receptive to communication with the lab. They now hold case meetings, in which officers and lab analysts sit down together and discuss which would be the best samples for initial submission in a case. Investigators are more aware of the details of their cases and the evidence; one investigator said, "I know that if I'm smart with my case, it will probably get done."

Crucial Points of Communication

Have a single point of contact in the lab

Many at the Palm Beach County Sheriff's Office were shocked to find that their DNA manager was spending half of her time coordinating with investigators, prosecutors, and outside agencies that utilized the crime lab's services. It was a wake-up call for the lab, and it led to a significant change in that agency's intake process.

Palm Beach County and several other jurisdictions, including the Miami-Dade Police Department, have reported success with establishing a full time Evidence Coordinator position. The Evidence Coordinator acts as a "gatekeeper" and is the single point of contact for initial communications with the lab. The Evidence Coordinator responds to calls, tracks case assignments, and limits the amount of "analyst shopping" by investigators seeking to expedite their cases.

In the Palm Beach County lab, the Evidence Coordinator uses a spreadsheet to track all DNA cases and helps to assign cases to analysts in an equitable way. With one quick review of the spreadsheet, the Evidence Coordinator can determine how many cases fall into each of the following categories:

- Pending (analysis requested and evidence is waiting to be assigned)
- Violent (a violent crime case with all evidence submitted and assigned to a DNA analyst)
- Property (a property crime case with all evidence submitted and assigned to a DNA analyst)

Without all of the necessary evidence present in the crime lab, a case will not be assigned to an analyst. In Palm Beach County, a single analyst works a case from start to finish, which allows for accountability and an equitable workload among analysts. The Miami-Dade Police Department is starting to triage cases according to crime classification (e.g., rape, homicide, robbery, burglary, etc.). Each type of crime is assigned to a designated group of DNA analysts.

Use your lab as a resource

One of the phrases echoed by many lab directors and analysts was that chiefs should "use the lab as a resource." The lab shouldn't simply be a place to run forensic tests and produce reports; analysts contain a wealth of information and can provide invaluable assistance in training sworn personnel, providing consultation while a crime scene is being worked, or reviewing a case with investigators and prosecutors.

There should be a mechanism in place for the lab to be contacted if advice is needed by agents collecting crime scene evidence in the field. This can be through a dedicated person or phone number available to those collecting evidence. Analysts should be prepared to issue guidance as to the most effective way to collect, package, or transport a piece of evidence. Analysts may also help determine what types of samples can be collected and what types of testing can be utilized; investigators may not be familiar with a new technology or process that could benefit a case. Keeping the lines of communication open at all stages of the investigation is critical.

Analysts may contribute to the training of officers, investigators, managers, attorneys, and the court. Many law enforcement agencies and forensic labs throughout the country are calling upon their scientists to hold workshops or write training materials to inform various stakeholders about the basics of forensic science and the role of the lab. The "CSI Effect" not only influences jurors' expectations with regard to forensic science; it is prevalent in the law enforcement and legal community as well. Police and prosecutors sometimes have unrealistic expectations about the real-world capabilities of forensic evidence.

As Stephanie Stoiloff, Bureau Commander for the Miami-Dade County Police Department crime lab, explained, "In many situations, police officers have to have a blind trust in the science, which goes against their nature." Using analysts for inter- and intra-departmental training sessions can facilitate communication and information sharing while also managing expectations.

Meetings with stakeholders are vital

Case management meetings among a group of stakeholders are an effective tool for many agencies. Often these meetings are held on an ad hoc basis. Investigators, crime lab personnel, and prosecutors will meet to discuss the impact of forensic science on a particular high-profile or significant case.

Many departments have also found success in routinely including crime lab analysts in homicide unit meetings. In the San Diego Police Department, Chief William Lansdowne and his lab director, Mike Grubb, have instituted a system in which lab analysts are assigned to help teams of detectives and prosecutors for all homicides, officer-involved shootings, and other high profile cases. In the Kansas City (MO) Police Department, a similar process became time-consuming for lab personnel, as the lab and the detectives operated out of different facilities. To facilitate communication, the agency uses video conferencing so crime lab analysts can participate in the daily homicide briefings. In the Phoenix Police Department, lab and investigative personnel attend case evaluation meetings for serious or complex crimes.

LAPD Chief Charlie Beck noted that his department has had prosecutors working on homicide taskforce details for years. However, only recently did the department begin having crime lab personnel work with homicide units as well. Beck said, "Forensic science is one area where things are extremely siloed and sworn officers and scientists speak different languages." Having scientists at the meetings has increased the communication and understanding between sworn personnel and the analysts.

There are a number of benefits to including lab staff in case meetings. Analysts at one agency noted that sitting down with members of customer agencies that use their lab helped to show officers that the lab's prioritization scheme was fair. (The officers had previously suspected that the lab favored cases submitted by its own agency over those submitted by customer agencies.) An initially difficult meeting resulted

in significantly improved lines of communication. At other agencies, analysts found that taking the time to hold case meetings actually limited their workload and the overall cost of analysis for a case. Other benefits of holding case meetings include:

- **Ability to identify and prioritize the most probative samples** – Frequently the parties involved in a meeting may have differing views about what evidence is the most important to test. Detectives may think that a particular piece of evidence will contain a DNA profile, while the analysts' experience tells them that there is a low likelihood of that type of evidence eliciting a useable DNA profile. Or the lab analyst and detective may both discount the probative value of a particular piece of evidence, while the prosecutor knows that it must be tested in order to present a persuasive case to a jury. By discussing the case and identifying the probative and case value for each piece of evidence, the analyst, detective, and prosecutor can agree on what evidence must be tested, and the lab can be spared from performing unnecessary DNA testing.

- **Reduces workload and cost** – Finding the most probative evidence on the front end of the case can reduce the number of samples that need to be tested. Backlog, workload, and lab analysis costs can all be reduced as investigators and prosecutors must consider what they ultimately need to achieve through DNA analysis.

- **Provides investigators with realistic expectations** – A number of scientists have expressed fear that as criminal investigations and prosecutions become more dependent upon forensic evidence, traditional "shoe leather" investigations will not be conducted with the same zeal. "It's easy for a detective to postpone extensive interviews, canvassing, or other investigative steps until he has his DNA profile back from the lab—but that may take months," said one lab director. Meeting with lab personnel on a case can help to manage investigators' expectations about what the forensic evidence may provide.

In addition to case meetings, simply taking the time to talk to groups of stakeholders about lab policies and procedures will help to clarify policies, streamline procedures, and improve communication with outside agencies. For example, when Bob Huston first took over as crime lab director in the Allegheny County Medical Examiner's Office, he held meetings with small groups of police chiefs who utilize the lab. Through these meetings, Huston found out that, because of the increased use of forensic science in cases, small law enforcement agencies were having difficulty finding appropriate storage space for evidence. The meetings also helped Huston to see that problems regarding chain of custody and storage could be addressed in many instances simply by implementing a 24-hour evidence intake capability at the crime lab.

Do your computers talk to one another?

Where are investigative reports and interview notes stored? How are lab requests submitted? What is the status of DNA analysis in our lab? Was there a CODIS hit in my case? What is the status of my court case? What is the size of our lab's backlog?

These are common questions in law enforcement and the answers are generally found in computer databases. Unfortunately, because of computer system interoperability difficulties, in most agencies you may need to check two or three systems to find the answer to just one of these questions. To obtain a holistic view of a case by consulting one database is virtually impossible in most agencies. Sharing information between units or among different law enforcement or prosecutorial agencies is sometimes possible, but often is not an easy task.

One of the major issues in many labs is that their backlog is clogged with evidence that no longer needs to be analyzed. Any number of situations can render analysis irrelevant. For example, the case may have already been adjudicated through a plea agreement, or the prosecutor may have declined to prosecute the case. This accumulation of now-irrelevant evidence has proven to be a significant, unnecessary contributor to the backlog in many crime labs. Lab personnel are generally unable to

access case status in databases maintained by investigative units or the courts; notification policies, where they exist, are often neglected by overworked prosecutors and investigators.

Agencies throughout the country have handled this problem in different ways. In Phoenix, for example, the police department assigns lab analysts and detectives to research cases and determine their status within the department and the justice system. The Phoenix PD and Maricopa County District Attorney's Office have also implemented an automated case information exchange to keep the lab aware of the status of cases (e.g., if they are charged, pled, or otherwise adjudicated). Likewise, other agencies throughout the country have worked to provide crime lab personnel with access to the prosecutor's case tracking database, or have established accountability in their formal process for notifying the crime lab when a case is adjudicated.

In Los Angeles, this proved to be an important issue with regard to the rape kit backlog. When the LAPD came under scrutiny from human rights groups in 2008 for its extensive backlog of unanalyzed rape kits, teams of detectives donned parkas and spent days in refrigerated storage units to obtain an accurate inventory of the kits. Without that detailed information, there was no way to determine the true size of the backlog. According to Criminalistics Lab Director Greg Matheson, the inventory initially identified a total of 5,193 kits from 1997 through 2008 that had not yet been analyzed. Upon further research, detectives found that 1,184 of those cases had been cleared by arrest, 1,857 were rejected by the District Attorney's Office, and 770 were ineligible for upload into CODIS. That reduced the number of high priority cases in the rape kit backlog to 1,382 and enabled the LAPD to develop testing priorities for remaining cases.

Cases also need to be tracked once the lab has completed DNA analysis. The method of reporting analysis results to an investigator or prosecutor is different in every department. In some agencies, the initial report is provided verbally on the phone. In others, an e-mail is provided

to an investigator or prosecutor. In a few agencies, the investigator or prosecutor has direct access to the lab's database in order to view case status and forensic reports.

With the high turnover in many police detective squads and prosecutors' offices, it is no surprise that there are instances where forensic reports fall through the cracks and CODIS hits do not receive even basic follow-up. Several agencies have taken this into consideration and have begun to track cases in which a profile match has been made through CODIS. For example, the Miami-Dade Police Department has an in-house "hit tracker" database to track the final dispositions of cases with a DNA profile hit. The Mesa Police Department uses a monthly watch list provided to sworn commanders to track CODIS hits. That department plans to begin providing this data to command staff in real time. In San Diego, Chief William Lansdowne and Crime Lab Director Mike Grubb have worked to maintain a "hit list" so that commanders are held accountable for cases that have received DNA results or a CODIS hit. Cases must receive investigative follow-up within five months after the information is received from the lab.

Other agencies have found that giving crime lab personnel access to intra-departmental databases has improved the analysis and reporting process. In the Kansas City (MO) Police Department, the crime lab has access to the detectives' case management system. This not only allows forensic analysts to view case status, but also lets them review victim and witness statements. This can assist in certain types of forensic analysis or in determining which evidence samples are most likely to elicit a CODIS-eligible DNA profile.

Conclusion

Leadership and case management are the two key considerations when managing an agency with a forensic science lab. Chiefs need to take the time to get to know the lab and what is required to ensure the current and future success of the forensic DNA program. Specifically, chiefs need to ask themselves:

- **What do I really know about the lab?** How well do you understand the challenges within your lab? Do you talk to your lab director and use him/her as a resource? Where can you turn when you need answers to basic questions about the lab? Where can you find answers to the really tough questions?

- **Who will manage the lab on a daily basis?** What are the advantages to having the lab run by a civilian or a sworn commander? Should you have both? How would they work together? Is the lab director a member of the command staff? Does the lab director have the requisite authority to succeed? How does the management structure affect the lab's productivity?

- **How do we monitor and maintain our lab's accreditation status?** Is your lab accredited and what does this mean to the department? Does your command staff appreciate the necessity of having the lab hold a national accreditation? How can you support the lab and ensure that it maintains the requisite standards?

- **How are cases prioritized?** What is the flow of a case through the lab? Does your lab have a formalized prioritization system? How much of your lab administrator's time is spent working to prioritize and facilitate cases? Where are the bottlenecks in the prioritization system and how can they be eliminated? Could a formal prioritization scheme make your lab more efficient?

- **How well does the lab communicate with stakeholders, and vice versa?** Do you use your crime lab as a resource beyond its analysis of evidence? Could your investigators and command staff better tap into this pool of knowledge to aid in investigations and trainings? How well do your computer systems work? What are the challenges to your lab personnel communicating with outside law enforcement and prosecutorial agencies?

2

Starting at the beginning: DNA evidence collection

DNA evidence collection techniques and policies are often overlooked by law enforcement agencies, now that the management of DNA backlogs and other lab issues has gained so much attention. However, evidence collection is directly linked to lab backlogs, priorities, and the overall efficiency and effectiveness of an agency's use of DNA evidence to solve crimes. The quality of evidence collected has a significant impact on the ability of the lab to analyze DNA samples and ultimately provide investigators and prosecutors with the best evidence.

This chapter will discuss the following issues related to DNA evidence collection:

- Under what circumstances an agency collects DNA evidence
- Who collects DNA evidence
- What training is provided to DNA evidence collectors
- The relationship between evidence collectors and crime lab personnel

A working understanding of these four elements will help to promote effective evidence collection.

Under what circumstances do you collect DNA evidence?

The types of DNA evidence collected by a local law enforcement agency can vary greatly depending upon state laws and local policies. Virtually all law enforcement agencies will deal with crime scene DNA evidence during the course of an investigation. Some agencies are also mandated by state or federal law to collect DNA swabs from certain convicted offenders or arrestees.

This publication is primarily concerned with DNA evidence found at crime scenes. Details on various aspects of collection and analysis are found in this and subsequent chapters. Before addressing these topics, however, it is important to discuss a recent development in DNA evidence collection that has had a significant impact on the workload of forensic labs: offender samples.

Usually state-level legislation or other government policies dictate when offender and arrestee samples can or must be collected. DNA sample collection is done in some agencies on a voluntary basis for individuals arrested for crimes not covered by state legislation. The District Attorney in Orange County (CA) has even started to utilize DNA databasing as an incentive for plea deals on minor offenses—if a perpetrator submits his/her DNA sample to the local database, the charges will be dropped.[9]

Frequently, corrections officers collect DNA samples (generally using buccal swab samples) from incarcerated offenders. Arrestee swabs may be collected locally by officers and deputies in holding cells or interview rooms. Regardless of where they are collected, offender and arrestee samples have a direct impact on the workload and DNA backlog of

9. Abdollah, Tami, "Arrested in O.C.? A DNA sample could buy freedom," *Los Angeles Times*, September 17, 2009. http://articles.latimes.com/2009/sep/17/local/me-oc-dna17

PERF SURVEY RESULTS
(216 Responding Agencies)

Determining When to Collect DNA for Potential Analysis	
Investigator Discretion	85% (183 agencies)
Request from prosecutor	44% (94 agencies)
Written Agency Policy	32% (69 agencies)
Informal Agency Policy	30% (65 agencies)
Other Determination	18% (38 agencies)

the forensic labs that are ultimately responsible for sample analysis and inputting DNA profiles into local or national databases. Even if analysis is outsourced to a private lab, the public agency and lab in charge of databasing the profiles will be impacted by the volume of work.

Tremendous variability exists in the policies and practices of law enforcement agencies when it comes to collecting DNA evidence. Many agencies have formal written policies on when to collect DNA evidence, but a large number of agencies rely upon more informal practices. The majority of law enforcement agencies collect potential DNA evidence for the most violent crimes as well as any crime that is against a person, including homicide, sexual assault, robbery, etc. In certain situations—sometimes in sexual assault cases, for example—the victim will determine whether certain DNA evidence is to be collected and/or tested.

Agency collection policies vary the most when it comes to how DNA evidence is treated at property crime scenes. For example, DNA evidence may be identified at the scene of a property crime (e.g., burglary or auto theft) through blood or other evidence left behind by the perpetrator, or on a particular item or surface touched by the perpetrator (e.g., rearview mirror or window). Whether a particular agency collects DNA evidence at a property crime scene is frequently dependent upon the responding

officers' ability to recognize the potential DNA evidence, the agency's available resources, and the likelihood of the samples ever being sent for analysis. Some agencies will collect and submit for testing any potential DNA evidence from a property crime scene. In other agencies, collection, submission, and analysis are done on a case-by-case basis, with priority given to likely serial crimes or evidence that is almost certain to elicit a DNA profile (e.g., blood evidence from broken glass), as opposed to more sensitive and less reliable "touch DNA" that can be extracted from skin cells left on an item.

There is ongoing debate among crime labs and law enforcement agencies with regard to the amount of lab resources that should be put toward property crimes. The Palm Beach County Sheriff's Office, for example, has encouraged the submission of DNA evidence from all property crimes. Although the lab has seen a considerable uptick in CODIS hits under this policy, Chief Science Officer and Forensic Biology Manager Dr. Cecelia Crouse warned, "Property crime evidence can cause a significant spike in the DNA workload. This has to be managed; the lab is not a limitless resource." Labs and investigators need to work together to determine what is the most probative evidence in any case.

Who Should Collect DNA Evidence?

Within a single law enforcement agency, any number of individuals may be involved in collecting potential DNA evidence from a crime scene. In most agencies, the personnel responsible for collecting DNA evidence depends upon the agency's formal or informal policy for calling in a crime scene specialist. It may also depend upon the availability of specially-trained personnel, the location or availability of collection kits and resources, or the likelihood of evidence destruction. For example, a patrol officer might swab a windowsill at a burglary scene, but a trained criminalist or crime scene unit might be called out to a homicide scene.

There is little standardization regarding a required level of expertise for the personnel who collect DNA evidence. Some agencies have specially trained crime scene investigators, while others use criminalists from crime labs located a hundred miles away. The level of expertise and training may also vary significantly even among members of a particular group. For example, someone holding the title of "crime scene technician" in one jurisdiction may have significantly more or less education, training, and expertise than someone called a "crime scene investigator" in a nearby jurisdiction. Typically, however, evidence collection can be conducted by a member of one of the following groups:

- **Patrol Officers and Investigators** – In some agencies, officers never collect DNA evidence; they must always wait for a specialized unit. In others, officers are a last resort for collection—only if the crime is less serious or it is impractical to wait for a crime scene unit (e.g., in the case of possible evidence destruction or a significant lack of resources). Some agencies provide minimal training to patrol officers and investigators who routinely carry equipment to collect samples and swab crime scenes for potential DNA evidence.

- **Crime Scene Technicians/Crime Scene Investigators** – These crime scene specialists are frequently civilians with some level of specialized training in evidence collection, and they attend to most crime scenes in their jurisdictions. In addition to collecting evidence, crime scene specialists may be trained to conduct analysis in other forensic disciplines (e.g., latent prints), but they generally do not perform the more complex analysis for DNA evidence.

- **Criminalists** – Some agencies place their lab analysts on rotation for collecting evidence at crime scenes. Others have done away with the rotation, so they have scientists who are assigned to crime scene evidence collection on a full-time basis.

- **Medical Personnel** – Specially trained physicians or nurse practitioners are frequently used for the purpose of collecting sexual assault evidence from victims. These medical professionals are typically employed by a hospital, where evidence is collected in the emergency room.

Many agencies that utilize crime scene specialists (i.e., crime scene technicians, crime scene investigators, criminalists, etc.) have reported that these units are facing much greater demands than they have in the past. As technology develops and agencies realize the increased role that DNA can play in their investigations, crime scene specialists are being called to a wider array of crime scenes. Courtroom testimony requirements have also increased significantly in many jurisdictions, so crime scene specialists in many agencies have found that they are spending many hours every month at the courthouse. Given the administrative duties related to certifications, accreditations, and continuing education requirements for these crime scene experts, it's no surprise that departments have been forced to either hire more specialists or rely more heavily on sworn officers to supplement these units.

Different qualifications, different results?

A lack of consistency in personnel expertise, training, and collection techniques is frequently cited by law enforcement agencies and forensic labs as an obstacle to the uniform processing of crime scenes. Conventional thought suggests that when police officers with minimal training and experience collect evidence, it is less likely to produce a useable DNA profile. However, few agencies actually measure this. In fact, this assertion was disputed in regard to property crimes by a 2008 study from the National Institute of Justice (NIJ) and The Urban Institute.[10] The study found no evidence to support the idea that property crime evidence collected by crime scene technicians is more likely to yield

10. See The DNA Field Experiment: Cost Effectiveness Analysis of the Use of DNA in the Investigation of High-Volume Crimes (www.ncjrs.gov/pdffiles1/nij/grants/222318.pdf).

a DNA profile than evidence collected by an officer or detective. It did, however, find that there were certain situations and techniques that, if used by those collecting evidence, were more likely to yield a DNA profile. For example, blood or saliva is more likely to yield a profile than "touch" DNA. Collecting the entire item of evidence, rather than just swabbing it, will also increase the likelihood of obtaining a DNA profile. Understanding DNA evidence and having adequate training are critical regardless of who is responsible for the collection.

The Phoenix Police Department has worked to improve its effectiveness and consistency in crime scene evidence collection. For every homicide crime scene, a specially designated crime scene lieutenant is present. That lieutenant acts as a single point of contact for the crime scene technicians and investigators and coordinates the necessary resources in order for the crime scene to be processed appropriately. This helps to minimize any potential evidence contamination or friction between personnel.

There are benefits to providing personnel of different backgrounds with similar instruction. Training can educate personnel on effective and consistent evidence collection techniques, regardless of their past scientific experience. This is the case with the Virginia Department of Forensic Science's annual forensic training academy. The Virginia statewide forensic lab system has six crime labs, all of which operate with a certain level of uniformity in procedures. Through the training academy, members of the Virginia State Police and local law enforcement agencies learn about the lab system expectations and requirements, make valuable contacts throughout the state, and are provided with uniform training on how to approach a crime scene and effectively collect forensic evidence.

The value of this training and uniformity in collection techniques was demonstrated in the response to the April 2007 shooting at Virginia Polytechnic Institute and State University (Virginia Tech). After student Seung-Hui Cho killed 32 people on campus, it quickly became apparent

that there would be a widespread and complex crime scene. Officers and crime scene specialists responded from across the state. Because they had been trained at the same academy, they all used the same techniques when collecting evidence at the crime scene. Notes and evidence labels were in similar formats, and officials found that many of the crime scene specialists even had interchangeable equipment, because local law enforcement agencies had purchased equipment based on the state lab's recommendations. According to the Director of the Virginia Department of Forensic Science, Peter Marone, "What could have been a logistical nightmare turned out to be a very smooth process." The advantage to the Virginia model is that the evidence collection and analysis procedures and reporting are systematic and consistent throughout the state.

Collection by patrol officers and investigators– The need for training

Very few agencies have the luxury of relying solely on crime scene technicians or criminalists for DNA evidence collection. The decision of whether to roll out a crime scene unit may depend on the type of crime or the availability of resources. The majority of small to medium size departments rely upon patrol officers or investigators to collect evidence and process all but the most complex crime scenes. Even large agencies, at least periodically, may need to rely upon patrol officers or investigators for DNA evidence collection.

Frequently, these officers have little, if any, formal training or education regarding DNA evidence collection. Without adequate training or continuing education as the field of DNA analysis changes, evidence collection by officers can result in evidence contamination, the collection of worthless evidence, or the collection and submission of too much evidence. This can cause a drain on officer and investigator time, as well as collection resources (e.g., collection kits, equipment, etc.) and lab resources. Just as good evidence can make a case, poor evidence collection can ruin it.

PERF SURVEY RESULTS
(216 Responding Agencies)

Challenging Aspects of DNA Evidence Collection	
Need Training on Evidence Collection	42% (90 agencies)
Need Training on Evidence Submission	35% (75 agencies)
Need Training on Evidence Collection Techniques	14% (30 agencies)

One of the recurring themes throughout this project was the need to better train officers and investigators on the collection of DNA evidence. A general knowledge of the use of DNA in investigations goes hand in hand with an understanding of how to effectively collect DNA evidence. An investigator may use this knowledge on a daily basis, while a patrol officer may find it helpful just a few times in an entire career. Regardless, training and continuing education on DNA are vital for anyone in law enforcement. Our experts stressed training for three reasons:

1. To improve the understanding of how DNA may help to solve certain crimes
2. To prevent evidence contamination at crime scenes
3. To improve the quality of evidence submitted to the lab

In many agencies, minimal DNA-related training is provided to recruits in the police academy. This is not ideal, and retention of the information may be negligible, as a plethora of information is presented to recruits in a highly condensed format. There is little follow-up, and rookie officers are generally not placed in assignments where they would routinely utilize any DNA-related knowledge that they acquired through their academy training. Continuing education and training are crucial to having well-informed officers.

As technology changes, new collection and analysis techniques emerge, as well as new requirements. Whatever an officer may have learned years ago in the academy can swiftly become obsolete. Some law enforcement agencies have found that there is a lack of continuing education for officers as they progress through their careers; many officers went through the academy so long ago that they never received training on DNA in the first place. Commander Bill Peters and his forensic lab staff in the Mesa Police Department pointed out that simply training officers or investigators in certain units won't reach everyone. For example, a long time narcotics detective may have never been trained in DNA, and that puts him at a disadvantage when he is transferred to a unit where the use of DNA evidence is more prevalent (i.e., sex crimes, homicide, etc.). A better approach would be to systematically implement a training program to educate all officers and investigators on the effective collection and use of DNA evidence.

The contamination of crime scenes was also noted as a major training issue. Several lab directors and DNA analysts complained that officers do not understand how sensitive and easily contaminated DNA evidence can be—particularly in the case of "touch" DNA. Others spoke of investigators contaminating evidence because they did not realize that an item could possibly contain DNA evidence. Training teaches investigators to think more critically about the evidence and provides them with the skills to handle the evidence properly.

> **Example: Don't contaminate "touch" DNA on handguns.** DNA analysts from one local agency reported frustration with the investigators' process of submitting firearms evidence. These analysts believed the investigators were frequently missing out on the opportunity to collect "touch" DNA evidence from handguns simply because they lacked a basic understanding of its potential. Often, handguns would be submitted to the latent print and firearms sections

of the lab. When analysis in those sections returned negative or ambiguous results, only then would the gun would be sent to the DNA section. By that time, the gun had been handled by so many analysts and investigators that the highly sensitive "touch" DNA analysis was rendered meaningless. This situation has been addressed in many labs throughout the country through improved training of investigators and lab personnel.

Example: "Touch" evidence from door handles may be useless. A DNA analyst receives a case that has been sitting in the DNA queue of cases for several months. The evidence includes swabs taken by a patrol officer at the scene of an armed convenience store robbery. The officer's request indicates that the swabs were taken from areas where the perpetrator was known to have had physical contact, and the officer hopes to receive a "touch" DNA profile. As the analyst continues to read, he learns that the swabs were from the handle of the front door and the store's countertop. These are public places and the analyst quickly realizes that any samples elicited would not be helpful. This case sat in the DNA backlog for months and prevented the analyst from spending time on other cases that were more likely to yield a useable profile. The situation could have been prevented through better training of officers, investigators, and evidence collectors to view crime scenes with a more critical eye and perform more efficient and effective evidence collection.

Many of the in-house training programs and ideas for effective officer training programs within agencies have come from crime lab directors and staff. "Use your lab as a resource," was repeated by agency after agency. Whether it is your agency's in-house lab or the outside lab used by your agency, there is value in opening the lines of communication

and encouraging sworn personnel to draw upon the expertise of the scientists in the crime lab. Bob Huston, Lab Director for the Allegheny County Medical Examiner's Office, noted that "the role of the lab is changing; crime labs need to be more involved in training officers."

What is the best way to reach officers and investigators? Some agencies, such as the Virginia Division of Forensic Science and the Kansas City (MO) Police Department, have formal training sessions attended by officers from multiple jurisdictions. In the San Diego Police Department crime lab, the DNA section provides a basic training program for all of its patrol officers and investigators. They are encouraged to communicate with the lab when collecting evidence, and they are also provided with a short reference guide on the identification and collection of DNA evidence (see Appendix G).

Other agencies have in-house tools, such as online FAQs and PowerPoint presentations, to teach their officers about effective identification and collection of DNA evidence. Another option would be to have lab staff videotape updates and changes in DNA evidence policies so that the taped training could be played at roll call. Some agencies have made use of the online training programs provided by the U.S. Department of Justice, Office of Justice Programs.

The Indio (CA) Police Department, under the leadership of Chief Brad Ramos, is one example of how agency leaders can draw upon multiple sources of information for officer training, and the department has improved its collection capabilities as a result. Chief Ramos's detectives collaborated with the California State Department of Justice crime lab to determine how they could better collect and submit DNA evidence. The department has 85 sworn officers, and most DNA evidence collection is done by patrol officers. Over a year, officials worked to train and outfit each patrol officer and community service officer (CSO) with the tools needed to identify and collect potential DNA evidence. On the advice

of their crime lab contacts, Indio PD required every officer and CSO to complete an online NIJ training course.[11] The Indo Police Department's training policy has received praise from crime lab DNA analysts. "Our evidence submissions have gone up and we are using DNA to solve more types of crimes," said Chief Ramos.

Dr. Cecelia Crouse in the Palm Beach County Sherriff's Office believes that labs are also responsible for providing feedback to the officers and investigators who routinely collect DNA evidence. When there is a mechanism for information exchange between the lab and sworn personnel, officers are able to better understand what they can do to improve the likelihood of getting a DNA profile from evidence. Cases provide the best opportunity for learning; experience is the best teacher. Positive reinforcement helps officers and investigators improve their collection techniques and enhance their understanding of a constantly changing field.

11. See training courses "What Every First Responding Officer Should Know About DNA Evidence" and "What Every Investigator and Evidence Technician Should Know About DNA Evidence." (http://dna.gov/training/letraining/)

ONE DEPARTMENT'S APPROACH TO DNA EVIDENCE COLLECTION

By Brad Ramos, Chief of Police
Indio Police Department (CA)

Prior to 2008, first responders in the Indio Police Department did not have the necessary training, equipment, or agency policies in place to properly collect DNA at the patrol level. More importantly, I saw that at major crime scenes we were collecting DNA evidence properly by using our crime scene personnel, but this was not being done on "routine" calls such as armed robberies, burglaries, and even auto theft cases.

At the patrol level, personnel were well versed in the recovery of latent fingerprints; we even had a recognition program in place for "hits" on latent fingerprints where personnel were evaluated on the effectiveness of their latent print recovery. Similar knowledge and familiarity were not present with regard to DNA. We began to realize that our patrol officers viewed much about DNA as media hype based on the science fiction found in many movies and television shows, such as CSI. It became clear that we needed to change the culture within our department so that people realized that DNA is here and now. DNA evidence can prove people guilty or innocent, and first responders are key to its success.

The Indio Police Department embarked on changing the culture of our first responders through training them on DNA evidence collection and equipping them with the necessary tools. We also realized the importance of police managers understanding this from a policy perspective, and they were also educated on the procedures for identification, documentation, collection, and retention of DNA samples.

We recognized that whole cases can rely upon the collection of DNA evidence by the first responder, as well as the chain of custody. This includes the documentation of the sample's original condition and location. This is where the buck starts, and we knew that the training our officers received was important. We found great success using the online training program available online at www.dna.gov and this was supplemented with additional in-house training.

As we moved the agency forward, we purchased the necessary equipment to outfit every officer with kits to recover DNA in the field. These kits include: swabs, swab boxes, sterile tweezers, tape lifts, envelopes, and fingernail kits, Phenolphthalein presumptive blood testing kits, and human semen testing agents. These kits have dramatically cut down the time needed to process a crime scene as well the number of samples that would never have yielded a useable DNA profile.

There are three key additional factors that I believe a chief or sheriff should understand and take into account when implementing a patrol-level DNA collection program:

- **Prioritization of Cases** – Administrators need to be familiar with the cost and time that is involved in the processing and typing of a single DNA profile/sample. Having this knowledge will assist managers with prioritization and selection of what types of cases/crimes or other evidentiary items should be submitted for DNA analysis.
- **Evidence Storage Capabilities** – In most cases, DNA can be stored at room temperature; however, certain samples may need to be refrigerated or frozen. Based on the volume of samples being stored, this can be a major issue for a department.
- **Stay Current on DNA** – It is paramount for an agency to stay abreast of legal updates and advances in DNA technology. Administrators should be well versed in the capabilities of the DNA labs that are being used, or on contract for use, by the department.

My advice to chiefs and sheriffs is that DNA evidence collection for first responders is necessary and should be considered as routine as taking fingerprints. Departments must develop a culture that institutionalizes the importance of DNA evidence collection at crime scenes, similar to what has occurred with fingerprint collection.

DNA evidence collection by crime scene technicians and criminalists – Communication is key

Through the PERF survey and conversations with various agencies throughout the country, it became evident that crime scene units vary greatly in background, training, and structure. Many agencies utilize civilian crime scene technicians who are independent from the lab. Others have found that it is beneficial to assign crime lab analysts to either full-time or part-time crime scene response duties. Most agencies use a combination of responders according to a largely informal response plan and a hierarchy of the types of crime scenes they encounter. Many agencies have an arrangement in which property crime evidence collection is handled by patrol or investigators, while evidence for all other crimes is collected by the crime scene unit.

The San Diego Police Department, for example, follows a three-tiered approach for evidence collection. Patrol officers and detectives receive some training on the identification and collection of DNA evidence, but most collection is performed by crime scene specialists. For some property crimes and minor evidence collection, a Field Evidence Technician (FET) may be called to the scene. A FET is a specially trained police officer who attends a regional training program and receives additional in-house training from the crime lab on evidence collection techniques. More significant crime scenes, however, are worked by crime scene specialists who are criminalists or trained crime lab analysts.

The Miami Police Department is the primary law enforcement agency responsible for evidence collection within the city of Miami. The city does not have its own crime lab; it relies upon the Miami-Dade County Police Department's lab, which is responsible for providing forensic services to a number of jurisdictions within the county. Lazaro Fernandez, Director of the Miami PD Crime Scene Investigation Unit, and Stephanie Stoiloff, Bureau Commander for the Miami-Dade PD crime lab, both stress the importance of communication and collaboration between their two units.

In the Miami PD, civilians are used for virtually all evidence collection. Public Service Aides may help with limited collection of DNA evidence at the scenes of relatively minor crimes, but most of the evidence collection is handled by the Crime Scene Investigation unit. Mr. Fernandez pointed out that by having a civilian staff, there is little transfer of personnel into or out of the division, so knowledge is retained within the unit. However, there are drawbacks to this arrangement as well, as information can become compartmentalized within the unit.

Regardless of the background of the responder, it is clear that adding this additional layer of personnel requires an increased awareness of the importance of communication. Crime scene specialists can enhance an investigator's understanding of the crime scene in addition to coordinating evidence analysis with the lab.

Mr. Fernandez stressed the need for a team approach to the crime scene. Crime scene specialists must work to develop and sustain good communication with both the detective and the analysts in the crime lab. Detectives need to be educated with regard to what information could be helpful to crime scene specialists as they deconstruct the crime scene. Basic information extracted from witness interviews or other sources may be crucial for determining what evidence to collect and what evidence to prioritize at the lab for DNA testing. The crime scene investigator is generally the initial point of contact with the Miami-Dade PD's DNA analysts and must be able to articulate to the lab any relevant details from the crime scene and investigators.

Conclusion

Any evidence collection policy, whether an official written policy or an informal strategy, should be reviewed by chiefs on a regular basis. Evidence collection is the first step in the process to prevent wasted resources and contaminated evidence. In updating or implementing a new DNA collection policy, chiefs and sheriffs should consider:

- **Under what circumstances do we have to collect DNA evidence or samples?** What samples are statutorily required in your jurisdiction (e.g., from offenders or arrestees)? Are your personnel required to do this collection? For what crimes will your department routinely collect DNA for analysis—and will this include property crimes?

- **Is it practical to collect DNA evidence in all situations?** Is it practical to use expensive resources and time to collect and analyze DNA evidence for a low-level crime? If you collect DNA evidence for all crimes, will all of the samples ever be sent for analysis?

- **Who should collect DNA evidence in my agency?** Is it possible to find, hire, and train qualified crime scene specialists? Are your officers and investigators able to effectively collect DNA evidence?

- **What training should we provide?** Do your crime scene specialists receive adequate training and continuing education? How comprehensive is your training for patrol officers or for investigators? Do you offer follow-up training to ensure everyone in your agency is up to speed on the latest practices?

- **How can I promote effective communication in this process?** What is the level of DNA-related knowledge and experience in your crime scene and investigative units? How well do those collecting DNA evidence communicate with the investigators and forensic lab staff? How can the agency command staff facilitate improvement in this area?

3

Backlogs, evidence storage, and other challenges in managing a law enforcement crime lab

After addressing the crucial issues of leadership, communication, and case management, police chiefs should work with their lab directors to facilitate effective crime lab management. As DNA technology has evolved and the use of forensic evidence has increased, chiefs are facing a number of difficult decisions. Assessing the size of any DNA backlog and determining the best approach in dealing with it are significant challenges for many chiefs. Critically important is the ability to understand evidence retention and storage challenges, in addition to the challenges of staffing a crime lab and staying aware of new technologies.

This chapter will explore the following topics:

- How to assess your DNA backlog and work to reduce it
- Evaluation of agency lab facilities and evidence storage
- Hiring, training, and certification of DNA analysts
- Implementation of new technologies

How large is your DNA backlog?

On the surface this might seem to be an easy question, but determining the exact size of a lab's backlog of DNA evidence is a vexing issue for many agencies. The PERF survey included 216 law enforcement agencies, most of which did not have their own crime labs. However, when asked about their agency's backlog of requests for DNA analysis that had been sent to either an in-house or outside lab, 29 percent of the respondents did not know the size.

"You can't tackle a backlog until you know what is in it," said Dr. Cecelia Crouse of the Palm Beach County Sheriff's Office.

The first step to answering this question is to determine how to measure the backlog. There appears to be little uniformity across the United States regarding how to quantify a DNA evidence backlog. The PERF survey results showed that 40 percent of the 216 agencies surveyed use "case" as their unit of measurement, while 16 percent of agencies use the number of samples. Some other type of measure was used by 28 percent of respondents.

Once the unit of measure is determined, "backlog" must be defined. Definitions vary from agency to agency. Some crime labs include any case that has been submitted for analysis if the lab results have not yet been received. Others include only cases that have been in the lab and assigned to a DNA analyst for a certain period of time (e.g., sixty or ninety days).

The definition is extremely important, as the LAPD recently learned. In 2008, after a slew of negative press reports and mounting pressure from elected officials and victims' advocates, the LAPD definition for the backlog of sexual assault serology/DNA cases was changed. According to lab director Greg Matheson, the original definition for the rape kit backlog was all cases where *a request for analysis* had been made, but for which a report had not yet been issued. Under that definition, there

were 444 rape kits that were awaiting analysis and/or a final report by the DNA section. When the definition of the sexual assault backlog was updated to include *all cases where a kit had been collected,* but a report had not yet been issued, the size of the backlog spiked to 7,500 cases.

Three significant factors were identified as directly contributing to DNA backlogs within law enforcement agencies and crime labs throughout the country. They are:

- **Management and staffing issues** – Ineffective management of the crime lab and other staffing issues are key challenges facing many agencies that are trying to sift through a growing number of case submissions and expanding backlogs. Without adequate management and oversight of the lab, it is virtually impossible to understand what is even contributing to the DNA backlog. A DNA manager or crime lab director needs to have an understanding of the size and makeup of the lab's DNA backlog. Several analysts noted that when cases sit in a general queue and are not immediately assigned to analysts, there is a lack of accountability for the casework and the backlog tends to grow.

  According to the PERF survey, staffing issues were a large contributor to backlogs, as 50 percent of agencies reported that they had insufficient personnel to conduct DNA analysis, and 20 percent of agencies lacked sufficient overtime funds for their staff. Some jurisdictions also noted an increase in the amount of time that analysts had to spend at the courthouse for testimony and trials.

- **Increase in crime scene and cold case samples** – Of the agencies responding to the PERF survey, 85 percent noted that increased collection for criminal investigations had contributed to DNA backlogs. Furthermore, 41 percent of agencies reported that they had increased their testing of cold case evidence to try to elicit a useable DNA profile.

As investigators become more aware of evidence that has the potential to elicit a DNA profile, and more officers are trained in the collection of DNA evidence, the amount of samples submitted for analysis has increased significantly. Most crime labs are reluctant to limit the number of samples they will accept in a case, or for what crimes they will routinely analyze DNA. A frequent complaint in crime labs is that officers and investigators do not take the time to consult with the lab or try to understand the probative value of the evidence. As a result, investigators frequently submit large quantities of evidence that can overwhelm evidence intake systems and result in inefficient labs.

- **Offender samples** – Of the agencies polled, 31 percent saw an increase in their backlog due to an uptick in offenders who are required to submit DNA samples. This is a significant issue for crime labs, frequently at the county and state level, which must analyze and upload these offender samples into CODIS. This increase in mandatory offender samples is likely to be exacerbated as states continue to modify their offender sample reporting requirements to include more crimes and/or samples. Many states not only require samples from felons, but have also mandated DNA sample submissions from certain misdemeanor offenders and arrestees.

This increase in offender submissions can be a significant challenge in reducing a lab's backlog. In Maryland, for example, the state legislature placed pressure on the State Police to reduce its inmate offender sample backlog. While the crime lab worked to fulfill this mandate, DNA analysis for crime scene samples became further backlogged. Once the offender samples were analyzed, those profiles all needed to be reviewed and uploaded into CODIS. This increased burden on the lab staff caused profile uploads to become backlogged as well.

A number of other states are also beginning to find that the state offender databases are missing offender profiles. As they work to collect, analyze, and upload profiles of those offenders, the labs are

challenged by an additional workload they had not necessarily anticipated. One of the most recent examples of this occurred in Wisconsin, when it was discovered that the state had failed to collect DNA profiles for an estimated 12,000 convicted felons.[12] It wasn't until the 2009 arrest of alleged serial killer Walter Ellis, a convicted felon whose DNA sample was not in the database, that the state realized it was missing so many profiles.

The aforementioned three contributors were the largest factors noted in discussions regarding backlog size. There were a number of other challenges identified. They include:

- **Case management and prioritization** – Where there isn't a clear prioritization schedule, investigators or prosecutors will frequently emphasize priority or expedited cases at the expense of others. In addition, "mega" cases with an exceptionally large number of evidence samples or other complex circumstances may require significant lab resources at the expense of other cases and the overall backlog.

- **Equipment** – DNA analysis equipment is costly, and once purchased it requires validation procedures and training for staff. The process can take weeks or months. It is not unusual to find an expensive piece of equipment sitting unused for a period of time either because it can't be validated or because the only analyst trained to use it has left the agency.

- **Reluctance to outsource** – A number of labs said that they are reluctant to outsource samples to private labs due to a number of factors, including cost, accountability, and additional technical review work that it creates for the crime lab. (This is covered further in Chapter 4.)

12. Van Hollen, J.B., *Memo to Gary H. Hamblin, Administrator, Division of Law Enforcement Services.* Wisconsin Department of Justice, Office of the Attorney General, September 16, 2009. www.doj.state.wi.us/absolutenm/templates/template_share.asp?articleid=1480&zoneid=3

- **Courts** – Judges, attorneys, and juries have an increased expectation that forensic evidence will be presented in a case, and the CSI effect is prevalent at all levels of law enforcement and the courts. As the amount of forensic evidence used in the court increases, so does the amount of time that an analyst must spend out of the lab and on the witness stand.

- **Reporting** – Increased documentation requirements in some labs were cited as slowing the analysis process.

Backlog reduction tactics

The issue of DNA backlogs has been addressed at the national level through specific grants and funding opportunities, particularly through the National Institute of Justice (NIJ) and other offices within the U.S. Department of Justice, Office of Justice Programs.[13] These programs have historically funded backlog reduction projects within crime labs, providing assistance with outsourcing, purchasing new equipment, and hiring additional analysts. Even without additional grant funding, however, there are a number of steps that crime labs can do to reduce their DNA backlogs. Participants in PERF's DNA project suggested the following approaches:

- **Outsourcing** – This typically is accomplished by sending certain types of cases (e.g., property crimes, cases already screened in-house, etc.) to a private lab for analysis. Prior to making such arrangements, however, it is important to consider how using an outside facility might affect your lab's accreditation and CODIS upload capabilities. Ensuring a steady funding stream through budgets, grant funds, or other sources is also a necessary step in the implementation of a successful backlog outsourcing program. (For additional information on this topic, see Jody Wolf sidebar, Chapter 4.)

13. See, e.g., The DNA Initiative: Advancing Criminal Justice through DNA Technology. www.dna.gov

- **Increase DNA analysis staff** – This does not simply mean an increase in the number of staff hired by the agency in which the crime lab is housed. Several agencies have begun to allow their customer jurisdictions to fund DNA analyst positions within the crime lab, or create DNA screening facilities.

  For example, in Maryland, the State Police forensic lab has several DNA analysts who work there pursuant to funding and memoranda of understanding (MOU) with local police departments. The State Police crime lab trains the analysts and provides the equipment for analysis. However, the analysts' priorities are to perform DNA analysis for the jurisdiction they represent, handling cases for other jurisdictions as time permits. This frees up the State Police analysts to perform other work.

  Several jurisdictions in Florida, including the Palm Beach County Sheriff's Office, have worked to create specialized DNA screening labs that are separate from the main crime lab facility. The screening labs are staffed with personnel specially trained to examine evidence and extract potential DNA samples for analysis. The samples are then sent to the main crime lab, where the DNA analysts are freed up to do the analysis, reporting and, where appropriate, uploading into the CODIS databases.

- **Train additional officers for collection** – In some agencies, crime lab personnel also participate in crime scene collection of evidence. By training specialized evidence technicians or investigators to do some or all of the collection, a lab can free its criminalists to focus on performing the DNA analysis in the lab. (See Chapter 2 on DNA evidence collection.)

- **Case management meetings** – Case management meetings should include all stakeholders, including crime scene technicians, lab analysts, investigators, prosecutors, and others. Such meetings have been lauded by departments that routinely use them as a way to prioritize cases, identify the most probative evidence, and improve efficiency within the crime lab.

- **Remove closed cases from lab queue** – As noted above, there have been many instances where cases remained with the lab even after a plea agreement was reached or the prosecutor declined to prosecute the matter. There should be some mechanism in place, whether via official notification or through some other form of information sharing, so that this information reaches the lab.

- **Limit submissions to the lab** – Limiting the number of samples that may be submitted to the lab can be done in several different ways. In the Kansas City (MO) Police Department, the lab limits the work it receives from outside agencies by charging a case fee and hourly rate. Lab analysts will first provide a free intake consultation to investigators from outside agencies where they typically limit the hourly-fee submissions based on what is most probative.[14]

  In the U.K., the Metropolitan Police Service's Forensic Services division acts as a gatekeeper for samples being performed by the lab (although the agency has no DNA lab of its own and utilizes all contract labs). In a typical case, up to three of the most probative samples for a case will be sent to the lab for analysis. Once those results are received and reviewed, personnel in the Forensic Service division will decide whether they need to send any additional samples to the lab.

  The Palm Beach County Sheriff's Office has a comprehensive written evidence submission policy, which has helped that agency's lab to manage its workload and DNA backlog (see Appendix F). "The lab is not a limitless resource," said Dr. Cecelia Crouse. "We aren't trying to control; we are trying to communicate and

14. The lab reports that this is a useful tool, as agencies all have the option to send evidence to the state lab free of charge. Agencies that use the KCPD lab tend to do so because the work needs to be expedited or it is a service that is unavailable from the state lab.

coordinate." Although initially wary of having limits placed on the number of samples they could submit in a case, local police departments, chiefs, and prosecutors were trained on the policy prior to its implementation. When they were told of the significant backlogs and routine requests for analysis that were unnecessarily large, it was an "eye opener" for investigators who use the lab. With the new policy, investigators think more carefully about the probative value of the evidence submitted in their cases.

FORENSIC SERVICES: ONE AGENCY'S APPROACH FOR A TURNAROUND

By Bill Peters, Commander, Operations Support Division Mesa Police Department (AZ)

The Forensic Services Section (FSS) at Mesa Police Department has enjoyed remarkable success, particularly in the past year. Utilizing the combined efforts of specially trained crime scene units and the scientists in the various crime lab disciplines, the FSS has eliminated the backlog in most of the units. Our biology unit was able to eliminate the DNA backlog in May 2009, even while the requests for DNA analysis nearly doubled. 2009 also saw a significant increase in our CODIS hit rate—from 55 to 235.

A full service forensic section similar to that of the Mesa Police Department is an invaluable resource that provides law enforcement, and the citizens they serve, with the tools necessary to determine truth and bring justice to those who are victimized. In addition to the incredible work ethic of the men and women in the Mesa Police Department FSS, the success of the unit can be attributed to clear casework prioritization, communication, internal process improvement, innovation, and accountability.

ESTABLISH CLEAR PRIORITIZATION OF CASEWORK

The first step toward building efficiencies in the FSS was establishing a single list outlining the priority with which all cases would be worked. This required a number of meetings to build consensus among scientists, detectives, and command staff. All cases, including requests for DNA analysis, are now prioritized as follows:

1. Expedited Cases (see below)
2. Homicide
3. Sexual Assault – Aggravated and/or stranger involved
4. Sexual Assault – Non-stranger
5. Aggravated Assault/Robbery – Weapon involved
6. Homicide – Additional items requested or cold cases
7. Aggravated Assault/Robbery – No weapon involved
8. Sexual Assault – Where unsure if actual assault occurred
9. Burglary
10. Vehicle crimes (e.g., stolen vehicle, vehicle burglary)
11. All other felonies
12. All misdemeanors

Based upon the present prioritization scheme, expedited cases and homicides are worked immediately and the rest follow in order.

Expedited cases fall into one of two categories where exceptions to the prioritization policy are allowed. Exceptions are either driven by the police department (e.g., serial cases, in-custody filings) or the courts (e.g., pending court date, discovery requirements).

Exceptions to the case prioritization list are only granted through command authorization and must be approved by the FSS supervisor or administrator. Requiring this authorization structure has significantly reduced detective calls to scientists, enabling the scientists to concentrate on their work.

COMMUNICATION

In the Mesa Police Department structure, a sworn police commander is broadly responsible for several areas within the

Department, including the FSS. Directly overseeing the FSS are both a civilian lab administrator and, as of January 2009, a sworn lieutenant.

The civilian lab administrator is responsible for the laboratory and the lieutenant is responsible for the field crime scene units. This division of labor allows the lab administrator to concentrate on accreditation issues, quality control, and grant management while the lieutenant has become a liaison between detectives and laboratory resources.

The sworn lieutenant has improved communication between the FSS and other personnel within the Department. The lieutenant educates sworn personnel about forensic capabilities and resources; he is essentially the gatekeeper of forensic resources for the Department. This allows the scientists to do their work and the lieutenant can deploy resources in a manner that provides confidence to detectives.

PROCESS IMPROVEMENT

Quality control of scientific analysis should never be compromised within a police department. The process by which evidence is collected, stored, analyzed, and reported, however, should be closely examined for opportunities to improve efficiencies.

Efficiency may be improved through the performance of a clear casework submission and prioritization policy. When properly implemented, such a policy will assist both lab personnel and sworn department members by eliminating confusion over how casework is to be submitted and distributed within the lab.

For example, the Mesa Police Department is committed to utilizing all available resources to resolve person crimes. As a result, property crimes can become backlogged. After a number of meetings between property crime detectives and members of the biology unit, a change was made to the way property crimes were submitted to the lab. Now, detectives can submit up to

three items for analysis in a property case. Each case is reviewed by a scientist, who selects the most probative piece of evidence from the three, and that is the sample that is analyzed.

As a result of this policy change, more DNA cases are processed by the biology unit and the improved productivity has drastically increased CODIS hits and case clearances. The elimination of the DNA backlog in May 2009 was a direct result of this policy change.

As news of productivity spread, detectives increased DNA requests four fold. The FSS has found that by securing grant funding for new equipment and relevant training, turnaround time for lab analysis can be drastically improved. It is currently working to validate new instruments in the biology unit to help to resolve the backlog that is being created by these additional work requests.

INNOVATION

Two innovative programs in the Mesa Police Department, the Evidence Processing Unit and Volunteer Crime Scene Unit, were implemented after inefficiency was found in the process of having more than one discipline (e.g., latent prints, biology, firearms) in the FSS review the same piece of evidence. Previously, analysts from each discipline processed evidence in accordance with the established priority list, but separate from each other. For example, if a detective requested to have a gun processed for latent prints, DNA, and firearm examination, the evidence would be passed around between the evidence section and the various lab disciplines. A significant delay was created when each discipline processed the item separately.

Two Crime Scene Specialists were pulled from the field to form the Evidence Processing Unit (EPU). Members of the EPU receive extensive training from the biology and latent print units, and they are able to process an item of evidence for both latent prints and DNA in a single handling. Recovered prints and DNA swabs are then sent to their respective units for identification, allowing the analysis and return of the evidence to occur much more quickly.

This improved efficiency came at the cost of staffing levels within the Crime Scene Unit and a civilian Volunteer Crime Scene Technician program was implemented. The increased competition for entry-level forensic careers, as well as a genuine interest in forensic work caused by the "CSI Effect," has resulted in civilians wishing to volunteer their time to process crime scenes. Volunteers are thoroughly screened and background-checked and must commit to at least one year of service. After completing a crime scene academy, the volunteers are capable of fully processing property crimes. They are trained to lift latent prints, take photographs, and swab for DNA evidence. In 2009, volunteer crime scene technicians spent 2,005 hours actively processing crime scenes. Their work resulted in a number of AFIS and CODIS hits and allowed the FSS to create the EPU without disruption in crime scene unit staffing.

ACCOUNTABILITY

Supervisors have been able to track the productivity of the FSS unit and individual staffers on a weekly basis. But similar tracking of lab results was lacking for detectives, as no database or system existed to determine how many CODIS, AFIS, or NIBIN "hits" were assigned to individual detectives or whether the hits had been acted upon.

The FSS has established a new CODIS AFIS NIBIN Report (CAN Report) that is produced for each district on a monthly basis and identifies the responsible detective and the number of days that a lab result has been posted without a supplemental report to the investigation. The CAN report is a tool that command staff and detective supervisors are able to use to ensure that lab results are acted upon in a timely manner; a sense of urgency is created through publication of results and holding individual detectives accountable for case follow-up. The system ensures that detectives are placing priority on the cases where they receive the use of the limited lab resources, and that lab results are not lost. It prevents situations similar to what was found in the initial CAN report—hundreds of lab results in aging cases that had not received follow-up reports from detectives.

CONCLUSION

Forensic science is a field of constant growth and technological advancement, and there are unlimited possibilities for active crime fighting. The Mesa Police Department Forensic Service Section has made significant improvements and enjoyed great success through continued examination of internal processes in search of efficiency improvements. Communication and accountability within the Department, as well as utilizing innovative ways to improve the Forensic Science Section, has helped to ensure the best use of the Department's forensic resources.

Facility and Storage

In recent years, DNA evidence collection has increased exponentially in most departments. As technologies improve and the ability to find usable DNA profiles at crime scenes increases, evidence collection will also increase. Many labs have found that they have already outgrown their old space, and law enforcement agencies have found that their property rooms and evidence storage space are lacking.

Lab Facilities

Several new forensic labs have opened across the country in recent years. In Anoka County, MN, for example, a new Tri-County crime lab opened in 2009 to serve as a collaborative regional lab for Anoka, Sherburne, and Wright Counties. The Mesa and Phoenix Police Departments and the Allegheny County (PA) Medical Examiner's Office also recently built new crime labs. Each of these agencies considered the need for future lab growth, so the possibility to expand within the new facility was considered during construction.

In Los Angeles, the Police Department and County Sheriff's Office have their labs housed in the same building. The crime lab personnel from both agencies were integral in providing input for designing the new lab spaces and also sharing information between agencies during the process. The collaborative effort worked to create workspaces that are designed to fit the specific needs of each agency's analysts.

Evidence Storage

When he became crime lab manager for the Allegheny County Medical Examiner's Office, Bob Huston decided to hold town hall-style meetings with the local police chiefs who utilize the lab's services. He was surprised to find that evidence storage was the top concern for the departments, particularly with regard to biological evidence.

Evidence retention and storage are a challenge for agencies of all sizes throughout the country. In the PERF survey, 23 percent of the 216 agencies polled reported that insufficient storage space was a challenging aspect of DNA evidence collection. A number of agencies reported that as technology improves and they are collecting more DNA evidence at crime scenes, new legislation is requiring them to retain DNA evidence for longer periods of time.

DNA evidence must be housed in proper storage facilities for many years; in fact, many state laws have been changed to require longer evidence retention times for DNA evidence. This affects the evidence rooms of large police agencies, many of which already had storage facilities that were bursting at the seams. Smaller agencies have found that this is a vexing issue, particularly as vendor labs (public or private) expect them to store their own evidence. Many smaller agencies may not have adequate refrigerated evidence storage space to match their sudden increase in evidence collection and retention times.

Contributing to overflowing evidence storage facilities are requirements that DNA evidence be retained by investigating agencies at least through the statute of limitations for an unsolved crime—and sometimes much longer. Across the country, approximately half of the states have adopted evidence retention laws requiring DNA evidence to be retained for a certain length of time even after a defendant has been convicted. This is so that DNA evidence remains available for situations where post-conviction DNA testing is permitted. A sampling of laws includes the following:

- **California** – DNA evidence is to be preserved through the time that the defendant is incarcerated.[15]

- **Florida** – DNA evidence must be preserved for any case where post-conviction DNA testing may be required. In a death penalty case, DNA must be preserved for 60 days following the execution.[16]

- **Texas** – In a non-death penalty case, DNA must be preserved until the defendant dies, completes his sentence or is released on parole. In a death penalty case, evidence must be retained until the inmate dies, is executed, or is released on parole.[17]

- **Virginia** – DNA evidence must be preserved up to 15 years from the time of conviction, unless a court determines it should be preserved for a longer time. In a death penalty case, evidence must be preserved until the defendant is executed.[18]

15. California Penal Code §1417.9, Retention of biological material
16. Florida Statute 925.11, Preservation of evidence
17. Texas Code of Criminal Procedure, Article 38.43, Preservation of evidence containing biological material
18. Virginia Code §19.2-270.4:1, Storage, preservation and retention of human biological evidence in felony cases

The most serious crimes are generally those with the longest statute of limitations and the longest prison sentences, or they result in death penalty prosecutions with a lengthy appeals process. Likewise those are the types of cases where crime scene investigators collect the greatest amount of evidence (a "megacase"). This combination of factors has led to many agencies experiencing a shortage of adequate evidence storage space.

Agencies have reported dealing with storage shortages in several ways. While many said that they would like their officers to be rather judicious when it comes to evidence collection, few agencies would consider placing a formal limit on the amount of evidence collected at a crime scene. Any type of limitation, if it exists at all, is generally handled through a crime lab evidence submission policy, which does not help with the evidence storage problem. Some agencies have addressed storage shortages through temporary measures, such as renting refrigerated trucks or additional warehouse space.

When expansion is not the best approach, some agencies have started to try to purge other non-biological evidence. Several agencies in Florida have reported that they are combing through their property rooms and disposing of other evidence as soon as statutorily possible. For example, at the Coral Springs Police Department (FL), Crime Scene Investigations Supervisor Sheila Lustigman has found that in order to make room for DNA evidence that must be stored indefinitely, her department has had to purge and destroy other types of evidence. These are generally items such as narcotics and firearms, which have a much shorter retention time, but which are more difficult to dispose of.

Hiring, training, and certifying analysts

Staffing a crime lab is very different from staffing other sworn or civilian positions within a law enforcement agency. Agency leaders must first find candidates who fit the proper requirements for the analyst positions, a task which can vary in difficulty depending on the department. Secondly, you must be prepared to provide your scientists with the requisite tools to maintain the lab's quality and efficiency standards.

First, whom do you hire? Scientists hired to conduct DNA analysis are frequently brought into entry-level positions and trained by agencies. The training process typically consumes much of the first two years of an analyst's time in the crime lab. Lab managers and police chiefs need to consider that there will be significant costs to the department during that time, and that the analyst will not be "on line" and contributing to the completion of routine casework during that period.

One lab director suggested the need for a "minor league" system in which universities could turn out DNA analysts with practical lab skills. In Los Angeles, the LAPD and LA County Sheriff's Office each reported some success with this. One building in downtown Los Angeles houses the crime labs for both agencies, as well as a California State University (Cal State) campus. Although both agencies do end up holding lengthy training programs for new hires (often jointly), they also report hiring a number of Cal State grads who are familiar with the labs at the time of hire.

One of the big risks for agencies is that significant time and money may be invested in training a new hire who then quickly departs for a job at another department. "Lab wars" have broken out between state and local labs in several states, including Maryland. Agencies take turns increasing analyst salaries and poaching trained criminalists from neighboring agencies.

There is also disparity in the ease with which agencies can hire experienced analysts. Some have found an abundant candidate pool of qualified, trained analysts, while other agencies reported great difficulty in finding lateral hires. Salaries, lateral transfer of seniority, training and certification budgets, lab conditions, and lab equipment have all been cited as reasons why labs either lose trained employees or have difficulty in hiring experienced analysts. Several analysts pointed out that high lab turnover contributes to a backup in casework, lowers morale, and places stress on lab analysts. This in turn leads employees to seek work in other labs, thus exacerbating the cycle.

The second question is how to provide your DNA analysts with the tools they need, to maintain the lab's quality and efficiency standards. Continuing education and certifications are two of the biggest issues. As an analyst progresses through his or her career, there are mandatory continuing education and training requirements. Some of this may be based upon state licensing requirements. Maryland, for example, requires that all chemists hold a state certification. There can also be continuing education and training requirements based on the lab's accreditation status and its use of the FBI CODIS system to access the national DNA database. The FBI requires that DNA analysts have a certain number of continuing education hours annually. There also must be at least one individual in the lab who meets the requirements of the "technical leader," as defined by the FBI.[19]

These requirements should not be confused with other certifications that are common in forensic science. Many disciplines offer certifications, frequently through testing and/or annual membership in an association, that are accompanied by continuing education requirements. Certifications have been praised by some in the field for contributing to the overall professionalism of the lab and enhancing analysts' credentials for testimonial purposes. They can also enrich the work environment for analysts.

19. *Quality Assurance Standards for DNA Databasing Laboratories.* Federal Bureau of Investigation, 2009. www.fbi.gov/hq/lab/html/databasinglab.htm

The overall value of these elective certifications generally depends on the culture within the lab, and the value that the crime lab and agency leadership place on training and continuing education. In some labs, additional certifications are supported by management, subsidized by the agency, and may lead to an increase in salary for the analyst. In other agencies, however, management may not be supportive of such programs, and they are unable to offer their criminalists significant incentives (monetary or otherwise) to become certified. When the lab culture does not encourage advancement, personnel may be reluctant to invest their own time and money to undergo the rigorous certification requirements.

New technologies

The introduction of new technologies to aid law enforcement often requires means that the users of the new equipment receive formal training.[20] An officer may need to attend several hours of training for a new piece of equipment or to learn a new computer program. In the case of forensic labs and DNA analysis equipment, the incorporation of new technology is often more complicated.

It takes a significant time investment to get a new piece of forensic lab equipment online and ready for use in routine DNA analysis. Training personnel on new equipment, then performing the requisite quality checks and validations, may take up to six or eight months. Every person who uses that particular piece of equipment must go through the training and validation process. Some labs have found that when one analyst leaves, not only is headcount affected, but staffing shortages are exacerbated if that person was the only one trained to use a particular piece of equipment. DNA units throughout the country have had to

20. See, e.g., Koper, Christopher, et al., *Law Enforcement Technology Needs Assessment,* Washington, D.C; Police Executive Research Forum, 2009. http://www.policeforum.org/upload/Lockheed%20Martin%20Report%20Final%203-16-2009_483310947_612009144154.pdf

watch expensive lab equipment sit unused for months or years because the section is understaffed, trying to tackle a large backlog, and cannot spare the man-hours necessary to have any of their analysts validated on the equipment. Ironically, this occurs even with equipment that could ultimately make the DNA analysis process run more smoothly. It is extremely difficult to delay casework and the everyday demands placed on the lab by command staff, investigators, and prosecutors, even for the purpose of introducing new equipment.

Even a change in a material or reagent used can cause an entire section of the lab to shut down for revalidation. More than once, a well-intentioned but uninformed member of a law enforcement agency has tried to save money by purchasing a different type of reagent or material for his DNA section. This can ultimately cost the lab significant time and money in revalidation.

In addition to the simple act of validation and training when implementing new DNA technologies, other potential challenges must also be taken into account. For example, if a lab plans to upgrade and begin to do analysis for "touch" DNA, the standards for cleanliness and ventilation in the lab are much stricter than for other DNA analysis. New technologies may require continued funding for maintenance and training. Dr. Cecelia Crouse also pointed out that as labs become more automated and increase the volume of work done by robotics, more checks and balances must be put into place in labs. In the Palm Beach County Sherriff's Office crime lab, the analysts use a system of "witnessing" when using robotics so that evidence numbers and samples are checked by multiple analysts.

Conclusion

Besides leadership and case management, there are a number of critical challenges within the DNA analysis unit of any lab that an effective police chief or sheriff must consider. Issues such as evidence backlogs, the lab facility, evidence storage, staffing, and the acquisition

and use of new technologies are challenges with a high level of visibility within your agency and the community you serve. Chiefs and sheriffs should ask:

- **What do I really know about our DNA backlog?** How do we measure a backlog and how large is ours? What contributes to the backlog and how can we mitigate those factors? Are there case management changes we can make to help reduce our backlog? How can we educate the public regarding our backlog and the factors that contribute to it? Where can we look for funding to address our backlog?

- **Is our facility adequate in size and function?** Do we currently have enough space in our lab? How much do we anticipate the lab expanding in upcoming years? Is our evidence storage space adequate for current demand? What are the requirements in our jurisdiction for evidence retention? Will they require us to devote more space to DNA evidence storage? How can we make more space? Should we build or rent a new facility?

- **What are the challenges in staffing our lab?** Do we have difficulty hiring qualified DNA analysts? Is it possible to partner with a local university to improve the hiring pool? How long does it take before new analysts can fully contribute to lab productivity? What is our attrition rate and what contributes to it? Is it possible for our lab to cooperate with, rather than compete with, other local labs to recruit and hire qualified forensic analysts?

- **How well do we acquire new technologies?** How long does it take to get a new piece of equipment online? Do we have an adequate number of staff who are proficient on each piece of equipment? What is the status of our funding source for new equipment?

4

Be an effective consumer of forensic services: Optimizing your agency's relationship with public and private labs

Depending upon a police agency's jurisdiction and geographical location, there may be a number of viable options when considering what type of crime lab to use for forensic DNA analysis. Outside labs are the providers of DNA analysis for agencies with no in-house crime lab. However, they are also frequently utilized by agencies *with* in-house DNA capabilities. There are many reasons for using an outside lab: it may be a matter of cost, technical capabilities, workload and backlog reduction, or even a condition of grant funding.

Outside labs generally are grouped in two large categories: public and private labs. There are also a number of agencies that are experimenting with other models to meet their DNA analysis needs. The typical options for outsourcing DNA analysis are as follows:

- **Private Crime Lab** – Labs in this category are typically for-profit corporations.
- **Public Agency Crime Lab** – Public labs are generally a division of a single government agency, such as a county sheriff's office, county medical examiner's office, state police department, or the FBI lab.

Some large city police departments with crime labs also work as contract labs through agreements where they perform DNA analysis for nearby jurisdictions.

- **Regional Crime Lab** – The model for most regional crime labs involves the pooling of resources from a group of participating law enforcement agencies. Regional crime labs typically only serve those jurisdictions, though some contract with other jurisdictions to do some or all of their DNA analysis.

- **Fund a Criminalist** – Through a Memorandum of Understanding (MOU) or other agreement, a local jurisdiction may fund a criminalist who works full-time in the DNA analysis section of a county or state crime lab. These criminalists are usually trained by the host lab. While their primary responsibility is to conduct DNA analysis for evidence submitted by their funding agency, the MOU will frequently include provisions for the criminalist to assist the host lab with analysis for other jurisdictions, as time permits.

- **Screening Labs** – Some agencies throughout the country are exploring the use of separate screening facilities in local law enforcement agencies. Specially trained screeners examine submitted pieces of crime scene evidence to determine whether any DNA evidence may be extracted. These screeners then submit identified DNA evidence to the crime lab for analysis. The use of screeners saves DNA analysts from having to do this first step and has been shown to increase lab efficiency.

Lab directors who routinely coordinate with vendor labs suggest that before deciding where to send evidence or entering into a vendor agreement with a lab, managers and command staff should examine a number of pertinent issues. If the police agency has its own lab, it frequently falls to the lab director to decide which vendors are most appropriate to use. If the agency is without a lab, that decision falls to command staff or to the chief.

The goal of this chapter is to give chiefs an overview of the basics of DNA vendor lab decisions. Having a working knowledge of the basic issues will aid in decision-making, budget allocations, and the efficient use of vendor resources. The chapter will cover:

- General considerations when outsourcing DNA analysis
- The benefits and challenges of using private DNA labs

Outsourcing DNA analysis: General considerations

The initial evaluation of potential vendor agencies should include a review of costs, facility capabilities, case prioritization, and case turnaround time. A second layer of review should include an examination of physical evidence considerations, systems security, and business continuity and contingency plans for incidents that could impact lab operations. Agencies also must examine their own internal organizational structure and determine which person and/or department will be able to most effectively manage the day to day communication and coordination with outside labs.

Cost

The cost of DNA analysis will be one of the factors in determining whether an agency should outsource it. Chiefs with in-house labs should consider whether it is more cost-effective to support the lab or to outsource some or all of the work. Views on this are mixed; some labs have found that outsourcing certain types of cases makes their in-house lab more efficient and effective. Others believe that outsourcing is a short-term solution and that agencies should invest in the expansion of their own labs. To help determine the best course of action, chiefs should consult with their internal lab directors to review lab protocols and costs.

The cost for outsourcing to either a public or private lab can vary greatly. Agency budgets and funding streams are significant considerations in choosing a forensic lab. Funding may come from the agency lab budget, grant money, or other sources.[21] When accepting grant funding, it is important to closely review any requirements regarding the DNA lab approved to do the work. Some police departments have been surprised to find that they must use pre-approved private labs for grant-funded analysis. Several agencies have had difficulty with such requirements, which resulted in additional expense and work for their in-house DNA analysts and investigators (e.g., site visits to the private lab, training private lab personnel on agency protocols, etc.).

For agencies without their own in-house DNA capabilities, county and state labs have historically been the sources for DNA analysis. Analysis is typically performed at minimal cost, if any, to the police agency submitting evidence.

Some public labs, such as in the Kansas City (MO) Police Department, charge outside agencies to do analysis. Outside agencies within the state of Missouri all have the option of using the Missouri State Highway Patrol crime lab for DNA analysis; the cost of this outsourcing is absorbed by the State of Missouri. However, several agencies prefer to pay the Kansas City crime lab to perform analysis for at least some of their DNA evidence testing. Their rationale is that the Kansas City PD lab can return results more quickly, and those agencies also enjoy a good working relationship with the crime lab's DNA analysts, who help to review cases and identify the most probative evidence.

Private labs frequently charge a premium for certain services and case turnaround times. It is important that all costs be considered and laid out in an agreement with the private lab. The agreement should be reviewed

21. Unique funding opportunities may be found through the use of community involvement and private donations. For example, after a rape kit backlog at the LAPD was brought to light, the department has benefited from donations by not-for-profit groups, large private donors, and donations solicited through the police foundation's website (http://ladnahelp.org).

and updated periodically. Costs may be based upon the type of testing to be done, amount of evidence submitted, and the turnaround time. One often-overlooked expense involved in using private labs is the cost to have the analysts available for testimony should a case go to trial. Travel and testimony expenses can either be an additional fee, or they may be included in the overall cost of analysis for a case.

Facility capabilities

Police chiefs should consider a lab's actual capabilities when deciding which facility to use in a particular case. The type of evidence in a case may warrant specialized DNA analysis testing that may not found in the local public lab (e.g., Y-STR or Mitochondrial DNA analysis).

Often, if a public lab is unable to perform a necessary DNA test in-house, it will pay for the outsourcing costs. To facilitate this outsourcing, a good working relationship between the submitting agency's investigators and the public lab is essential. For example, in the Palm Beach County Sheriff's Office crime lab, if the analyst feels that the best test to be done in a case can only be done by a private vendor, then the county will pay to have that sample sent to the private lab. If the evidence to be outsourced comes from one of the lab's customer law enforcement agencies, that agency is not responsible for the additional outsourcing costs. Likewise, that agency's investigator is not responsible for navigating the often complex arrangements that must be made to use a private lab.

This is also the case in Baltimore County, Maryland, where the public lab conducts routine STR analysis in-house, but sends out any samples that are more appropriate for Y-STR or Mitochondrial DNA testing. Having analysts available to assist in these decisions takes the onus off an investigator who may not fully understand the differences between the various types of DNA testing. As several lab directors warned, you want to make sure that you get it right the first time—particularly in the case of a small sample that is likely to be consumed in the first round of testing.

A lab's ability to upload into CODIS should also be considered when deciding what types of cases should be sent to a particular facility. Whether public or private, the lab's ability to upload into CODIS may be critical to a case where the perpetrator is unknown and investigators will want to search the national database. CODIS access may not be important when the evidence only needs to be compared against a standard that has been obtained from the suspect.

It is essential to realize that private labs will not have direct access to CODIS. This does not necessarily preclude privately analyzed evidence from having a profile uploaded into CODIS, however. In some cases, public labs have established a relationship with a private facility (including performing necessary site visits and verifying certain credentials). In those cases, after the public lab has completed a technical review of the private lab's analysis, the profile may be uploaded into CODIS.

Prioritization of cases and case turnaround time

When using an in-house lab, a chief or sheriff can always pick up the phone and call his lab director to discuss the lab's prioritization scheme or request that a particular case be expedited. It is an entirely different situation to work through case prioritization with a lab official from either a private company or another public agency, whose lab management will generally have to weigh the priorities of multiple agencies and customers.

It is usually easier for a private lab than a public lab to create a prioritization scheme that allows the customer agency to have some input into routine and expedited cases. Prioritization requirements and turnaround time should be addressed in the vendor agreement signed in advance of the forensic work. That said, frequently a special expediting fee is required in order to have a case turned around quickly.

Law enforcement agencies using public agencies' labs report that they often have little say in the daily prioritization scheme of the lab. Some public agency labs may have a formal procedure in place so that outside agencies can request priority or expedited status for a particular case. It is common, however, for this to be done informally through an investigator's relationship with a particular DNA analyst, or through informal communication between the chief and the head of the outside public agency lab (i.e., medical examiner, forensics director, sheriff, police chief).

Physical evidence considerations

Regardless of whether evidence is sent to a private or public lab, investigators and agencies should always consider the quality and quantity of the evidence submitted. Chain of custody concerns are also important.

The evidence itself should be scrutinized to ensure that it is the most probative and most likely to result in the extraction of a useable DNA profile. Some labs consult with customer law enforcement agencies to ensure that the most probative samples are submitted for analysis. This requires that the lab staff have a certain amount of experience with crime samples. As will be discussed further in the next section, law enforcement agencies that rely upon a private lab to screen evidence for DNA samples should make sure that the lab has a sufficient level of expertise with crime scene evidence.

Another consideration is the likelihood of the sample being consumed through DNA analysis. Once the sample is consumed, it's gone; no further testing can be done. If there is a finite amount of evidence available in a case, the types of testing available must be thoroughly researched and considered prior to choosing what lab to use. There may be only one opportunity to get it right.

The geographic location of the lab can be important as well; it may affect the cost of analysts for testimony, but it also comes into play with physical evidence. Law enforcement personnel may be tied up for hours, or even an entire day, just transporting evidence to the lab. In some states, the nearest DNA lab is several hundred miles from many of its customer agencies. Chain of custody must be maintained whether the evidence is transported to the lab directly by law enforcement personnel or it is sent via some other method (e.g., courier, mail, etc.).

In Pittsburgh, for example, the Allegheny County Medical Examiner's crime lab has created a 24/7 evidence drop system that allows agencies to leave evidence for analysts at any time. This has been important especially for the smallest of police departments in the county, which often have very limited evidence storage capabilities.

The lab facility itself must have the proper storage conditions and security procedures to maintain whatever custodial requirements are necessary in your jurisdiction. Arrangements also must be made with the lab to determine what agency will be responsible for any evidence remaining after analysis. Typically this goes back to the requesting law enforcement agency.

Systems security and business continuity plans

Physical security surrounding the lab facility and evidence storage areas is a concern with any vendor lab, as is the security of computer networks. When investigating a potential lab vendor, chiefs may also want to consider and review the lab's employee screening requirements, document retention policies, and any other systems in place that may affect the evidence submitted to the lab, the lab's analysis, or the lab's reporting capabilities.

Another issue that has come to light recently is the concern over who owns DNA profile information. Significant privacy concerns emerged with the recent bankruptcy filing by deCODE, an Icelandic company that operated a private DNA testing business. The company filed for Chapter

11 protections in U.S. Bankruptcy Court in 2009. While the DNA data held by deCODE reportedly remained the property of its customers, some DNA data remained in the possession of the company at the time that it was acquired by an investment group. The company was quick to reassure its customers that the new ownership would be bound by the same confidentiality requirements that also bound deCODE and its employees. Some in the forensic science community were concerned that these confidentiality and information ownership documents were unclear and contradictory.[22]

When assessing lab security and privacy issues, chiefs should consult with forensic experts and agency attorneys to examine all aspects of vendor lab agreements. Some of these issues may be moot if the lab is accredited (e.g., by ASCLD/LAB or FQS-I) and therefore required to meet the stringent requirements of the accrediting body. Any vendor agreement or MOU should take these issues into consideration to prevent any ambiguity or confidentiality concerns.

Communication and coordination

Whether your agency uses a private or public lab, the rapport between your agency representatives and the lab director and personnel goes a long way. This was evidenced in the Palm Beach County Sheriff's Office, where many of the crime lab's customer agencies have a good working relationship with the lab. "This is our lab," said Sergeant James Cink of the West Palm Beach Police Department. Many of the investigators in outside departments will routinely consult with Palm Beach County lab analysts for advice on cases and even on potential contract negotiations with outside forensic providers. They have found that it helps to have the scientists weigh in on decisions regarding evidence, including whether it should be sent to another lab for expedited testing or analysis that is not available in the Palm Beach County crime lab.

22. Henderson, Mark, "Privacy Fears as DNA testing firm deCODE Genetics goes bust," *The Times*, November 18, 2009. www.timesonline.co.uk/tol/news/science/genetics/article6920653.ece

Rather than have individual investigators responsible for outsourced cases, a number of agencies use a "clearinghouse" method for managing evidence that is sent to an outside lab. Creating a single point of contact (the "clearinghouse") between your agency and any vendor lab, public or private, can help to mitigate or eliminate many of the concerns addressed above. It will facilitate more effective communication, problem solving, and case management.

In the United Kingdom, for example, all forensic evidence is sent to labs that operate on a commercial basis and are either privately-owned or government-owned companies. The Metropolitan Police Service has a Forensic Services division that, under the direction of Mr. Gary Pugh and his staff, reviews all requests for forensic DNA analysis. According to Mr. Pugh, the division reviews all cases, and in cases with an unknown suspect, the division selects three samples to be sent for initial DNA analysis. The number of samples remains relatively consistent, and they are sent to the lab once per day at an appointed time. This allows the forensic lab to predict when, and approximately how many, samples will be submitted by the Forensic Services division each day. According to the vendor agreements, there is a prescribed amount of time, normally less than three working days, in which the analysis will be completed, the results searched against the U.K. National DNAS Database, and matches returned to the Forensic Services division. Should additional evidence analysis be required, it is sent to the lab at that time. The predictability and communication with a single department has helped to streamline and expedite the analysis process in the U.K.

Several U.S. agencies with crime labs also use a similar model, utilizing crime lab evidence coordinators to track evidence that is sent outside of the agency for analysis. For agencies without an in-house lab, the choice of contact person varies. The role may fall to an evidence room specialist, a crime scene specialist, or one of the investigators.

The use of an investigator as point of contact has been the model in the Indio (CA) Police Department, where Detective Jeremy Hellawell formed a solid working relationship with several of the analysts at the state crime lab. Detective Hellawell spent a day at the lab and observed the analysts' work so that he would have a better idea of how the analysis process functioned. He communicated this back to his colleagues in Indio. Through his working relationship with the analysts and with the support of Chief Brad Ramos, Detective Hellawell has improved his agency's evidence collection capabilities, understanding of the forensic laboratory system and its challenges, and also the communication with the analysts throughout the life of a case.

Some agencies have also considered hiring a forensic expert on either a full-time or consultant basis. The best individual to have in this position would likely be someone with extensive experience as a crime scene investigator or a former crime lab analyst with working knowledge of the various forensic disciplines. The forensic expert could be utilized in a number of different ways, including review of the evidence collection process to ensure good practices and assisting investigators to make certain that the most probative evidence in a case is submitted to the lab. The expert could also be a gatekeeper to serve as a liaison between the police department and outside labs.

WHAT EVERY CHIEF OF POLICE NEEDS TO KNOW ABOUT DNA OUTSOURCING

By Jody Wolf, Assistant Crime Lab Administrator
Phoenix Police Department (AZ)

When considering the use of private vendors to perform DNA analysis, there are many factors to take into consideration. Outsourcing can be a complicated process with administrative and technical challenges. The Phoenix Police Department (PPD) Crime Laboratory has tackled these challenges to build a very strong and successful outsourcing program. These recommendations are offered for agencies that are considering sending cases to a private vendor for analysis.

Quality Assurance: Quality is an incredibly important factor when considering the use of private DNA vendors. Foremost is ensuring the DNA profiles developed can be entered in to the Combined DNA Index System (CODIS). CODIS is a software program that enables federal, state, and local crime laboratories to exchange and compare DNA profiles electronically, thereby linking crimes to each other and to convicted offenders. Based on a match, police in multiple jurisdictions can coordinate their respective investigations, and share the leads they developed independently. Matches made between the Forensic and Offender indexes provide investigators with evidence regarding the identity of the perpetrator(s).

In order to participate in CODIS, a laboratory must meet the FBI's DNA Quality Assurance Standards. There are over 350 standards which set forth the minimum quality assurance requirements for the testing of evidentiary items for DNA analysis. Included in these standards are requirements which specifically address the use of private vendors for casework analysis. It is important to use only those laboratories which meet these standards and are accredited to perform forensic DNA testing.

In addition, one aspect that has made the PPD's outsourcing program so successful has been the incorporation of an internal quality assurance component. These are measures to evaluate the quality of the work product being provided by the private DNA

vendor, such as sending samples to the vendor where the DNA profile is already known (blind proficiencies), retesting of returned evidence to corroborate the profile developed by the vendor, an approved contract/scope of work, vendor site visits, and 100 percent technical and administrative reviews of the work product provided by the vendor. These measures have dramatically increased the quality of the work product provided by the vendors and ensure a proactive relationship between our agency and the DNA vendors used.

Not all vendors are created equal: Another key consideration when looking to outsource DNA evidence is to realize that every vendor is not created equal. There are multiple types of technology utilized in the development and analysis of DNA profiles from evidentiary items, and it is important to select vendors which utilize technology that has been approved by the FBI. It is also vitally important that the vendor's technology be consistent with the type of technology used in your own laboratory. This becomes critical when attempting to enter profiles into CODIS. The data generated by a vendor must be reviewed and reported on by a CODIS participating laboratory, and the analyst performing the review must be qualified in the same technology as used by the vendor. If this is not the case, the profiles are not eligible for CODIS entry. Therefore, a key component of the vendor qualification process is to specify the technology to be used in the testing of items.

Further, some private vendors will excel at various types of testing, i.e., Y-STR analysis, low level/degraded (low copy number – LCN) testing, animal DNA, etc. Before an agency begins outsourcing, it is important to know the various capabilities of the private vendor used for testing of DNA evidence and the outsourcing needs of the agency. For this very reason, it has been the practice of the PPD Crime Lab to qualify multiple vendors for the testing of DNA samples. This increases the capabilities of the agency and offers a lot of flexibility for selecting the vendor based on the type and number of cases.

In addition, it is important to determine—prior to outsourcing—whether the vendor is responsible for the evidence screening *and* DNA analysis or only DNA analysis. This will impact both the scope of work and the quality assurance component of the outsourcing program. If the private vendor is responsible for the screening and DNA analysis, it is highly recommended the same quality assurance measures listed above for DNA analysis are used for the screening testing.

Outsourcing still requires internal resources: There is often a misconception that an agency is able to "wash their hands and walk away" when sending out evidence for testing. This is not the case when outsourcing DNA evidence. There are many internal activities necessary to successfully implement an outsourcing program. These activities range in scope from administrative management to technical reviews/reporting, and can keep one or more employees busy full-time depending on the number of cases/samples outsourced. As stated previously, the data must be reviewed and reported by a CODIS participating laboratory in order to enter a DNA profile into CODIS. (Private laboratories do not have direct access to CODIS.) Often the review is performed by a qualified DNA analyst who works for the law enforcement agency that outsourced the evidence. This review/reporting process can be time-consuming, but is an integral part of the quality assurance process and allows for the entry of eligible profiles into CODIS.

One or more employees will also need to be available to coordinate the vendor qualification process, execute vendor contracts, monitor financial transactions/payments of invoices, address vendor quality issues to include the resolution of quality issues, perform vendor site visits, and many other administrative and technical tasks. In addition, much of the funding today for DNA outsourcing is supported through local, state, and federal grants. This requires grant management activities which include many of the same activities as listed above along with the grant reporting requirements.

Bottom line: a law enforcement agency is not "off the hook" when it decides to outsource evidence. There remains a significant responsibility and commitment by the agency when outsourcing DNA evidence. The PPD Crime Lab, which outsourced more than 600 DNA cases last year, has dedicated a team of two qualified DNA analysts, one forensic biology screener, and a laboratory technician to cover these responsibilities.

Outsourcing can be an intimidating endeavor. However, it can be a very effective tool for an agency that is faced with demanding workloads and limited or diminished resources. The PPD Crime Lab began outsourcing evidence almost 10 years ago, and it has been through a committed effort to quality that these accomplishments were possible.

Private lab considerations

There are many examples of law enforcement agencies successfully using private forensic DNA labs worldwide. Our research made clear that the most successful utilization of private labs has occurred when the liaison between the law enforcement agency and the private lab is either from within the agency's own in-house DNA section or, as in the United Kingdom, the liaison is a team of in-house forensic experts.

In Florida, for example, the Palm Beach County Sheriff's Office and Miami-Dade Police Department have used grant money and other funding to contract out their DNA analysis for property crimes. In the Los Angeles County Sheriff's Office and the LAPD, funds have been devoted to sending out rape kits for analysis by private labs. Other agencies have had success in sending out certain types of cases when they can identify a specific need and an available funding source.

When deciding whether to use a private lab for DNA analysis, potential challenges and opportunities should be taken into consideration. If your agency does decide to use a private lab, there are a number of factors that should be considered when comparing different private DNA laboratory vendors.

Advantages

The advantages of using a private lab generally stem from the fact that they are not bound by many of the constraints typically found in government agencies. Some of these advantages include:

- **Business Model** – Private crime labs are profit-driven businesses. Many law enforcement agencies have found them to be more responsive to the needs of their customers while also making sure that they meet the expectations of the field. Without adequate quality control, law enforcement agencies and other customers will stop using private labs.

- **Technology and Process** – Private labs have a business incentive to keep up with the latest technologies, so there may be more accountability (e.g., to shareholders, company owners, etc.) when it comes to purchasing and using new equipment. Private labs are frequently able to get new equipment online faster than public labs, because they can devote more time and resources to the validation of new equipment and technology. New technologies at one private lab may be significantly more advanced than those offered by public labs or even other private labs. As noted earlier, it is crucial that the right technology be used the first time around, particularly if there is a possibility that the sample could be completely consumed during the first test.

  Some private labs also claim that they can more quickly adjust their processes to the needs of clients, saying it is easier for them to expand because they can hire new analysts and acquire equipment faster than a government agency. Some private labs have also found that rather than having an "assembly line" approach in which different analysts perform different tasks in the DNA analysis process, they are able to use a more "holistic" approach, with one analyst per case. This case management approach allows for a single point of contact between the lab and the law enforcement agency, adds accountability to the process, and also cuts down on potential testimony costs.

- **Turnaround Time** – Private labs tend to claim that they can be more attentive to the needs of their paying customers. If their analysts are not as overwhelmed as those working in government labs, they may be better able to respond to queries by investigators and scientists from their customer agencies. The majority of private labs also offer different fee schedules for cases based upon the desired turnaround time. If one lab is to receive a large amount of work from a particular law enforcement agency, productivity expectations should be negotiated and included in the vendor agreement.

- **Communication** – Some proponents of lab independence and autonomy believe that private labs have an advantage because they have less direct communication between police investigators and their scientist than may occur in public labs. This reduces any opportunity for officers to "meddle" in the science or to have any influence—direct or unintentional—on the testing results.

  Infrequent, formal communication between the police and the scientists can allow for more efficiency in the analysis process, but only when agencies ensure that outgoing samples are accompanied by adequate case information. While an in-house DNA analyst may be able to pick up the phone and call a detective to clarify a point, this is not always as easy in the case of a private lab analyst who is not as familiar with the police agency and its personnel. In order to screen evidence effectively, analysts need to be provided with information (usually through a report or written note) about the case and the investigator's theories.

- **Frequent Audits** - Private labs are frequently subjected to audits. This may be due to the requirements of the lab's accrediting body. In addition, labs that contract with public law enforcement crime labs, and whose DNA profiles may eventually be uploaded into the national database using CODIS, must undergo audits by each of the law enforcement labs with which they contract.

Challenges

There are a number of significant challenges to using private labs. Law enforcement agencies that do not have their own in-house forensic DNA capabilities may encounter more significant challenges than agencies that have their own DNA analysis capabilities and just outsource some portion of their analysis. Regardless of your agency's situation, it is important to be aware of these challenges, which include:

- **Accountability and Public Trust** – Private labs recognize that they must produce a reliable and quality product in order to build and maintain their client base. However, because private labs are inherently profit-driven, they do not necessarily have the same public accountability as a law enforcement agency or public forensic lab.

- **CODIS Access** – One of the most controversial topics among law enforcement agencies, labs, and experts throughout the country has been the lack of private lab access to the FBI's CODIS system and the national DNA database. Due to the nature of the statutory language that allows for a national DNA database system in the United States, private entities have never been allowed access to the database.

  A DNA profile that is generated by a private lab can be uploaded into the national database via a public lab with CODIS access—but only if certain criteria are met. These criteria must be established and verified *prior* to the sample being analyzed by the private lab. The private lab must be accredited and must meet the FBI quality assurance standards for a testing lab. This, in part, requires that the private lab undergo an audit by the public lab that will ultimately upload the profile into CODIS. The public lab must perform a technical review of the private lab's work and certify it prior to the profile being entered into the national database.

The most significant challenges in this area occur with law enforcement agencies that have no in-house lab to perform the technical review, but which still want to use a private lab. More than one agency has lamented spending countless hours trying to work out a contract with a private lab, only to find that the work done by the private lab could not be uploaded directly into CODIS. What's missing in this equation is the involvement of a public lab with CODIS access. An agency with no in-house lab must have the assistance of a public lab that will agree to do the technical review and CODIS upload. Because this requires such a large investment of time by the public lab, most public labs will refuse to do it unless the samples go through them first and they can choose the private lab that best meets their requirements and standards.

For agencies that have their own in-house labs, one of the biggest CODIS-related challenges is with the technical review. Public labs that do some outsourcing must take into account that, while they will not have to invest manpower in the actual analysis of the samples, they will still need to have qualified persons available to conduct the technical review and upload the profiles generated by the private lab into CODIS.

This has been a challenge for a number of labs. In the Maryland State Police forensic lab, for example, grant money helped to reduce the lab's backlog by providing funds for outside private lab analysis. However, the State Police lab's queue for uploading profiles into CODIS started to back up, because the state lab was initially not prepared for the number of profiles that it received from the private lab. The Palm Beach County Sheriff's Office experienced a similar situation in which cases ended up waiting for technical review after being returned from private labs. So now, when each new batch is received from the private lab, the DNA manager and CODIS administrator immediately set aside a block of time to perform the technical reviews and upload the cases into CODIS all at once.

- **Weakness in Handling Non-Perfect Evidence** – Some public forensic labs have expressed concern that the analysts at private labs are less experienced in the analysis of "non-perfect" or low-level forensic DNA evidence. These public labs warned other agencies to conduct "spot checks" of evidence, particularly of samples that are returned to the public lab with a report that no DNA profile was found. Analysts at more than one police lab noted that their "spot checks" had exposed situations in which the private lab screener identified no DNA evidence on an item where the government lab screener was subsequently able to extract DNA that resulted in a usable profile.

  In an effort to combat this problem, the analysts in the Phoenix Police Department now screen their evidence in-house prior to sending it to a private lab vendor. They will perform their own forensic biology screening analysis and only send prepared samples for further DNA testing. This practice is time-consuming for the lab, but ensures that they have control over the screening process. It is also beneficial for small samples which may be consumed during the extraction and screening process.

- **Communication** – While some agencies considered it an advantage to have less communication between analysts and investigators when using a private lab (see above), others found this to be a disadvantage. They reported that private labs are less likely to give investigators status reports and helpful information as the case progresses; information often isn't shared until the final report is issued by the lab.

- **Cost** – Many law enforcement agencies that routinely use county or state crime labs to perform DNA analysis reported that they do not have sufficient funds to pick and choose which lab they will use. They simply choose the lab that will cover the cost of analysis for their jurisdiction. In times of strained city budgets, it is difficult to justify sending evidence to a facility where the agency must pay a

fee, unless there is a very specific reason for doing so. In many cases, a county or state crime lab will determine that a particular piece of evidence should be outsourced for analysis (e.g., where a more sensitive or newer technology is needed and unavailable in-house). Typically the county or state crime lab will also fund the outsourcing, so local police agencies get the special testing at no additional cost.

Testimonial costs for private lab analysts can also be a burden. The travel and testimony costs for analysts who may be located half a country away from the law enforcement agency can be steep. Agencies have addressed this in the past through their contract agreements with the private lab (this is easier if the law enforcement agency is sending a large amount of work to the private lab, as opposed to a one-off case). Law enforcement may also choose to consult with the prosecutor's office regarding the potential need for forensic testimony prior to sending a case to a distant private lab.

- **Audit Control** – Public crime labs may be subject to certain audits simply because they are part of a government agency. Any lab (public or private) that is accredited by ASCLD/LAB, FQS-I, or ISO/IEC 17025:2005, or that performs DNA analysis for eventual upload into CODIS, is subject to strict audit requirements. (This is discussed further in Chapter 5.) Many of these labs undergo multiple audits each year. In comparison, a non-accredited private lab may not be required to undergo any routinely scheduled audits.

- **Chain of Custody** – Law enforcement needs to be mindful of evidence custody, control and storage issues when sending evidence. Typically, a visit to a private lab will help to ensure that it has proper storage and controls in place. This is particularly important if the lab is not accredited by a national body.

Conclusion

Nearly every law enforcement agency, regardless of whether it has in-house DNA analysis, will at some time use an outside lab. Prior to entering into an agreement with a vendor lab, police chiefs and sheriffs need to consider what type of arrangement is best for their agencies. Simply keeping with the status quo may not be the best situation. Chiefs need to weigh the pros and cons of using outside agencies, and should exercise extreme caution, particularly when using private companies for DNA analysis. Whether outsourcing to a public or private lab, chiefs should consider the following:

- **What are the lab's capabilities?** Will the lab be able to perform the necessary tests? Will the resulting profile be eligible for CODIS upload? Does the lab have adequate staffing and capacity to handle the workload generated by your agency?

- **What are the costs for outsourcing?** What is the budgetary commitment? Do you expect to have budget or grant funds available on a continuing basis to fund outsourcing? Have you considered alternative funding sources? Do any of your funding sources place restrictions on outsourcing?

- **Does the lab hold a national accreditation?** What accreditation does it hold? What are the requirements of that accreditation? What can you do to ensure that accreditation status is maintained?

- **What quality control standards are in place at the lab?** Will you have the ability to retest samples to check the lab? Does your agency have mechanisms in place to hold the lab accountable for its work and to perform onsite inspections or audits? How responsive will the lab be to any concerns or problems?

- **What will be the average turnaround time for a case?** How are cases prioritized and expedited? How much influence will your agency have on case prioritization? Can the lab meet the volume and turnaround time requirements of your agency? What are the possible consequences (e.g., effect on your agency, contractual penalties to the lab, etc.) if they cannot?

- **How will the DNA profiles be uploaded to CODIS?** Is the vendor a public lab with direct access to CODIS? If not, does your agency have an in-house lab to perform the technical review and upload, if necessary? Does the vendor lab have arrangements with another public lab to review its work and upload profiles into CODIS?

- **What impact will outsourcing have on your in-house lab?** Will evidence be screened in-house or by the private lab? Can in-house lab staff handle the additional technical review and increased demand for CODIS uploads? How will any required audits of private labs be handled?

- **How will analyst testimony be handled?** When necessary, will the analysts be able to travel to court? Is the cost built into the vendor agreement or analysis fee? If not, who will pay for the analysts' time and travel costs?

5

Post-analysis and DNA profile databases

The subject of DNA databasing, including the FBI's CODIS software, is a topic that can evoke a spirited discussion among members of the law enforcement and forensic science community. We also found that there is general confusion and lack of understanding within the law enforcement community with regard to CODIS requirements and restrictions for uploading and searching profiles in the database. This topic is complex, but police executives cannot simply rely on their scientists to understand the CODIS requirements. As law enforcement becomes more reliant on DNA evidence, it is critical that chiefs take the time to understand it.

There is much debate over whether private labs should have direct access to the CODIS database. Currently, due to the language in the federal legislation granting the FBI permission to maintain a national DNA database, private labs do not have direct access to CODIS. As discussed in Chapter 4, this does not preclude privately analyzed DNA profiles from ultimately being uploaded into the system, but chiefs and lab directors need to understand the requirements for this to occur.

Prior to entering into any contract or arrangement with another public or private lab, police chiefs must understand how the CODIS system works and how the evidence will ultimately be used. It is essential that chiefs have a basic understanding of the databasing process *before* entertaining any potential contracts with a vendor lab. More than one law enforcement agency has, with the best intentions, expended numerous man-hours and agency dollars trying to arrange for vendor contracts with labs that were promising the impossible.

This chapter will address the basics of CODIS, including:

- The three tiers of the CODIS database
- What can be uploaded into CODIS
- Restrictions on what entities can upload profiles into CODIS
- What happens when there is a profile hit in CODIS
- Challenges of DNA databases in the United States

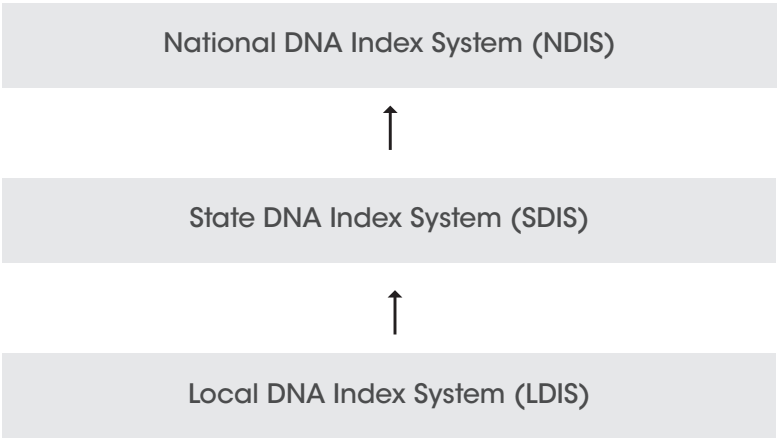
CODIS – The basics

Following the success of a pilot project that the FBI Laboratory launched in 1990, the DNA Identification Act of 1994 established a framework for the FBI to create a national index of DNA profiles, to be administered according to federal law and FBI quality assurance standards. The result was a national database that is frequently referred to by law enforcement, the news media, and the public as CODIS, or the Combined DNA Index System. "CODIS" is actually the name of the software platform developed by the FBI for DNA record databasing purposes. The software is licensed to labs and agencies throughout the United States and the world.

There are currently 33 countries that have CODIS licenses and utilize the CODIS software for their DNA databases. The databases for foreign countries are maintained by the governments of those countries. There is no information-sharing or connectivity in CODIS between the national database in the United States and those of foreign governments. The CODIS software may also be used for smaller, more specialized DNA

profile databases. For example, during a plane crash, CODIS may be used to match DNA profiles obtained from the crash site with the DNA profiles of persons believed to be victims or biological relatives of the victims. Those profiles remain in the limited database and are not uploaded into the national database.

In the United States, CODIS is a system of tiered databases, each of which can have its own submission requirements. The three tiers are laid out as follows:



When a qualified lab uploads a DNA profile into the CODIS system, it is generally first checked for matches against the profiles in the Local DNA Index System (LDIS). It is then run through the State DNA Index System (SDIS). The profile requirements for uploading into an LDIS or SDIS vary by state and jurisdiction, and they may be less stringent than the requirements for uploading a profile into the national database.

If a profile meets the National DNA Index System (NDIS) requirements set forth by the FBI, it may be uploaded into that national database. There are currently over 9 million DNA profiles in NDIS, which is managed by

the FBI CODIS Unit.[23] NDIS and "national database" are frequently used interchangeably when referring to this database. A lab that has met the criteria to upload profiles into NDIS is frequently referred to as a "NDIS lab" or a "NDIS participating lab."

Before a lab can upload samples into NDIS, the lab must meet the latest FBI quality assurance standards that took effect on July 1, 2009. The set of standards of primary concern for most law enforcement agencies are the *Quality Assurance Standards for Forensic DNA Testing Laboratories* (see Appendix E).[24] These standards have provisions that apply to NDIS labs and also to vendor labs (generally private labs) which provide profiles to NDIS labs to be uploaded into the CODIS NDIS index.

NDIS labs must have a CODIS administrator, who is "an employee of the laboratory responsible for administration and security of the laboratory's CODIS at a laboratory that owns the database and/or known samples."[25] The CODIS administrator is responsible for all aspects of CODIS use within a lab—from uploading samples to tracking CODIS "hits" for the agency. As we will discuss below, the CODIS administrators for different agencies work together when a DNA profile from a crime scene in one jurisdiction matches a profile that was uploaded into the system from another jurisdiction.

What can be uploaded into NDIS?

NDIS contains DNA profiles in several index categories. As of February 2010, NDIS contained over 9 million offender profiles and over 305,000 forensic profiles.[26] State and federal law dictate which DNA profiles may

23. Statistics provided by FBI CODIS Unit Chief and NDIS Custodian.
24. *Quality Assurance Standards for DNA Databasing Laboratories.* Federal Bureau of Investigation, 2009. www.fbi.gov/hq/lab/html/databasinglab.htm; See also *Quality Assurance Standards for DNA Testing Laboratories.* Federal Bureau of Investigation, 2009. www.fbi.gov/hq/lab/html/testinglab.htm
25. *Quality Assurance Standards for DNA Databasing Laboratories.* Federal Bureau of Investigation, 2009. www.fbi.gov/hq/lab/html/databasinglab.htm;
26. Statistics provided by FBI CODIS Unit Chief and NDIS Custodian.

be uploaded into NDIS (e.g., what types of crime an individual was arrested for or convicted of). The indices in the NDIS database include:

- Offenders
- Missing Persons
- Arrestees
- Biological Relatives of Missing Persons
- Forensic
- Unidentified Human Remains

The CODIS software has many capabilities, and allows for a number of different types of searches. Forensic profiles, or those profiles extracted from crime scene evidence, must meet certain requirements. According to lab administrators and DNA analysts, there is often confusion by law enforcement officers as to what types of crime scene profiles may be uploaded into NDIS. Only profiles that are believed to be from an *unknown perpetrator* are permitted for upload into the forensic index.

> **Example.** A detective is investigating a double homicide, but has few immediate leads. One witness points to a pool of blood on the ground and says that a third person was also shot by the perpetrator, but he left the crime scene before the police arrived. Crime scene technicians collect the blood for analysis. The detective submits the blood to the lab for DNA analysis. When he requests that the profile be uploaded into NDIS, the CODIS administrator refuses.
>
> Why can't the profile be uploaded into NDIS? As noted above, only the crime scene DNA profile from an unidentified *perpetrator* may be uploaded to be searched against the other forensic profiles in the system. NDIS does not permit the same type of searching to be done in order to identify potential victims or witnesses.

Why can't a private lab upload a profile directly into CODIS?

Based on the PERF Executive Session on DNA and many conversations with leaders in the law enforcement and forensic science communities, it is clear that this is a contentious topic. While few support the notion that private labs should have full searching capabilities in CODIS, there are a number of advocates for allowing private labs the opportunity to upload profiles directly into CODIS.

The FBI's CODIS Unit has tried to make clear that this is not a decision that they have made alone. The current policy is governed by federal legislation as well as FBI regulations, with input from members of the forensic community. The DNA Identification Act of 1994 requires that DNA profiles in the national index "shall include only information on DNA identification records and DNA Analysis that are…maintained by Federal, State, and local criminal justice agencies…"

This is further supported by Standard #17 of the *Quality Assurance Standards for Forensic DNA Testing Laboratories*, which gets to the heart of many of the perceived challenges described by law enforcement executives and investigators who have tried to use private labs. This standard requires a forensic DNA profile analyzed by a private lab to be technically reviewed by someone from an NDIS lab. It also requires that a vendor lab meet certain accreditation standards, allow for annual site visits by an NDIS lab relying upon its services, and provide certain information to the NDIS lab regarding technical specifications and compliance with the quality assurance standards.

Those in favor of private labs being allowed to upload to CODIS believe that if a lab meets the stringent requirements of accreditation and the FBI quality assurance standards, it should be allowed to upload DNA records. Advocates contend that this will help to reduce the large analyst

workloads and DNA backlogs experienced by many law enforcement crime labs. Several interviewees professed their faith in local private labs, as many of their DNA analysts are former employees of law enforcement crime labs. Although there are a number of differences between the systems in the United States and the United Kingdom, some advocates in the United States point to the experience in the United Kingdom, which allows commercial labs to upload into the national database.

Others argue that allowing private labs to have direct involvement in the national database would be problematic, and could adversely impact law enforcement's control over the integrity of CODIS. They believe that the profit-driven nature of private business tend to create a potential to cut corners. Others have noted examples of inexperience or inefficiency at private labs that were unable to identify DNA on crime scene evidence where the law enforcement crime lab later found it. The accountability and public trust that are generally found in public law enforcement agencies may not exist in private labs.

As previously noted, there are currently strict requirements for a privately-analyzed sample to be uploaded into CODIS. Several law enforcement agencies have reported confusion regarding the logistics of using a private lab and difficulty in trying to negotiate work with a private lab. The agencies assumed that they could take the private lab's reports to state lab analysts, who could then just review them and upload the information into CODIS. However, in some situations private labs have misled potential customer agencies by misrepresenting the nature of their working relationship with a public lab for the purpose of uploading to CODIS. When an investigator brings private lab results to a public lab without understanding the CODIS requirements, it can cause confusion and frustration for all parties. Frequently, the reason that a private lab's work cannot be uploaded to CODIS is that the lab does not meet the vendor lab requirements set forth by the FBI.

Example. Police Department X is in a medium-size city with little violent crime. The police department has no forensic lab of its own, and relies solely on the state lab for its forensic DNA analysis. The homicide division is investigating a violent rape and murder in the community with few leads. Department X's police chief decides that because of the community and political pressure to solve the case, he cannot wait through the usual 8-month turnaround time for a case sent to the state lab. When the state lab director is unable to expedite the case, the chief directs his investigators to find a private lab where they can have the sample analyzed more quickly. Within two weeks they have a DNA profile for the likely perpetrator and they request that the state lab upload it into CODIS so that it can be run against NDIS as soon as possible. The state crime lab refuses to do so.

Why won't the state lab upload the profile? Because the FBI's *Quality Assurance Standards for Forensic DNA Testing Laboratories* require the NDIS lab (here, the state lab) to take ownership for that sample in order to upload it into CODIS. This doesn't mean that the NDIS lab can simply perform a technical review of the analysis results. The NDIS lab must also ensure that the vendor lab is accredited and, in compliance with the FBI quality assurance standards, it must perform a site visit at the vendor lab (or rely on a site visit previously done by another NDIS lab). The site visit and assurance of technical specifications must occur *before* the NDIS lab accepts DNA data for upload.

How can law enforcement agencies and labs prevent such misunderstandings? The key is advance planning and communication. Any law enforcement agency that thinks it may run into such a situation should have a conversation with its primary DNA forensic service provider

(e.g., state lab, county lab, etc.) to ascertain whether the lab already has vendor agreements in place with a private lab. A formal prioritization agreement between the law enforcement agency and its primary forensic service provider can prevent further difficulties as additional cases and issues arise.

A CODIS hit – now what?

CODIS and the national database clearly are extremely useful crime-fighting tools. However, like any crime-fighting tool, CODIS is a resource that must be managed effectively by law enforcement agencies. The first step is to understand what a CODIS hit actually means. With any profile hit in one of the databases (LDIS, SDIS, or NDIS), there are a number of procedures and investigative steps that must be done.

> **Example.** Agency A extracts from a rape kit the DNA profile of the alleged perpetrator. Agency A's CODIS administrator uploads the profile into CODIS and when it is compared to profiles in the NDIS database, there is a match. Agency A's rapist matches the profile of an individual whose profile was uploaded into CODIS two years ago by Agency B. The CODIS software alerts both Agency A and Agency B to the match. At this point, the two agencies are left to communicate directly with one another and the FBI CODIS unit is generally no longer involved.
>
> Using the information obtained about the suspect through CODIS and from Agency B, Agency A may obtain a court order to obtain a DNA sample from the suspect. This is a "reference sample" to be compared against the crime scene sample in order to confirm, independent of CODIS, that there is a match.

Some chiefs and investigators have expressed frustration with the need to obtain a reference sample from the suspect after a CODIS hit. They fear that the perpetrator may be "tipped off" when the reference sample is taken, or that the wait for further testing could jeopardize the investigation. However, the FBI CODIS Unit, attorneys, and judges have stressed that the reference sample is crucial from the perspective of chain of custody and expert testimony requirements. In the end, this added step simplifies the process for the prosecution of the case.

It is at this critical point of investigative follow-up for a CODIS hit (e.g., coordinating with the other agency, obtaining a warrant or court order for a reference sample, etc.) where some agencies have experienced a breakdown in the process. Difficulty with case management during follow-up has been attributed, in part, to high turnover within investigative units and prosecutors' offices. As discussed in Chapter 1, it's possible that at this point in the investigation there is no longer an assigned detective, or the lab reports may not be routed to the correct person or unit. Months, or even years, may have passed. Unless proper procedures and safeguards are established within the department, information can easily fall through the cracks.

To combat this problem and ensure that CODIS hits receive proper attention from detectives and prosecutors, several agencies have implemented procedures to facilitate case tracking. For example, some agencies rely on regularly issued "hit reports" delivered by the lab to command staff. Either the lab director or the commander over the lab will then track the cases to ensure investigative and prosecutorial follow up.

Other agencies have approached this problem by immediately matching incoming CODIS hits with the corresponding case files, and having an efficient case assignment scheme. Some police departments distribute the cases among the various investigative divisions (e.g., homicide, sex crimes, etc.). LAPD Chief Charlie Beck suggested that agencies that receive a large volume of CODIS hits establish a group of detectives whose primary responsibility is to follow up with those cases.

VIRGINIA'S APPROACH TO DNA EVIDENCE: A PROSECUTOR'S PERSPECTIVE

By Richard A. Conway, Assistant Commonwealth's Attorney Prince William County (VA)

The "bottom line" for prosecutors in cases involving DNA evidence is the impact of its courtroom presentation. Identification through DNA often establishes compelling facts from which the jury will draw the inescapable reasonable inferences advanced by the prosecution. Coordination among police officers, laboratory analysts, and prosecutors provides the best opportunity for successful results, and the Commonwealth of Virginia has taken measures that greatly enhance the coordinated efforts of these agencies.

Nearly forty years ago, the Virginia General Assembly created a statewide laboratory system with four regional facilities to service the various law enforcement agencies throughout the Commonwealth. Currently known as the Virginia Department of Forensic Science (VDFS), our state lab is fully accredited and independent of any police department or other law enforcement agency. Virtually all DNA analysis sought by police departments in Virginia is performed by VDFS.

In order to permit maximum utilization of forensic science in the apprehension and prosecution of criminals, and recognizing the need for advanced training of police officers who collect evidence at crime scenes, the state legislature also created the Virginia Forensic Science Academy. The Academy is administered by the Training Section within VDFS, and each class is composed of ten to twelve police officers selected from jurisdictions throughout the state. The officers train for ten weeks at the central laboratory in Richmond. They learn to properly recognize, document, collect, and preserve items of physical evidence found at crime scenes and to properly submit those items for laboratory examination. Much of the daily training is provided by the very laboratory experts who analyze the evidence submitted to the lab, thereby conveying to the officers a better understanding of the

capabilities and limitations of the modern forensic laboratory. An annual retraining session is provided to all graduates in order to keep them current in the methods and procedures of the various forensic disciplines, particularly in the collection and preservation of DNA evidence.

Many of our lab experts will periodically respond to unusual or unique crime scenes, but the vast majority of crime scenes in Virginia are processed by police officers. Therefore, the close interaction between the lab experts and the officers attending the Forensic Science Academy has proven invaluable. The advances in technology among the various forensic disciplines often impact what the crime scene officers should be looking for, as well as how evidence should be recovered and preserved. The advent of "touch DNA" technology, for example, has opened new possibilities for the educated crime scene officer to identify perpetrators.

Although advanced technologies in DNA and other forensic sciences provide excellent opportunities for criminal law enforcement, our ultimate success will always depend largely upon the training and experience of dedicated police officers. For example, one successful prosecution was primarily due to the work of the crime scene officer. When the victim did not show up at work, her father went to her home and found her dead. The victim had been stabbed to death in front of her four-year old son, who was found sleeping on her body. The officer processing the crime scene opened the kitchen cabinet and found a push-bottle soap dispenser bearing a patent fingerprint made from blood. DNA testing proved that it was the victim's blood, and fingerprint analysis lead investigators to the perpetrator—an accused drug dealer out on bond. The victim was a witness against him. That kind of evidence provides the probative impact that causes jurors to nod in agreement when the prosecutor points at the accused in closing argument.

The reliability of DNA identification is so well-established (by case law and statute in Virginia), that DNA analysis for identification has often become a non-issue in prosecutions. Challenges now come with questions such as how and when did the DNA evidence get to the location where it was found. VDFS provides additional training to police officers in the field of bloodstain pattern analysis, which enables the officers to qualify as experts and provide compelling answers to vital questions that go beyond identification. Consider, for example, the officer who demonstrated how a weapon found in the hand of a murder victim was placed there after the victim had been shot. In another case, an officer showed how high-impact stains of the victim's blood found on the inseams of the defendant's pants were caused while the pants were straddling the blood source (murder victim) at the time the blows to the victim were administered. In the eyes of jurors, this kind of evidence gives meaning to the DNA identification and adds impact to its courtroom presentation.

Virginia reinforced its commitment to maximize the use of DNA technology by becoming one of the first states to establish a DNA data bank. The data bank began with felony sex offenders in 1989, and it expanded to all convicted felons in July 1990. Our statutes now authorize collection of DNA samples upon arrest, with expungement if the arrest does not result in conviction. These major legislative victories by our public safety advocates have led to a DNA data bank system so successful that open criminal cases throughout Virginia's police departments are being solved by "cold hits" almost daily.

Much of the credit for Virginia's success in promoting the use of DNA evidence in criminal cases goes to our police chiefs. The chiefs are among the advocates who helped convince our legislators to adopt our aggressive approach. They also provide daily support in policy and resources for the continued availability of advanced training for their officers in the use of DNA technology. They have provided an example worth following.

Challenges of DNA databasing in the United States

During the course of the project, chiefs often brought up the need for an expanded and improved national database. However, there is much debate over what would constitute an "improved" database. The following three challenges were identified during the project:

- **Consistency in offender sampling** – Many chiefs were concerned with the differences in the requirements throughout the country regarding the laws that require convicted offenders and, in some cases arrestees, to provide DNA samples. Also noted was the apparent lack of priority that this has received in many jurisdictions. As discussed previously, it took a serial murder case for the Wisconsin Attorney General to realize that over 12,000 offender samples had never been obtained and submitted to the state database. Some chiefs pondered whether the decision to obtain DNA samples from offenders and/or arrestees should continue to be left to state legislators or whether national standards would be more effective.

- **Access to international DNA databases** – Some international DNA searches are possible, but there is currently no seamless method of sharing forensic DNA data internationally. By going through their state CODIS administrators and eventually connecting with Interpol personnel, law enforcement agencies may be able to arrange for an international search through Interpol. The ability to conduct international DNA searches is hampered by the fact that there is variability in profiles between the countries. Not all countries track the same alleles that are used to comprise a DNA profile in the United States. International comparison is difficult, but there may be some overlap in alleles.

- **Familial DNA searches** – Familial DNA searches are a technique more frequently utilized in the United Kingdom. In this type of search, the DNA database is searched to find profiles of potential close biological relatives of the unknown offender. This is determined through a similarity in alleles in the DNA profiles—they are similar, but not a "match" for CODIS hit purposes. Using this information about potential family members is one tool that can help investigators to narrow their focus in a case with an unknown perpetrator.

A few jurisdictions in the United States have begun to allow these searches in state databases, including California and Colorado. At the opposite end of the spectrum, the state of Maryland has passed legislation that prohibits such searches. Many chiefs have urged lawmakers to allow for such searches in other states, as well as through the national database.

Conclusion

CODIS includes three tiers of DNA databases, and federal legislation mandates that the system be accessible only to public law enforcement forensic labs that meet certain criteria. A number of procedures and safeguards are in place to guide agencies following a profile "hit" in CODIS, and the requirements must be understood and addressed by both crime lab personnel and law enforcement officers.

Police executives need to familiarize themselves with the requirements and opportunities offered by the CODIS database. Chiefs should be aware of the types of profiles that are allowed to be entered into the system; any training program for officers and investigators should include this as well. As the use of CODIS increases and the number of hits returned to law enforcement grows, investigative units need to have systems in place and be prepared to handle the necessary follow up.

Chiefs and sheriffs should consider the following questions with regard to CODIS:

- **Do I understand the basics of CODIS?** Who can I rely on to answer questions regarding CODIS? Do my investigators understand CODIS?

- **How does our agency follow-up on CODIS hits?** Do we have a tracking system in place? Who is responsible for ensuring that cases receive adequate follow-up?

- **What are our agency's challenges with searching DNA databases?** Who is responsible for performing CODIS searches? If we don't have a DNA lab, who in the agency is responsible for understanding CODIS? If we use a private lab, how do results get uploaded into CODIS?

6

Recent developments in the use of DNA analysis

Two of the most significant recent developments in forensic science were discussed at length at the PERF Executive Session on DNA issues held in Washington, DC on September 23, 2009. The first was the issuance in early 2009 of a major government report that was extremely critical of the forensic science system in the United States. The report, by the National Academy of Sciences (NAS), also issued recommendations on how the field should change and improve. The second development was the ruling by the United States Supreme Court that prosecutors may not rely on crime lab reports in criminal trials unless they also make the analysts who prepared the reports available to testify.

In 2005, a Congressional mandate required the NAS to study the field of forensic science. The findings were issued in a February 2009 report entitled, *Strengthening Forensic Science in the United States: A Path Forward* (hereinafter "NAS Report").[27] The NAS Report reviewed all disciplines of forensic science and included recommendations on topics as varied as the formation of a federal oversight agency, lab accreditation, and issues with the coroner and medical examiner systems.

27. *Strengthening Forensic Science in the United States: A Path Forward*. Washington, D.C.: National Academies Press, 2009. www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf

As the law enforcement and forensic science communities sought to understand the implications of the NAS Report, the U.S. Supreme Court, in June 2009, issued its ruling in the case of *Melendez-Diaz v. Massachusetts*.[28] At issue was the Sixth Amendment's Confrontation Clause, giving criminal defendants the right to be confronted by witnesses against them. The Court held that in order to enter a crime lab report into evidence, the prosecution must also make the analyst who prepared the report available for testimony and cross-examination.

What does every police chief need to know about the NAS report recommendations?

In total, the NAS Report made thirteen recommendations for forensic science (see Appendix H). They included:

- Creation of an independent federal entity to oversee forensic science in the United States
- Removing public laboratories from the "administrative control" of law enforcement
- Mandating accreditation and certification of forensic labs and disciplines
- Standardization of protocols, terminology, and reporting within the various forensic science disciplines

The report also made a number of other wide-ranging recommendations, including the need for further research to examine the effect of human error and observer bias on forensic science.

The general consensus among the lab directors and police chiefs who participated in PERF's DNA project was that the NAS report recommendations are important not only to the forensic community, but also to law enforcement. Moving forward, the law enforcement

28. *Melendez-Diaz v. Massachusetts,* 129 S. Ct. 2527 (2009).

community needs to have a place at the table and participate with other stakeholders in discussing how to overcome the challenges facing forensic science today. Law enforcement needs to be a part of crafting potential solutions, given its instrumental role in implementing them.

Every chief, whether or not he or she is the executive officer of an agency with a lab, needs to understand the NAS Report and the critical issues facing the forensic science community. Chiefs should discuss the NAS Report with their lab directors, whether their labs are in-house or external, and inquire as to how the lab(s) are addressing the issues raised in report.

A number of the chiefs and lab directors who participated in the project cautioned against too quickly passing judgment on the impact of the NAS Report. It would be daunting to attempt to address all of the recommendations at once, and they will need to be examined incrementally and in the order of most significance to the field.

What recommendations have the greatest potential to impact the use of DNA analysis by law enforcement?

Overall, the discipline of DNA analysis fared better than other forensic sciences in the NAS Report. Much of the debate regarding the report is on how it will affect the field generally, as well as its potential impact on several key disciplines (e.g., fingerprint analysis, firearms, etc.). The report has the potential to impact how law enforcement utilizes forensic science, including DNA analysis, for investigative purposes.

Three of the NAS Report's thirteen recommendations have the greatest potential to directly impact law enforcement and particularly those agencies with in-house crime labs. There is apprehension among law enforcement executives that the recommendations could be costly to implement and that they may be used to strip the profession of its forensic crime labs.

The first recommendation is the proposal that a federal entity, the National Institute of Forensic Science (NIFS), be created to oversee forensic science in the United States (Recommendation #1). Second is the recommendation that labs have a level of independence and autonomy from law enforcement control (Recommendation #4). Finally, there is also concern regarding the impact of a recommendation of mandatory accreditation and certification for forensic labs and their personnel (Recommendation #7).

> **NAS Report Recommendation 1:** To promote the development of forensic science into a mature field of multidisciplinary research and practice, founded on the systematic collection and analysis of relevant data, Congress should establish and appropriate funds for an independent federal entity, the National Institute of Forensic Science (NIFS). NIFS should have a full-time administrator and an advisory board with expertise in research and education, the forensic science disciplines, physical and life sciences, forensic pathology, engineering, information technology, measurements and standards, testing and evaluation, law, national security, and public policy. NIFS should focus on:
>
> a. Establishing and enforcing best practices for forensic science professionals and laboratories;
>
> b. Establishing standards for the mandatory accreditation of forensic science laboratories and the mandatory certification of forensic scientists and medical examiners/forensic pathologists—and identifying the entity/entities that will develop and implement accreditation and certification;
>
> c. Promoting scholarly, competitive peer-reviewed research and technical development in the forensic science disciplines and forensic medicine;

d. Developing a strategy to improve forensic science research and educational programs, including forensic pathology;

e. Establishing a strategy, based on accurate data on the forensic science community, for the efficient allocation of available funds to give strong support to forensic methodologies and practices in addition to DNA analysis;

f. Funding state and local forensic science agencies, independent research projects, and educational programs as recommended in this report, with conditions that aim to advance the credibility and reliability of the forensic science disciplines;

g. Overseeing education standards and the accreditation of forensic science programs in colleges and universities;

h. Developing programs to improve understanding of the forensic science disciplines and their limitations within legal systems; and

i. Assessing the development and introduction of new technologies in forensic investigations, including a comparison of new technologies with former ones.[29]

The chiefs and lab directors who participated in this project had mixed reactions to this proposed federal agency. However, most agreed that it would not be created quickly, so other recommendations in the NAS Report need to be addressed first. Those who were not in favor of federal oversight argued that history has demonstrated that services are often best provided at a state and local level. They did not believe that adding another level of bureaucracy would improve the field.

29. *Strengthening Forensic Science in the United States: A Path Forward,* p. 19-20.

Others believed that federal oversight could be useful to forensic science, but only if it is "done right." Most agreed that federal funding would help to expedite the improvement of the various forensic science disciplines in the United States. However, they warned that regulation and oversight at the federal level must be considered with an abundance of caution and that it could be a hindrance, depending on the purpose and design of the oversight. For example, while some said that specific forensic analysis techniques should not be regulated, others encouraged national standards for evidence collection procedures and analysis protocols.

> **NAS Report Recommendation 4:** To improve the scientific basis of forensic science examinations and to maximize independence from or autonomy within the law enforcement community, Congress should authorize and appropriate incentive funds to the National Institute of Forensic Science (NIFS) for allocation to state and local jurisdictions for the purpose of removing all public forensic laboratories and facilities from the administrative control of law enforcement agencies or prosecutors' offices.[30]

This recommendation has been interpreted in several different ways. The simplest, but probably the most limiting, interpretation is that forensic labs should be removed from the control of law enforcement altogether. However, such a reading misses the "autonomy from within" section of the text. According to Peter Marone, Director of the Virginia Department of Forensic Science and a member of the committee that authored the NAS Report, this recommendation would allow for forensic labs to remain under the auspices of law enforcement agencies, while maintaining a sense of autonomy through independent budgeting and decision-making. Based on the ISO/IEC 17025:2005 principles, this should be done anyway, as compliance prohibits scientific decision-making based upon non-scientific priorities. However, even though Marone's reading of

30. *Strengthening Forensic Science in the United States: A Path Forward,* p. 24.

Recommendation #4 is that it might not require removal of forensic labs from police agencies, he said that specific policies and procedures must be in place to very clearly define the relationship.

A number of concerns were raised with regard to this recommendation. Arguments for keeping labs within the control of law enforcement addressed questions of perceived objectivity, ownership and public trust, and other more practical implications such as cost and coordination.

First, some chiefs and lab directors expressed anxiety about the perception that if a forensic lab is tied to a law enforcement agency, it is inherently tainted and prejudicial in favor of the police. Gary Pugh, Director of Forensic Services for the Metropolitan Police Service (U.K.) said that organizational independence alone does not necessarily equate to inherent objectivity. In fact, a number of the participants in this project argued that forensic science won't work without contact and coordination between the police and scientists. Some police executives and lab administrators said that it is through this affiliation with law enforcement that scientists can better understand crime trends and investigative procedures, leading to a more effective evidence collection and analysis process. Critics of Recommendation #4 argue that the professionalism and accreditation requirements of scientists help them to maintain their objectivity throughout the process.

A number of practical implications of this recommendation were also raised, mostly surrounding monetary costs. To completely revamp the forensic laboratory system in the United States and remove all labs from the control of law enforcement would be costly and would take many years to implement. It is not as simple as merely relocating labs, many of which are physically housed in police buildings. New lab facilities and evidence storage would have to be funded and built. Lab computer systems, many of which are currently integrated within the law enforcement agency, would need to be reconfigured. Additionally, CODIS access requirements must be reconsidered if privately owned labs were to become commonplace for forensic DNA analysis.

As was noted previously, most law enforcement agencies in the United States do not have their own in-house DNA labs. The majority of agencies send their DNA evidence to crime labs that are run by other local, state, or federal law enforcement agencies. The use of private labs in the United States has primarily been coordinated through those agencies, and there are many examples of the successful implementation of programs using private vendors.

An independent system of forensic labs has been considered successful in the United Kingdom, where commercial labs are used and are able to produce analysis results in a timely manner. However, Mr. Pugh is quick to point out that this requires good communication between the scientists and law enforcement (i.e., through a "clearinghouse" in the law enforcement agency). Mr. Pugh said that it requires effective contract management with the commercial suppliers. When private labs remain responsive to law enforcement needs and maintain a working dialog with police agencies, they can work.

In Allegheny County, Pennsylvania, the crime lab is under the control of the Medical Examiner's Office. Police Superintendent Charlie Moffatt considers this an effective model, illustrative of how a lab can be both independent and responsive to the needs of law enforcement. In fact, Superintendent Moffatt was adamant that he would not want to have supervisory responsibility for the lab. His department works with the Medical Examiner and lab director to ensure that the lab is responsive to the needs of the police, but he is freed from having to worry about the budgeting, accreditation, and other administrative aspects of the lab.

The state of Virginia is another good example of an independent lab system. The Virginia Department of Forensic Science, led by Director Peter Marone, has four crime labs to serve law enforcement agencies throughout the state. The agency has its own budget, and its director reports directly to the Secretary of Public Safety, who reports to the Governor. By having one agency overseeing the four labs in the state,

there is uniformity in the work and reporting done by the analysts. This arrangement is also beneficial to local law enforcement agencies and prosecutors, who have developed good working relationships with the labs. As noted previously, the consistency in evidence collection techniques proved to be extremely valuable when working the difficult crime scene after the Virginia Tech massacre.

CRIME LABORATORIES AFTER THE NAS REPORT

By Dr. Karl E. Williams, Medical Examiner
Office of the Medical Examiner of Allegheny County (PA)

In February 2009, the National Academy of Sciences (NAS) issued a report entitled "Strengthening Forensic Sciences in the United States: A Path Forward." This report was commissioned by Congress in 2005 and followed extensive hearings and reviews of current forensic practice. It follows more than a decade of increasing criticism and concern within the forensic community. The report will not result in immediate, radical changes in day-to-day practice, but is certain to dominate policy making and particularly impact on the practice in crime labs well into the future.

One year later, at the annual meeting of the American Academy of Forensic Sciences (AAFS), this report was the subject of two sometimes-heated full-day symposia and numerous small group meetings, in addition to being the topic of general discussion throughout the weeklong event. None of the concepts or debates in the report is new. Issues of the validation and inherent bias

in the forensic disciplines, the lack of basic resources for the forensic community, and the need for increased oversight have been discussed for years. The report does, however, focus direct attention on the problems. It signals a significant paradigm shift to which all stakeholders in the forensic community need to pay careful attention.

The fourth specific recommendation in the NAS report was that "to maximize independence from or autonomy within the law enforcement community," funds should be authorized to "remov(e) all public forensic laboratories and facilities from the administrative control of law enforcement agencies or prosecutors' offices." This will also not occur anytime soon.

The NAS recommendation that crime laboratories remain completely autonomous arises, at least in part, from a string of high-profile problems in laboratories in both federal and local jurisdictions. The individual cases range from outright fraud and fabrication of lab reports to procedural irregularities. They have resulted in numerous instances of wrongful conviction, causing both negative press coverage and occasional but increasing significant damage payments. The affected facilities are predominantly under the law enforcement control and vary from state labs to the FBI. Remedies have varied from individual termination to closure of labs.

Crime laboratories have been forced to respond to these events by carefully examining internal policies and procedures and strengthening quality assurance programs. These efforts have spurred an increased accreditation of labs through the American Society of Crime Lab Directors/Laboratory Accreditation Board (ASCLD/LAB) and preparation for even more stringent standards of the International Organization of Standardization (ISO). This trend is certain to continue.

Discussions at the AAFS meeting of remedies to the situation have included expressions of some positions that I consider extreme. Representatives of the criminal defense bar, for example, have espoused solutions that include:

1. Cessation of all laboratory work until validation of various forensic sciences is completed;
2. Complete "transparency" of laboratory work, including defense access to all testing work product, including personal notes and data; and
3. Disciplinary action for failure to pass mandated proficiency testing.

The approach of the established governmental agencies is, needless to say, considerably more cautious. While agreeing that there is a need for significant changes in the system and for more laboratory autonomy, they see no immediate need to remove crime labs from their current positions within law enforcement entities.

One proffered alternative to radical institutional and regulatory changes is to create a "culture of science" that would permeate the forensic disciplines. The technical staff in crime labs is comprised of scientists, and they should be expected to be sympathetic to a more rigorous, thoroughly validated and compulsively documented approach to casework. ASCLD/LAB would have a prominent role in these efforts. ASCLD/LAB currently certifies almost 95 percent of publicly funded labs, including my own, and has a full set of policies and procedures that regulate every aspect of laboratory practices, including quality assurance. It could form the backbone of institutional improvement of the labs it certifies.

On the other hand, the number of independent forensic laboratories—and their degree of certification—are unknown. In the Commonwealth of Pennsylvania there is no requirement for licensing, let alone certification, of forensic labs. Small, specialty forensic crime units in such disciplines as fingerprint, toxicology and even serology/DNA are widely distributed throughout police departments and the private sector and remain in some case completely unregulated, unlicensed, and uncertified by ASCLD/LAB. These units will inevitably fall under intense scrutiny in the immediate future.

The Crime Laboratories of the Office of the Allegheny County Medical Examiner are among a small number of completely autonomous, full service crime labs in the country. One of the arguments not advanced at the AAFS symposia was that forensic pathologists, as medical examiners, are the logical choice to head such labs. Although not qualified in the individual forensic disciplines, pathologists certified in clinical pathology are trained in the key aspects of laboratory management and quality assurance. This provides them with a broad overview of the necessary administrative and managerial skills that will be required to advance the forensic sciences.

It would be comforting to think that guaranteeing the independence of crime labs, such as in the situation of Allegheny County, would also successfully address the important issue of bias that is of fundamental concern in resolving the current crisis that the forensic community faces. Unfortunately, this is wishful thinking. Bias is an intrinsic feature of human nature. Any practitioner of forensic science realizes that, whether administratively independent of law enforcement or not, they almost invariably tend to be allied physically and emotionally with law enforcement. Defense entities tend to be viewed skeptically. This is despite the fact that the individual scientists are competent as well as rigorous in their laboratory work and analyses. Addressing the issue of bias in all laboratory settings will inevitably require both structural and educational efforts.

In summary, the entire law enforcement community is facing a period of increased stress and scrutiny that extends to its crime laboratories. In retrospect, we have been aware of many of the current problems for a significant period of time. Many argue that we have chosen to ignore these issues, rather than being proactive. These mounting pressures have now been pushed to the forefront by the NAS report. Failing to deal with them is no longer an option.

> **NAS Report Recommendation 7:** Laboratory accreditation and individual certification of forensic science professionals should be mandatory, and all forensic science professionals should have access to a certification process. In determining appropriate standards for accreditation and certification, the National Institute of Forensic Science (NIFS) should take into account established and recognized international standards, such as those published by the International Organization for Standardization (ISO). No person (public or private) should be allowed to practice in a forensic science discipline or testify as a forensic science professional without certification. Certification requirements should include, at a minimum, written examinations, supervised practice, proficiency testing, continuing education, recertification procedures, adherence to a code of ethics, and effective disciplinary procedures. All laboratories and facilities (public or private) should be accredited, and all forensic science professionals should be certified, when eligible, within a time period established by NIFS.[31]

The recommendation of mandatory accreditation has generally been met with acceptance from chiefs and lab directors. In fact, any crime lab with CODIS access already has to hold a national certification (e.g., ASCLD/LAB or FQS-I) and comply with strict FBI requirements. Additionally, over a dozen state legislatures have passed laws requiring that all crime labs in their states hold a specific accreditation status. For example, Maryland recently passed a law requiring oversight of all state forensic labs, and they eventually must all meet the ASCLD/LAB accreditation standards.

31. *Strengthening Forensic Science in the United States: A Path Forward*, p. 25.

In fact, many lab directors and chiefs noted that accreditation requirements actually help lab staff who are feeling pressure from sworn officers or command staff who don't fully understand the science or databasing procedures. Several analysts and lab directors noted specific incidents where they were approached by sworn officers, or sometimes even the chief, who demanded that a profile be uploaded into CODIS even though the CODIS administrator knows that it doesn't fully meet the requirements for a NDIS search. It is helpful for that CODIS administrator or the lab director to have the CODIS requirements and accreditation standards backing them up when they explain to the chief why they cannot do something that may seem innocuous to a non-scientist.

With regard to personnel certification, requirements vary greatly among the various forensic disciplines, and also between law enforcement agencies and labs. Professional certifications for criminalists are generally not mandatory within law enforcement agencies. In fact, many agencies do not offer additional incentives for personnel who are certified. Many criminalists view certification as a difficult and time-consuming process in which there are no universal standards between agencies, and for which they will likely not receive any advancement or monetary incentive in the agency where they are currently employed. The labs with high percentages of certified criminalists typically report that it is due to the scientists' intrinsic desire for professional development and a lab culture where that is encouraged through ways other than agency incentives.

Several lab directors pointed out that mandatory certification, combined with adequate support from the forensic and law enforcement communities, could help to enhance professionalism in crime labs by instituting standard practices and an enforceable code of ethics. This could have the same effect on "forensic service providers" such as crime scene investigators and evidence collectors. There is a huge range in both the amount and quality of training held by many of these professionals, and generally little standardization when it comes

to collection techniques, documentation, chain of custody practices, etc. When there is standardization, it is usually within a state or region, such as in Virginia, where forensic service providers attend the same training and certification programs. Mandatory national certification could provide beneficial standards.

Potential ramifications of the Melendez-Diaz case

On June 15, 2009, the United States Supreme Court issued a 5-4 decision in the case of *Melendez-Diaz v. Massachusetts*.[32] The Court held that prosecutors may not rely solely on crime lab reports in criminal trials. At issue was the Sixth Amendment's Confrontation Clause, which gives criminal defendants the right to be confronted by witnesses against them. The decision requires that if a lab report is entered into evidence, the prosecution must also make the lab analyst available for cross-examination.

The issue was briefly revisited by the Court in *Briscoe v. Virginia,* which was argued before the court on January 11, 2010. The Court ultimately dismissed that matter, remanding it to the state for proceedings "not inconsistent with the opinion in *Melendez-Diaz v. Massachusetts*."[33]

The initial fear after the *Melendez-Diaz* decision was that the use of forensic science in investigations and prosecutions would grind to a standstill. Some worried that analysts would be required to spend more and more time in court, thus contributing to an even greater number of backlogged cases in crime labs. Lab directors, law enforcement administrators, and prosecutors feared that this requirement would also increase the backlog because of the need to retest samples that were to be used at trial in the event that the original analyst was no longer

32. *Commonwealth v. Melendez-Diaz,* 129 S. Ct. 2527 (2009).
33. *Briscoe v. Virginia,* 558 U.S. ___ (2010).

available for testimony. Others worried that former crime lab analysts (i.e., those who had recently left departments, but still had cases pending in court) or private labs would jump at the chance to profit by increasing testimony fees. There has been some confusion over who will be required to testify in the case of multiple analysts working on one sample, as is frequently the case in DNA evidence screening, extracting, and analysis.

Many agencies have been forced to take a "wait and see" approach with regard to how the decision will directly affect them, if at all. In Arizona, for example, because of certain state requirements already in place, crime lab supervisors in Mesa and Phoenix did not anticipate any significant changes to their analysts' court appearances. A number of agencies reported that they have seen the issue come up in cases in which blood alcohol levels are used as evidence. This isn't surprising, considering the high volume of such matters in judicial systems throughout the country. However, few agencies have reported widespread and systemic problems as a direct result of the *Melendez-Diaz* ruling.

Some law enforcement agencies have tried to anticipate future challenges and look for potential remedies. For example, Greg Matheson, the LAPD Criminalistics Lab Director, reported that within a week of the *Melendez-Diaz* decision, the local prosecutor put the lab on notice that all cases would need to be retested if the analyst who completed the original work was no longer working at the lab. This has not been as widespread an issue as was originally anticipated, but the LAPD crime lab was forced to retest evidence in some cases. The Allegheny County Medical Examiner's crime lab is another agency that has had to retest

samples when the analyst is no longer available for testimony. Such a policy has the potential to be extremely problematic when applied to DNA evidence, particularly if the original sample was consumed during analysis. It is also a huge problem for other types of analysis, particularly firearms and tool marks, which in many labs already have extremely large backlogs and a shortage of examiners.

Several other agencies have begun to look into the possibility of video testimony that would allow lab analysts to testify from specially-wired rooms in the lab, thus saving hours of travel and time sitting in the courthouse while waiting to testify. This has been done with some success by the Michigan State Police, which implemented a statewide video conferencing system that allows for forensic analysts to testify in court remotely.[34] The program was the first of its kind and improved efficiency in both the lab and courts by allowing scientists to testify without leaving the laboratory.

Conclusion

Law enforcement will be better served if chiefs and sheriffs stay abreast of changes within the field. They should coordinate with their lab directors (inside or outside of the agency) and remain aware of the challenges and opportunities that may emerge from national recommendations, such as the NAS Report, or from new state and federal case law.

It is imperative that law enforcement be present at the table as the forensic science community considers how to move forward with the NAS Report recommendations. The forensic science community is at a turning point, and law enforcement leaders need to be able to anticipate where the field is headed and prepare the profession and their individual agencies.

34. *State Police Receives Innovation Award,* Michigan State Police, December 9, 2008. www.michigan.gov/msp/0,1607,7-123--204770--,00.html

Questions that chiefs should ask themselves regarding the NAS report and recent developments include:

- **Have I read the NAS report?** Has my lab director reviewed the report and provided me with an assessment of how we compare?

- **What are the potential effects of the NAS report recommendations on my agency?** Which recommendations are of greatest concern to my agency? Who should be part of the team to address these recommendations? Which recommendation(s) should we address first?

- **What are the potential effects of the *Melendez-Diaz* decision on my agency?** Have I talked to the local prosecutor about this case or others that may affect forensic testimony in our jurisdiction? What, if any, steps can I take to mitigate the impact of this decision?

7

The chief's checklist

The goal of this publication is to provide chiefs and sheriffs with guidance as they assess their departments' forensic DNA needs and adopt forward-looking policies. Agency leaders must be aware of the various challenges and opportunities with managing DNA evidence throughout the entire investigative process—from collection to exoneration or conviction.

Below is a synopsis of the questions posed at the end of each section of this publication. This checklist is designed to be a guide for chiefs as they further consider the use of forensic DNA evidence in their own agencies and jurisdictions.

Chapter 1 - Leadership and case management in a law enforcement crime lab

- What do I really know about the DNA lab used by my agency?
- Who manages the lab on a daily basis?
- How do we monitor and maintain our lab's accreditation status?
- How are cases prioritized?
- How well does the lab communicate with stakeholders, and vice versa?

Chapter 2 - Starting at the beginning: DNA evidence collection

- Under what circumstances do we have to collect DNA evidence or samples?
- Is it practical to collect DNA evidence in all situations?
- Who should collect DNA evidence in our agency?
- What training should we provide?
- How can I promote effective communication in this process?

Chapter 3 - Backlogs, evidence storage, and other challenges in managing a law enforcement crime lab

- What do I really know about our DNA backlog?
- Is our facility adequate in size and function?
- What are the challenges in staffing our lab?
- How well do we acquire new technologies?

Chapter 4 - Be an effective consumer of forensic services: Optimizing your agency's relationship with public and private labs

- What are the capabilities of the DNA labs used by my agency?
- What are the costs for outsourcing?
- Does the lab hold a national accreditation?
- What quality control standards are in place at the lab?
- What is the average turnaround time for a case?
- Does the lab have direct CODIS access?
- What impact will outsourcing have on our in-house lab?
- How is analyst testimony handled?

Chapter 5 - Post-analysis and DNA profile databases

- Do I understand the basics of CODIS?
- How does our agency follow-up on CODIS hits?
- What are our agency's challenges with searching DNA databases?

Chapter 6 - Recent developments in the use of DNA analysis

- Have I read the NAS report?
- Has my lab director reviewed the report and provided me with an assessment of how we compare?
- What are the potential effects of the NAS report recommendations on my agency?
- What are the potential effects of the *Melendez-Diaz* decision on my agency?

Conclusion

These issues have tremendous implications for the future of law enforcement and investigations in the United States. The challenges of keeping up with the rapidly-changing field of DNA analysis can be daunting, particularly in tough economic times. However, the need to understand the many opportunities to use DNA in investigations is critical as law enforcement assesses how it can better identify suspects, exonerate the innocent, and solve crimes.

As we look to the future, chiefs and sheriffs need to constantly assess their responsibilities regarding DNA use in their agencies. Chiefs and sheriffs need to make a concerted effort to keep current with technology and the law, and they need to consistently evaluate the effectiveness of their DNA program. We have only begun to scratch the surface on DNA.

About the Authors

Molly E. Griswold joined PERF in May 2009 as a Research Associate and focuses on law enforcement and homeland security research, analysis, and technical assistance. She currently manages a project on the development of future law enforcement leaders and plays a key role in a project on port security.

Prior to joining PERF, Ms. Griswold worked in several New York City government agencies, including a position as investigator for the Civilian Complaint Review Board, where she was responsible for investigations into alleged misconduct by New York City Police Department officers. She also worked as an investigator for a boutique firm specializing in corporate intelligence and life insurance fraud investigations.

Ms. Griswold received a Master of Science in Justice, Law and Society from American University and a Juris Doctor from Fordham University School of Law.

Gerard R. Murphy serves as PERF's Director of Homeland Security and Development and oversees all PERF homeland security-related projects. In this capacity he manages a variety of research, management, and technical assistance projects focusing on law enforcement and homeland security. In addition, he oversees the development of ideas for new projects for PERF.

In his 15 years at PERF, Mr. Murphy has directed a variety of research and technical assistance projects and has written or co-written numerous PERF publications. Two of his most recent publications include *Promoting Effective Homicide Investigations,* a joint publication with the COPS office, and *Managing a Multijurisdictional Case: Identifying the Lessons Learned from the Sniper Investigation.* Mr. Murphy also spent 12 years with the Baltimore County Police Department, holding the positions of Assistant to the Chief and Director of Planning and Research.

Mr. Murphy holds a master's degree in policy sciences, has completed extensive work towards his doctorate in policy sciences, and is a graduate of the Federal Executive Institute.

About the COPS Office

The Office of Community Oriented Policing Services (COPS Office) is the component of the U.S. Department of Justice responsible for advancing the practice of community policing by the nation's state, local, territory, and tribal law enforcement agencies through information and grant resources.

Community policing is a philosophy that promotes organizational strategies which support the systematic use of partnerships and problem-solving techniques, to proactively address the immediate conditions that give rise to public safety issues such as crime, social disorder, and fear of crime.

Rather than simply responding to crimes once they have been committed, community policing concentrates on preventing crime and eliminating the atmosphere of fear it creates. Earning the trust of the community and making those individuals stakeholders in their own safety enables law enforcement to better understand and address both the needs of the community and the factors that contribute to crime.

The COPS Office awards grants to state, local, territory, and tribal law enforcement agencies to hire and train community policing professionals, acquire and deploy cutting-edge crimefighting technologies, and develop and test innovative policing strategies. COPS Office funding also provides training and technical assistance to community members, local government leaders, and all levels of law enforcement. The COPS Office has produced and compiled a broad range of information resources that can help law enforcement better address specific crime and operational issues, and help community leaders better understand how to work cooperatively with their law enforcement agency to reduce crime.

- Since 1994, the COPS Office has invested more than $15 billion to add community policing officers to the nation's streets, enhance crime-fighting technology, support crime prevention initiatives, and provide training and technical assistance to help advance community policing.
- By the end of FY 2009, the COPS Office had funded approximately 121,000 additional officers to more than 13,600 of the nation's 18,000 law enforcement agencies across the country in small and large jurisdictions alike.
- Nearly 500,000 law enforcement personnel, community members, and government leaders have been trained through COPS Office-funded training organizations.
- As of 2009, the COPS Office has distributed more than two million topic-specific publications, training curricula, white papers, and resource CDs. Additional information regarding the COPS Office can be found at www.cops.usdoj.gov.

About the Police Executive Research Forum

The Police Executive Research Forum (PERF) is a professional organization of progressive chief executives of city, county, and state law enforcement agencies who collectively serve more than 50 percent of the U.S. population. In addition, PERF has established formal relationships with international police executives and law enforcement organizations from around the globe. Membership includes police chiefs, superintendents, sheriffs, state police directors, university police chiefs, public safety directors, and other law enforcement professionals.

Established in 1976 as a nonprofit organization, PERF is unique in its commitment to the application of research in policing and the importance of higher education for police executives. PERF has developed and published some of the leading literature in the law enforcement field. A series of reports in the "Critical Issues in Policing" series—*A Gathering Storm—Violent Crime in America; 24 Months of Alarming Trends;* and *Violent Crime in America: A Tale of Two Cities*—provides in-depth analysis of the extent and nature of violent crime and countermeasures that have been undertaken by police. PERF also explored police management issues in *"Good to Great" Policing: Application of Business Management Principles in the Public Sector*. And PERF produced a landmark study of the controversial immigration issue in *Police Chiefs and Sheriffs Speak Out on Local Immigration Enforcement.* PERF also released *Exploring the Challenges of Police Use of Force* and *Police Management of Mass Demonstrations: Identifying Issues and Successful Approaches,* which serve as practical guides to help police leaders make more informed decisions. Other publications include *Managing a Multijurisdictional Case: Identifying Lessons Learned from the Sniper Investigation* (2004) and *Community Policing: The Past, Present and Future* (2004). Other PERF titles include the only authoritative work on racial profiling, *Racial Profiling: A Principled Response* (2001); *Recognizing Value in Policing* (2002); *The Police*

Response to Mental Illness (2002); *Citizen Review Resource Manual* (1995); *Managing Innovation in Policing* (1995); *Crime Analysis Through Computer Mapping* (1995); *And Justice For All: Understanding and Controlling Police Use of Deadly Force* (1995); *Why Police Organizations Change: A Study of Community-Oriented Policing* (1996); and *Police Antidrug Tactics: New Approaches and Applications* (1996).

To learn more about PERF, visit www.policeforum.org.

Appendixes

Appendix A: PERF DNA Survey and Results

PERF DNA Survey

With support from the U.S. Justice Department's Office of Community Oriented Policing Services (COPS), PERF is conducting a survey of our members about managing the collection, analysis, and use of DNA evidence in investigations. This survey will be used to identify agencies' current capabilities with regard to DNA evidence in investigations. It will explore many of the key issues in managing agency crime labs and utilizing external public or private labs and identify innovative methods used by law enforcement executives to address many of these challenges. The survey is relatively short and should be easily completed by any person with a good knowledge of how your agency uses DNA in criminal investigations. This person could be you or someone from your forensic services or investigations divisions.

Your participation is vital to our goal of achieving as close to a 100 percent response rate as possible. Although your participation is voluntary, our receipt of your completed survey is critical to the achievement of our goal.

There are three ways to respond to this survey:

1. **Internet: An electronic version of this questionnaire is located on the Internet at http://survey.policeforum.org/dna.pdf. If you choose to complete the survey via the Internet, you will be prompted to enter the following information:**

   USER NAME: dna

   PASSWORD: onlinesurvey

Without entering your agency's user name, password, and ID number (located in the box at the top right of this form), you will not be able to complete the survey online. The user name and password provide a secure location to submit your survey.

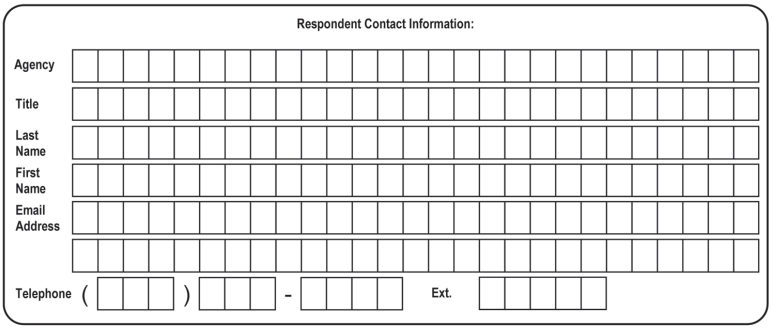
2. **Fax the completed survey to the Police Executive Research Forum at 202. 466.7826.**

3. **Mail the completed survey using the enclosed self-addressed envelope to:**

   Molly Griswold
   Police Executive Research Forum
   1120 Connecticut Avenue, NW, Suite 930
   Washington, DC 20036

If you have any questions regarding this project, please feel free to contact Molly Griswold at (202) 454-8344 or mgriswold@policeforum.org.

Thank you for your time and assistance.



1. **Does your agency have in-house DNA analysis capabilities?**

   ☐Yes ☐No

If NO, are you planning to develop in-house DNA analysis capabilities in the next three years?

   ☐Yes ☐No

2. **Does your agency collect DNA samples from offenders? Please mark all that apply.**

   ☐ Yes - for all arrests
   ☐ Yes - for all felony arrests
   ☐ Yes - for certain misdemeanor and/or felony arrests
   ☐ Yes - for all convictions
   ☐ Yes - for all felony convictions
   ☐ Yes - for certain misdemeanor and/or felony convictions
   ☐ No

3. **Does your agency collect DNA evidence for potential analysis in criminal cases?**
   - ☐ Yes - all crimes
   - ☐ Yes - certain crimes
   - ☐ No
4. **How do you determine when your agency will collect DNA evidence for potential analysis? Please mark all that apply.**
   - ☐ Agency policy (written)
   - ☐ Agency policy (informal)
   - ☐ Request or guidance from prosecutor
   - ☐ Investigator discretion
   - ☐ Don't know
   - ☐ Other (please explain):_____
5. **What are the most challenging aspects of collecting evidence for DNA analysis? Please mark all that apply.**
   - ☐ Difficulties in identifying possible biological evidence
   - ☐ Evidence collection techniques
   - ☐ Evidence contamination
   - ☐ Evidence packaging
   - ☐ Problems with the availability of proper collection kits/tools
   - ☐ Insufficient storage space for DNA evidence
   - ☐ Need for better training for officers and investigators on DNA evidence collection techniques
   - ☐ Need for better training for officers and investigators on evidence submission and DNA analysis process
   - ☐ Don't know
   - ☐ Other (please explain):_____
6. **What obstacles does your agency face in managing cases with DNA evidence? Please mark all that apply.**
   - ☐ Conflicting philosophies within the agency regarding prioritization of cases
   - ☐ Conflicting philosophies between the agency and outside lab(s) regarding prioritization of cases
   - ☐ Differing views within the agency on the usefulness of DNA evidence

- ☐ Too many evidence samples collected for cases
- ☐ Inappropriate communication between forensic analysts and investigators
- ☐ Not enough communication between forensic analysts and investigators
- ☐ Lack of follow up by investigators after DNA results are received
- ☐ Failure to withdraw DNA analysis request when case is resolved prior to analysis
- ☐ Lack of interoperability between agency and forensic lab computer systems
- ☐ Don't know
- ☐ Other (please explain):

7. For the purposes of measuring DNA analysis workload and backlog, what unit of measurement does your agency utilize?

- ☐ Number of samples
- ☐ Number of cases
- ☐ Don't know
- ☐ Other (please explain):_____

8. If your agency has a backlog of its evidence for DNA analysis, how large is it currently?

- ☐ Under 500
- ☐ 500 to 1,000
- ☐ Over 1,000
- ☐ We have a backlog, but I am unsure of the size
- ☐ I don't know if we have a backlog or not (SKIP to Question 11)
- ☐ We do not have a backlog (SKIP to Question 11)

9. Is your backlog increasing, decreasing, or about the same as compared to three years ago?

- ☐ Increasing
- ☐ Decreasing
- ☐ About the same
- ☐ Don't know

10. What has contributed to your agency's backlog? Please mark all that apply.

- ☐ Increased collection of DNA for criminal investigations
- ☐ Increased collection of DNA from offenders
- ☐ Increased collection of DNA for cold case review
- ☐ Insufficient personnel to conduct analysis
- ☐ Insufficient or unavailable equipment for analysis
- ☐ Insufficient funds for overtime
- ☐ Insufficient grant funding from outside state and federal agencies
- ☐ Backlog at outside lab(s) used by agency
- ☐ Don't know
- ☐ Other (please explain):_____

11. Who performs DNA analysis for your agency? Please mark one response per lab type.

	All samples	> 50% of samples	< 50% of samples	No samples	Don't know
Our agency's own lab	☐	☐	☐	☐	☐
Local Lab	☐	☐	☐	☐	☐
State Lab	☐	☐	☐	☐	☐
Federal lab	☐	☐	☐	☐	☐
Private Lab	☐	☐	☐	☐	☐
Other lab (please explain):	☐	☐	☐	☐	☐

12. What are the biggest challenges for your own forensic lab regarding DNA analysis? Please mark all that apply.

- ☐ Budgeting for reagents, materials, and equipment
- ☐ Validation of equipment
- ☐ Inadequate lab space for analysis
- ☐ Evidence storage
- ☐ Training lab personnel

- ☐ Employing personnel for screening and analysis
- ☐ Employing personnel for technical review
- ☐ Incompatibility of internal databases (e.g., LIMS, other internal agency systems)
- ☐ Access to external databases (e.g., CODIS)
- ☐ Don't know
- ☐ Other (please explain): _____
- ☐ N/A

13. What are the challenges to using outside PUBLIC labs for DNA analysis? Please mark all that apply.

- ☐ Longer turn around times
- ☐ Cost too great
- ☐ Inability to identify and analyze low level DNA samples
- ☐ Our agency has no input into the prioritization of work
- ☐ Poor quality of laboratory work
- ☐ Inconsistent reporting of results
- ☐ Problems with obtaining expert witness testimony
- ☐ Inability of lab to upload to CODIS
- ☐ Don't know
- ☐ Other (please explain):

14. What are the challenges to using outside PRIVATE labs for DNA analysis? Please mark all that apply.

- ☐ Longer turn around times
- ☐ Cost too great
- ☐ Inability to identify and analyze low level DNA samples
- ☐ Our agency has no input into the prioritization of work
- ☐ Poor quality of laboratory work
- ☐ Inconsistent reporting of results
- ☐ Problems with obtaining expert witness testimony
- ☐ Inability of lab to upload to CODIS
- ☐ Don't know
- ☐ Other (please explain): _____

15. In what areas would additional guidance with regard to forensic DNA be helpful? Please mark all that apply.

- ☐ Types of lab accreditations and their benefits
- ☐ Types of forensic analyst certifications and their benefits
- ☐ Understanding the CODIS system
- ☐ Quality control measures
- ☐ Prioritization methods for DNA cases
- ☐ Training of lab personnel
- ☐ Training of officers and investigators on the use of DNA analysis in cases
- ☐ Using DNA analysis for property crimes
- ☐ Enhancing coordination between investigators and forensic analysts
- ☐ Don't know
- ☐ Other (please explain): _____

16. The recently published National Academy of Sciences (NAS) report, *Strengthening Forensic Science in the United States: A Path Forward* (www.nap.edu/catalog/12589.html), has recommended that forensic labs have autonomy or independence from administrative control by law enforcement.

a. How do you feel about this recommendation?

- ☐ Strongly agree
- ☐ Agree
- ☐ No opinion
- ☐ Disagree
- ☐ Strongly disagree

b. What do you think would be the challenges to having independent forensic laboratories? Please mark all that apply.

- ☐ Long waits for analysis results
- ☐ No standardization in testing procedures
- ☐ Inability of police agency to prioritize its cases for analysis
- ☐ Increased cost
- ☐ Poor quality of laboratory work

- ☐ Lack of uniform results reporting
- ☐ Increased expenses for laboratory expert witnesses
- ☐ Other (please explain):_____
- ☐ I do not perceive any challenges

17. Has your agency (or any other agency that you are aware of) recently overcome great obstacles or implemented innovativeprograms in its use of DNA as an investigative tool? Please briefly explain and identify the agencies, if applicable. _____

_____

_____

_____

18. What can PERF do to help police agencies to better understand DNA evidence or undertake the recommendations in the NAS report? Please briefly explain. _____

_____

_____

_____

If you have any questions about this survey or the project, please contact Molly Griswold of PERF at 202-454-8344 or mgriswold@policeforum.org. Thank you for assisting us with this survey.

PERF DNA Survey Results

The PERF DNA survey was distributed to PERF member agencies in August 2009. The survey was completed by 216 agencies, 31 of which had in-house forensic crime labs with DNA capabilities.

1. **Does your agency have in-house DNA analysis capabilities?**

Yes	31 (14%)
No	185 (86%)

   If you answered "No" to the above question, are you planning to develop in-house DNA analysis capabilities in the next three years?

Yes	14 (8%)
No	160 (87%)

2. **Does your agency collect DNA samples from offenders?**

   Yes…

For all arrests	2 (1%)
For all convictions	1 (1%)
For all felony convictions	11 (5%)
For all felony arrests	24 (11%)
For certain misdemeanor and/or felony convictions	39 (18%)
For certain misdemeanor and/or felony arrests	106 (49%)
No	54 (25%)

3. **Does your agency collect DNA evidence for potential analysis in criminal cases?**

   Yes…

For all criminal cases	43 (20%)
For certain criminal cases	171 (79%)
No	2 (1%)

4. **How do you determine when your agency will collect DNA evidence for potential analysis? Please mark all that apply.**

Agency policy (written)	69 (32%)
Agency policy (informal)	65 (30%)
Request or guidance from prosecutor	94 (44%)
Investigator discretion	183 (85%)

5. **What are the most challenging aspects of collecting evidence for DNA analysis? Please mark all that apply.**

Difficulties in identifying possible biological evidence	49 (23%)
Evidence collection techniques	30 (14%)
Evidence contamination	59 (27%)
Evidence packaging	15 (7%)
Problems with the availability of proper collection kits/tools	16 (7%)
Insufficient storage space for DNA evidence	49 (23%)
Need for better training for officers and investigators on DNAevidence collection techniques	90 (42%)
Need for better training for officers and investigators on evidence submission and the DNA analysis process	75 (35%)
Don't know	6 (3%)
Other	57 (26%)

6. **Who performs DNA analysis for your agency? Please mark all that apply.**

	All samples	> 50% of samples	< 50% of samples	No samples	Don't know
Our agency's own lab	20 (9%)	9 (4%)	0	184 (85%)	0
Local Lab	44 (20%)	15 (7%)	8 (4%)	147 (68%)	1 (1%)
State Lab	83 (38%)	35 (16%)	18 (8%)	75 (35%)	1 (1%)
Federal lab	1 (1%)	2 (1%)	10 (5%)	199 (92%)	1 (1%)
Private Lab	2 (1%)	8 (4%)	50 (23%)	151 (70%)	2 (1%)
Other lab (please explain):	0	0	7 (3%)	202 (94%)	0

7. What obstacles does your agency face in managing cases with DNA evidence? Please mark all that apply.

Conflicting philosophies within agency regarding prioritization of cases	20 (9%)
Conflicting philosophies between agency and outside lab(s) regarding prioritization of cases	106 (49%)
Differing views within agency on usefulness of DNA evidence	27 (13%)
Too many evidence samples collected for cases	42 (19%)
Inappropriate communication between forensic analysts and investigators	15 (7%)
Not enough communication between forensic analysts and investigators	67 (31%)
Lack of follow up by investigators after DNA results are received	22 (10%)
Failure to withdraw DNA analysis request when case is resolved prior to analysis	40 (19%)
Lack of interoperability between agency and forensic lab computer systems	36 (17%)
Don't know	3 (1%)
Other	65 (30%)

8. For the purposes of measuring DNA analysis workload and backlog, what unit of measure does your lab utilize?

Number of samples	35 (16%)
Number of cases	85 (39%)
Other	60 (28%)
Don't know	33 (15%)

9. If your agency has a backlog of its evidence for DNA analysis, how large is it currently?

Under 500	68 (32%)
500 to 1,000	11 (5%)
Over 1,000	6 (3%)
We have a backlog, but I am unsure of the size	40 (19%)
I don't know if we have a backlog or not	21 (10%)
We do not have a backlog	62 (29%)

10. Is your backlog increasing, decreasing or about the same as compared to three years ago?

Increasing	73 (58%)
Decreasing	25 (20%)
About the same	20 (16%)
Don't know	7 (6%)

11. What has contributed to your agency's backlog? Please mark all that apply.

Increased collection of DNA for criminal investigations	10 (84%)
Increased collection of DNA from offenders	39 (31%)
Increased collection of DNA for cold case review	51 (41%)
Insufficient personnel to conduct analysis	62 (50%)
Insufficient or unavailable equipment for analysis	12 (10%)
Insufficient funds for overtime	25 (20%)
Insufficient grant funding from outside state and federal agencies	18 (14%)
Backlog at outside lab(s) used by agency	74 (59%)
Other	20 (16%)
Don't know	3 (2%)

12. What are the biggest challenges for your own forensic lab regarding DNA analysis? Please mark all that apply.

Budgeting for reagents, materials, and equipment	22 (10%)
Validation of equipment	18 (8%)
Inadequate lab space for analysis	16 (7%)
Evidence storage	13 (6%)
Training lab personnel	18 (8%)
Employing personnel for screening and analysis	18 (8%)
Employing personnel for technical review	9 (4%)
Incompatibility of internal databases (e.g. LIMS, other systems)	11 (5%)
Access to external databases (e.g. CODIS)	4 (2%)
Don't know	7 (3%)
Other	11 (5%)
Agency does not currently have a lab with DNA capabilities	168 (78%)

13. What are the challenges to using outside PUBLIC labs for DNA analysis? Please mark all that apply.

Longer turnaround times	120 (56%)
Cost too great	37 (17%)
Inability to identify and analyze low level DNA samples	28 (13%)
No input into the prioritization of work	82 (38%)
Poor quality of laboratory work	6 (3%)
Inconsistent reporting of results	8 (4%)
Problems with obtaining expert witness testimony	18 (8%)
Inability of lab to upload into CODIS	15 (7%)
Don't know	31 (14%)
Other	36 (17%)

14. What are the challenges to using outside PRIVATE labs for DNA analysis? Please mark all that apply.

Longer turnaround times	22 (10%)
Cost too great	148 (69%)
Inability to identify and analyze low level DNA samples	7 (3%)
No input into the prioritization of work	28 (13%)
Poor quality of laboratory work	5 (2%)
Inconsistent reporting of results	6 (3%)
Problems with obtaining expert witness testimony	37 (17%)
Inability of lab to upload into CODIS	65 (30%)
Don't know	29 (13%)
Other	36 (17%)

15. In what areas would additional guidance with regard to forensic DNA be helpful?

Types of lab accreditations and their benefits	44 (20%)
Types of forensic analyst certifications and their benefits	32 (15%)
Understanding the CODIS system	64 (30%)
Quality control measures	32 (15%)
Prioritization methods for DNA cases	85 (39%)
Training of lab personnel	32 (15%)
Training of officers and investigators on the use of DNA analysis in cases	125 (58%)

Using DNA analysis for property crimes	112 (52%)
Enhancing coordination between investigators and forensic analysts	100 (46%)
Don't know	10 (5%)
Other	20 (9%)

16a. The recently published National Academy of Sciences (NAS) report, *Strengthening Forensic Science in the United States:* A Path Forward, has recommended that forensic labs have autonomy or independence from administrative control by law enforcement.

Do you agree or disagree with this recommendation?

Strongly Agree	20 (9%)
Agree	44 (20%)
No Opinion	49 (23%)
Disagree	77 (36%)
Strongly Disagree	25 (12%)

16b. What do you think would be the challenges to having independent forensic laboratories?

Long waits for analysis results	79 (37%)
No standardization in testing procedures	54 (25%)
Inability of police agency to prioritize its cases for analysis	139 (64%)
Increased cost	143 (66%)
Poor quality of laboratory work	21 (10%)
Lack of uniform results reporting	61 (28%)
Increased expenses for laboratory expert witness	124 (57%)
I do not perceive any challenges	11 (5%)
Other challenges	37 (17%)

17. **Has your agency (or any other agency you are aware of) recently overcome great obstacles or implemented innovative programs in its use of DNA as an investigative tool? Please briefly explain and identify the agencies.**

Below is a list of the most commonly mentioned explanations:

- Trained/equipped patrol officers in DNA collection.
- Cut rape kit backlogs through case examination and prioritization
- Implemented new technology: robotics; Y-STRS testing
- Developed a triage process for DNA collection, processing, and tracking.
- Developed guidelines/best evidence policy for submitting DNA requests to labs.
- Restructured case assignment procedures
- Established new prioritization guidelines

18. **What can PERF do to help agencies to better understand DNA evidence or undertake the recommendations in the NAS report? Please briefly explain.**

Below is a list of the most commonly mentioned explanations:

- Establish standardized protocols for collecting/analyzing DNA
- Educate/inform law enforcement of new technological developments, techniques and case law/legal issues.
- Implement standardized training program
- Develop a best practice model with recommendations
- Condense/summarize NAS Report's impact upon law enforcement
- Assist in standardizing accreditation/certification requirements

Appendix B: Site Visits and Interviews

Allegheny County (Pennsylvania) Medical Examiner's Office
Bob Huston, Crime Lab Director

Allegheny County (Pennsylvania) Police Department
Charles Moffatt, Superintendent
Jim Morton, Assistant Superintendent

Baltimore County (Maryland) Police Department
Irv Litofsky, Director Forensic Services Section
Lieutenant Scott Cantor, Assistant Director Forensic Services Section

Chromosomal Laboratories
Vladimir Bolin, CEO
Jim Bentley, Vice President
R. Vincent Miller, Technical Leader

Coral Springs (Florida) Police Department
Sheila Lustigman, Supervisor Crime Scene Investigations Unit

Elizabeth Township (Pennsylvania) Police Department
Chief Robert McNeilly

Federal Bureau of Investigation, CODIS Unit
Jennifer Luttman, Codis Unit Chief
Douglas Hares, NDIS Custodian

Florida Office of the State Attorney
Andy Slater, Assistant State Attorney

Indio (California) Police Department
Chief Brad Ramos
Detective Jeremy Hellawell

Kansas City (Missouri) Police Department
Linda Netzel, Lab Director

Los Angeles County (California) Sheriff's Department
Captain David Walters
Bob Taylor, Crime Lab Assistant Director

Los Angeles (California) Police Department
Deputy Chief Charles Beck, Chief of Detectives
Greg Matheson, Criminalistics Lab Director

Maryland State Police
Tom Coppinger, Chief of Staff

Metropolitan Police Service (London)
Commander Simon Foy, Homicide and Serious Crime Command
Gary Pugh, Director of Forensic Services
Alan Chalkley, DNA Services Manager

Miami (Florida) Police Department
Chief John Timoney
Lazaro Fernandez, Director Crime Scene Investigation

Miami-Dade (Florida) Police Department
Stephanie Stoiloff, Senior Bureau Commander, Crime Laboratory Bureau

Mesa (Arizona) Police Department
Commander Bill Peters
Lieutenant Craig Walter
Deb Rector, Lab Administrator
Kim Fiorucci, DNA Supervisor

Palm Beach County (Florida) Sheriff's Office
Cecelia Crouse, Chief Science Officer and Forensic Biology Manager
Major James Stormes
Misty Lynn, Evidence Coordinator
Julie Sikorsky, Senior Forensic Scientist
Members of the Forensic Biology Section

Phoenix (Arizona) Police Department
Commander Harry Markley
Jody Wolf, Assistant Crime Lab Administrator
Janelle Smith, DNA Tech Lead

Public Safety Consulting, Inc.
Betty Kelepez, President

San Diego (California) Police Department
Chief Williams Lansdowne
Assistant Chief Cesar Ortiz
Assistant Chief David Ramirez
Mike Grubb, Lab Director
Shawn Montpetit, DNA Technical Manager

Virginia Department of Forensic Science
Peter Marone, Director

West Palm Beach (Florida) Police Department
Lieutenant Tony Kalil
Detective Sergeant James Cink
Fredrick Fisher, Crime Scene Investigator

Appendix C: DNA Executive Session Participants

Held on September 23, 2009 in Washington, D.C. List of Meeting Attendees

Alexandria County (VA) Police Department
Commander Charles E. Bailey, CSI Commander

Anne Arundel (MD) County Police Department
Captain Norman E. Milligan III, CID Major Crimes Unit
Stephanie Rauscher-Finn, Crime Lab Director
Craig A. Robinson, Evidence Coordinator, Crime Scene Unit

Arlington County (VA) Commonwealth's Attorney Office
Cari M. Steele, Assistant Commonwealth's Attorney

Arlington County (VA) Police Department
Lieutenant Charles A. Penn, Homicide/Robbery Unit Supervisor

Baltimore County (MD) Police Department
Lieutenant Scott Canter, Assistant Director Forensic Services

Bureau of Alcohol, Tobacco and Firearms
Kenneth Melson, Acting Director
Frank R. Shults

CALEA
Sylvester Daughtry, Executive Director
Craig Hartley, Deputy Director

Charleston County (SC) Sheriff's Office
Sergeant Paul D. McManigal, Forensic Services

Charlotte-Mecklenburg (NC) Police Dept
Matthew C. Mathis, Crime Laboratory Director

CNA Corporation
James K. Stewart, Senior Fellow

Colorado Springs (CO) Police Department
Chief Richard Myers
Dr. Ian Fitch, Crime Lab Supervisor

Dallas (TX) Police Department
Lieutenant Jamie Keough

Department of Homeland Security
Becca Sharp, Executive Director Homeland Security Advisory Council

Fairfax County (VA) Commonwealth's Attorney Office
Raymond Morrogh, Commonwealth Attorney

Fairfax County (VA) Police Department
Second Lieutenant David M. Smith, Major Crimes Division Supervisor

Federal Bureau of Investigation
Ron Ruecker, Assistant Director
Dr. Douglas R. Hares, NDIA Custodian
Tony Nelson, Office of Law Enforcement Coordination

Fort Wayne (IN) Police Department
Deputy Chief Karl M. Niblick, Investigative Division

Fresno (CA) Police Department
Lieutenant Joyce A. Vasquez, Patrol Field Commander

Howard County (MD) Police Department
Chief William J. McMahon
Robert C. Bartley, Director Forensic Services
Captain Glenn A. Hansen, Commander of Criminal Investigations

Howard County (MD) State's Attorney Office
F. Todd Taylor, Jr., Deputy State's Attorney

Houston (TX) Police Department
Irma Rios, Crime Lab Director

Indio (CA) Police Department
Chief Bradley S. Ramos

International Association for Property and Evidence
Ret. Lieutenant Robert E. Giles, President

Johnson County (KS) Sheriff's Office
William A. Hamm, Assistant Director Crime Laboratory

Kansas City (MO) Police Department
Deputy Chief Kevin E. Masters, Investigations Bureau
Linda Netzel, Director Regional Criminalistics Division

Las Vegas (NV) Metropolitan Police Department
Kimberly B. Murga, DNA Lab Manager

Los Angeles County (CA) Sheriff's Department
Chief David R. Betkey, Technical Services Division

Los Angeles (CA) Police Department
Greg Matheson, Criminalistics Laboratory Director

Mesa (AZ) Police Department
Kim Fiorucci, Forensic Scientist Supervisor
Lieutenant Craig Walter, Forensic Sciences Lieutenant

Metropolitan Nashville (TN) Police Department
Raymond DePriest, Forensic Quality Assurance Manager
Captain Karl Roller, Identification Division

Metropolitan Police Department (DC)
Assistant Chief Peter Newsham, Investigative Services Bureau
Dr. William T. Vosburgh, Laboratory Director

Metropolitan Police Service (London)
Alan Chalkley, DNA Services Manager

Miami (FL) Police Department
Lazaro Fernandez, Forensic Investigation Supervisor

Milwaukee (WI) Police Department
Lieutenant Mark A. Ciske, Sensitive Crimes Division

Minneapolis (MN) Police Department
Captain Constance C. Leaf, Forensic Division

National District Attorneys Association
David LaBahn, President

National Institute of Justice
Kristina Rose, Acting Director
Dr. Ellen Scrivner, Deputy Director
Michael Sheppo, Chief of Investigative and Forensic Sciences Division

National Institute of Standards and Technology
Mark Stolorow, Director of Office of Law Enforcement Standards

New Haven (CT) Police Department
Assistant Chief Peter G. Reichard, Investigative Services Division
Lieutenant Lisa Dadio, Commander of Major Crime Unit
Sergeant Martin Dadio, Operations Supervisor Special Investigations Unit
Sergeant Pasquale Marino, Officer in Charge of Crime Scene Unit

New Rochelle (NY) Police Department
Detective Robert C. Torr, Forensic Unit

Office of Community Oriented Policing Services
Dave Buchanan, Acting Director
Carl Peed, Ret. Director
Nicole J. Scalisi, Social Science Analyst
Amy Schapiro, Social Science Analyst
Kimberly Nath, Social Science Analyst

Palm Beach (FL) County Sheriff's Office
Sergeant William Springer
Julie Sikorsky, Senior Forensic Scientist

Pasadena (CA) Police Department
Commander Eric R. Mills

Philadelphia (PA) Police Department
Joseph Szarka, Lab Director

Phoenix (AZ) Police Department
Assistant Chief Kevin L. Robinson, Technical Services Division
Jody Wolf, Assistant Crime Lab Administrator

Prince William County (VA) Commonwealth's Attorney Office
Prosecutor Richard A. Conway, Violent Crimes

Prince William County (VA) Police Department
Chief Charles Deane
Thomas J. Pulaski, Director of Planning and Budget
First Sergeant Ross C. Randlett, Director of Forensic Services Bureau

Public Safety Consulting Inc.
Ret. Chief Betty P. Kelepecz, President

Richmond (CA) Police Department
Captain Alec Griffin, Administrative Services Captain

Saint Paul (MN) Police Department
Assistant Chief Nancy DiPerna, Major Crimes and Investigations

San Jose (CA) Police Department
Lieutenant Rikki Goede

Toronto (ON) Police Service
Staff Superintendent Richard Gauthier, Commander of Detective Services

Tulsa (OK) Police Department
Jon Wilson, DNA Tech Leader

Virginia Beach (VA) Police Department
Capitan Kevin J. Perry, Commanding Officer Detective Bureau

Virginia Department of Forensic Science
Peter Marone, Director

West Des Moines (IA) Police Department
Lieutenant Cameron Coppess, Criminal Investigations Commander

Winston-Salem (NC) Police Department
Captain David C. Clayton, Criminal Investigations Division
Lieutenant Bryan L. Macy, Forensic Services Division Director

Appendix D: Hurtt Testimony

CITY OF HOUSTON

Houston Police Department

Bill White, Mayor

1200 Travis Houston, Texas 77002-6000 713/247-1000

CITY COUNCIL MEMBERS: Toni Lawrence Jarvis Johnson Anne Clutterbuck Wanda Adams Michael Sullivan M.J. Khan, P.E. Pam Holm Edward Gonzalez
James Rodriguez Peter Brown Sue Lovell Melissa Noriega Ronald C. Green Jolanda "Jo" Jones CITY CONTROLLER: Annise D. Parker

September 8, 2009

Harold L. Hurtt
Chief of Police

The Honorable Patrick Leahy
Committee on the Judiciary
United States Senate
433 Russell Senate Office Building
Washington, DC 20510

Dear Senator Leahy:

The purpose of this correspondence is to provide you with a historical account of the Houston Police Department Crime Lab, reforms implemented and potential solutions for addressing the challenges in forensics.

Historical Perspective

In November 2002 investigative news reports criticized forensic analysis performed by the DNA Section of the Houston Police Department Crime Lab. As a result of the news reports, management requested an independent audit of the DNA section by the Texas Department of Public Safety. The audit revealed deficiencies that resulted in the suspension of DNA testing.

The Internal Affairs Division was assigned to investigate the employees of the Crime Lab for criminal and administrative violations. The investigations were reviewed by the District Attorney's Office for criminal misconduct. Two Grand Juries reviewed the evidence and no indictments were returned. Thirty investigations were completed resulting in written reprimands up to terminations. Additionally, An Assistant Chief of Police, the Crime Lab Director, and a DNA supervisor resigned or retired in lieu of termination.

In early 2003, three outside DNA labs were employed to conduct DNA re-testing of cases performed by the HPD Crime Lab employees. Additionally, in 2003 the National Forensic Science Technology Center (NFSTC) was hired to assist in the evaluation of various aspects of the Crime Lab's operations including competency testing of employees and temporary management of the Lab. In October 2003 a permanent Crime Lab Director Irma Rios was hired to manage the Crime Lab operation and lead the Crime Lab through the successful completion of

the accreditation process. Effective September 2005 the State of Texas mandated that Crime Labs accredited.
We discovered 280 boxes of crime lab evidence that was improperly labeled and stored. No evidence, to date, has been found related to any active investigation but evidence was discovered that related to 29 capital defendants that created concern.

The evidence has been catalogued and tagged, cases supplemented, and returned to the original investigative units for final review and disposition. For an additional level of oversight the District Attorney's Office and the Texas Rangers were involved during this process.

In September 2004, I sought an independent review of the Crime Lab and Property Room. A Stakeholder committee was formed to select and oversee the progress of an independent investigator. The committee included various community leaders, civil rights advocates, defense attorneys, forensic scientists, and academics. In March 2005 we entered into a contractual agreement with Mr. Bromwich to perform the independent investigation. The entire Bromwich Report can be found at http://www.hpdlabinvestigation.org.

Three main elements were addressed during the investigation and included the following:

- Historical operations of the Crime Lab and Property Room. This included a review of over 3500 cases from individual sections within the Crime Lab prior to accreditation
- Serology incarceration cases. These cases included testing performed during the period of 1980 through 1992.
- Review of current operations. A comprehensive assessment of the current operations of the Crime Lab and Property Room with the purpose of making recommendations to improve the operation.

For transparency quarterly reports were released to the public and posted on a website dedicated to the Independent Investigation. A Final Report was issued June 2007 and a Summary of Recommendations was issued August 2007.

Independent Investigator's Final Report

The final report consisted of a review of approximately 3500 cases and 100 interviews at a cost of $5.3 million. It was important that a full and frank public disclosure about the Crime Lab's past be made in order to build a foundation of trust and credibility with the public. The investigation uncovered that for a 15-year period preceding the DNA/Serology section's closure in December 2002, the following historical problems existed:

- **Lack of Support and Resources for the Crime Lab.** Inadequate resources and attention paid to the Crime Lab by command staff.
- **Ineffective Management within the Crime Lab.** There was a lack of strong and effective leadership and inadequate management of the strong and difficult personalities within the Crime Lab.
- **Lack of adequate Quality Control and Quality Assurance**. Technical reviews were lacking and many of the standard operating procedures, when available, were cobbled together. There were gaps and failures in quality control and technical reviews of analysts' work, problems with contamination and interpretation of test results in the DNA testing and insufficient and misleading reporting of analysts' results.

Reforms Implemented

Thoroughly understanding the issues that led to the Crime Lab crisis set the stage for local, state and national reforms. The state legislature mandated Accreditation statewide. The deficiencies noted in the independent audits began an urgent effort to overhaul our Crime Lab.

The Crime Lab's testing procedures, practices, policies, equipment, facility and personnel were overhauled. In 2005, the Crime Lab received national accreditation from the American Society of Crime Lab Directors-Laboratory Accreditation Board (ASCLD-LAB) in Controlled Substances, Firearms, Toxicology, Questioned Documents and Biology. In 2006, the Crime Lab received its accreditation in DNA and Trace analysis. The Crime Lab continues to undergo external audits and reviews by outside consultants. New laboratory equipment and technology have been purchased and robots are being evaluated for DNA testing.

Staffing criteria has been upgraded, with an emphasis on experience, certifications and educational credentials. Managers have been hired with experience in laboratory management and forensic science. We have imposed rigorous training requirements, including yearly ethics training. Some of our current staff members have been elected to local and national forensic boards and committees, and some have published in forensic journals.

A comprehensive Quality Assurance Program has been implemented to review operating procedures, competency of employees and provide a "checks and balance" measure in the form of testimony monitoring, proficiency testing, and re-testing of evidence.

The Crime Lab continues to cooperate fully with the Innocence Project by making evidence available for review and testing.

Significant Events

The HPD Crime Lab has come under intense scrutiny following the re-examination of several high-profile cases resulting in the exoneration of individuals.

Factors that contributed to the problems included:

1. Lack of being able to conduct DNA tests because they were not available at the time;
2. Mistakes made by personnel due to lack of training, allocations of resources, quality assurance, and supervisory oversight;
3. An eyewitness misidentifies a suspect. When evidence is available and processed properly, it should eliminate misidentification by eyewitnesses.

Property Room / Operational Efficiency

In 2009 a new 53,000 sq. ft. property room was built at the cost of $73 million. The new facility has state of the art equipment such as bar-coding, moveable shelving, and refrigerated space for storage of biological evidence.

Backlogs and Case Assessment & Interpretation Strategies

Adding more staff is not necessarily the only solution to reducing backlogs and increasing the quality of work performed. A strong long term agenda must be implemented using advancing technologies and case assessment strategies. These strategies begin from the time an officer is called to a scene and include proper collection, preservation, and processing of evidence based.

Many police agencies are submitting significant amounts of evidence to Crime Labs that result in little or no significance to the case resulting in backlogs. A strategy of case assessment should be used to tackle these backlogs. Best evidence and best test should be agreed upon by officers, attorneys, and crime lab staff prior to the processing of evidence. This process enables decisions to be made that will deliver a value for the money and will meet the needs of the end users. This process is used in the United Kingdom and is one that should be explored more diligently in the United States. We can choose to do our work the same way and get the same results or change the way we do business. Advancing technologies such as Laboratory Information Management Systems using bar coding, robotics, automation, and databases are key to streamlining operations and improving the quality of work.

How did we get here?

The question that I hear often is "how did we get here?" Initially, crime labs were run by trained police officers who may have known policing well, but certainly lacked knowledge in advancing technologies surrounding the capture, storage and identification of DNA evidence. The limited scientific knowledge of prosecutors, defense attorneys and judges further compounded the problem of not asking the right questions and not understanding limitations lab results and conclusions drawn by the scientists. In instances where there was scientific fraud or sloppy work, they did not have the knowledge to identify it.

The scientific aspects of ever evolving technology required that trained scientists be brought in to run our labs, scientists with no law enforcement or legal training. A knowledge gap between law enforcement, attorneys, judges and scientists resulted in a significant vulnerability. Crime Labs have been understaffed, underfunded, and worked performed in facilities that have been retrofitted into Crime Labs with inefficient evidence processing layouts.

Professionals involved in the criminal justice system, including the end users, need training to ensure the optimal use of advancing technologies in forensic testing. High standards are necessary to protect both public safety and individual rights. That's why accreditation is so important.

Accreditation requires that labs adhere to industry standards to ensure the quality and integrity of data and the competency of the lab and, more importantly, external audit processes help us identify vulnerabilities and create an opportunity for improvement. We have realized that well-defined and consistent guidelines and standards combined with checks and balances are a must in today's forensic labs.

Conclusion

The Houston Police Department Crime Lab has undergone extensive review from numerous sources and will continue to do so into the future. We have opened ourselves up to everyone and have withheld no information concerning any aspect of our Lab or its operation. Restoring the public's faith in the integrity of the crime lab and the criminal justice system as a whole is a challenge that we are fully committed to accomplishing.

Sincerely,

Harold L. Hurtt
Chief of Police

Reference material

STAKEHOLDER COMMITTEE MEMBERS

Adrian Garcia
- City Council Member
- Chair of the Public Safety Committee

Fran Gentry
- President of the NAACP

Sylvia Gonzalez
- Director of LULAC

Rusty Hardin
- Local Attorney- Rusty Hardin and Assoc.
- Former Prosecutor for Harris County

Dr. Richard Li
- Asst. Professor- Sam Houston State University Forensic Science Program

Dr. Ashraf Mozayani
- Laboratory Director, Harris County Medical Examiner's Office
- Diplomat Certification- American Board of Forensic Toxicology

Annise Parker
- City Controller, Houston, Texas

Frank Parish
- Attorney, Justice For All- Parents of Murdered Children

Dr. Wayne Riley
- Baylor College of Medicine: VP and Vice Dean for Health Affairs and Government Relations
- Ben Taub Hospital Asst. Chief of Medicine

Dr. Ben Roa
- Baylor College of Medicine: Director DNA Diagnostic Laboratory
- Asst. Professor, Molecular and Human Genetics

Kent W. "Rocky" Robinson
- Local Attorney- Partner: Andrews Kurth
- President of the Houston Bar Association

Dr. Richard Ward
- Dean and Director, Sam Houston State University College of Criminal Justice

Dr. Don Woods
- Dean, Texas Southern University School of Public Affairs

Appendix E: FBI Quality Assurance Standards for DNA Databasing Laboratories

(Located at www.fbi.gov/hq/lab/html/databasinglab.htm)

Introduction

These Standards are applicable to databasing laboratories performing DNA analyses on DNA samples obtained from identified subject(s) for purposes of entering the resulting DNA profile or DNA record into a DNA database. If, in addition, the databasing laboratory is performing DNA analyses on known or casework reference samples considered evidence by that laboratory, the databasing laboratory shall:

Follow the Quality Assurance Standards for Forensic DNA Testing Laboratories for the known or casework reference samples; or

Follow these Standards including the additional requirements for known and casework reference samples in 5.1.2.1.1 and 7.1.2.1.

This document consists of definitions and standards. The Standards are quality assurance measures that place specific requirements on the laboratory. Equivalent measures not outlined in this document may also meet the Standard if determined sufficient through an accreditation process.

Effective Date

These standards shall take effect July 1, 2009.

References

Federal Bureau of Investigation, "Quality Assurance Standards for Forensic DNA Testing Laboratories" and "Quality Assurance Standards for Convicted Offender DNA Databasing Laboratories," Forensic Science Communications, July 2000, Volume 2, Number 3.

1. SCOPE

These Standards describe the quality assurance requirements that laboratories performing DNA testing on database, known or casework reference samples for inclusion in the Combined DNA Index System (CODIS) shall follow to ensure the quality and integrity of the data

generated by the laboratory. These Standards also apply to vendor laboratories that perform DNA testing on database, known or casework reference samples in accordance with Standard 17. These Standards do not preclude the participation of a laboratory, by itself or in collaboration with others, in research and development, on procedures that have not yet been validated.

2. DEFINITIONS

As used in these Standards, the following terms shall have the meanings specified:

Accredited laboratory isa DNA laboratory that has received formal recognition that it meets or exceeds a list of standards, including the FBI Director's Quality Assurance Standards, to perform specific tests, by a nonprofit professional association of persons actively involved in forensic science that is nationally recognized within the forensic science community in accordance with the provisions of the Federal DNA Identification Act (42 U.S.C. §14132) or subsequent laws.

Accuracy is the degree of conformity of a measured quantity to its actual (true) value.

Administrative review is an evaluation of the report and/or supporting documentation for consistency with laboratory policies and for editorial correctness.

Analyst (or equivalent role, position, or title as designated by the Laboratory Director) is an employee that has successfully completed the laboratory's training requirements for database, known or casework reference sample analysis, passed a competency test, and has entered into a proficiency testing program according to these Standards. This individual conducts and/or directs the analysis of database, known or casework reference samples and interprets the resulting data from these samples.

Analytical documentation is the documentation of procedures, standards, controls and instruments used, observations made, results of tests performed, charts, graphs, photos and other documentation generated which are used to support the analyst's conclusions.

Analytical procedure is an orderly step-by-step process designed to ensure operational uniformity and to minimize analytical drift.

Annual is once per calendar year.

Audit is an inspection used to evaluate, confirm, or verify activity related to quality.

Biochemistry is the study of the nature of biologically important molecules in living systems, DNA replication and protein synthesis, and the quantitative and qualitative aspects of cellular metabolism.

Calibration is the set of operations which establish, under specified conditions, the relationship between values indicated by a measuring instrument or measuring system, or values represented by a material, and the corresponding known values of a measurement.

Casework reference sample is biological material obtained from a known individual and collected for purposes of comparison to forensic samples.

CODIS is the COmbined DNA Index System administered by the FBI. CODIS links DNA evidence obtained from crime scenes, thereby identifying serial criminals. CODIS also compares crime scene evidence to DNA profiles obtained from offenders, thereby providing investigators with the identity of the putative perpetrator. In addition, CODIS contains profiles from missing persons, unidentified human remains and relatives of missing persons. There are three levels of CODIS: the Local DNA Index System (LDIS), used by individual laboratories; the State DNA Index System (SDIS), used at the state level to serve as a state's DNA database containing DNA profiles from LDIS labs; and the National DNA Index System (NDIS), managed by the FBI as the nation's DNA database containing all DNA profiles uploaded by participating states.

CODIS administrator (or equivalent role, position, or title as designated by the Laboratory Director) is an employee of the laboratory responsible for administration and security of the laboratory's CODIS at a laboratory that owns the database and/or known samples.

Competency test(s) is a written, oral and/or practical test or series of tests designed to establish that an individual has demonstrated achievement of technical skills and met minimum standards of knowledge necessary to perform database DNA analysis.

Competency is the demonstration of technical skills and knowledge necessary to perform database DNA analysis successfully.

Contamination is the unintentional introduction of exogenous DNA into a DNA sample or PCR reaction.

Continuing education is an educational activity (such as a class, lecture series, conference, seminar, or short course) that is offered by a recognized organization or individual that brings a participant up to date in his/her relevant area of knowledge.

Coursework is an academic class officially recognized and taught through a college or university program in which the participating student successfully completed and received one or more credit hours for the class.

Critical equipment or instruments are those requiring calibration or a performance check prior to use and periodically thereafter.

Critical reagents are determined by empirical studies or routine practice to require testing on established samples before use on database or known samples.

Database or databasing refers to the DNA analysis of database samples for entry into CODIS and, if eligible, for upload to the National DNA Index System (NDIS).

Database sample is a sample obtained from an individual who is legally required to provide a DNA sample for databasing purposes and whose identity is established at the time of collection of the sample.

Developmental validation is the acquisition of test data and determination of conditions and limitations of a new or novel DNA methodology for use on database and known samples.

DNA record is a database record that includes the DNA profile as well as data required to manage and operate NDIS; i.e., the Originating Agency Identifier which serves to identify the submitting agency; the Specimen Identification Number; and DNA personnel associated with the DNA profile analyses.

DNA type (also known as a DNA profile) is the genetic constitution of an individual at defined locations (also known as loci) in the DNA. A DNA type derived from nuclear DNA typically consists of one or two alleles at several loci (e.g., short tandem repeat loci). The DNA type derived from mitochondrial DNA is described in relation to the revised Cambridge Reference Sequence (Nature Genetics 1999, 23, 147).

Employee is a person: (1) in the service of the applicable federal, state or local government, subject to the terms, conditions and rules of federal/state/local employment and eligible for the federal/state/local

benefits of service; or (2) formerly in the service of a federal, state or local government who returns to service in that agency on a part-time or temporary basis. For purposes of a vendor laboratory, an employee is a person in the service of a vendor laboratory and subject to the applicable terms, conditions and rules of employment of the vendor laboratory.

Expert System is a software program or set of software programs that interprets the data generated from a DNA analysis instrument platform in accordance with laboratory defined quality assurance rules and accurately identifies the data that does and does not satisfy such rules.

FBI is the Federal Bureau of Investigation, the Federal agency authorized by the DNA Identification Act of 1994 to issue quality assurance standards governing forensic testing and DNA databasing laboratories and to establish and administer the National DNA Index System (NDIS).

Genetics is the study of inherited traits, genotype/phenotype relationships, and population/species differences in allele and genotype frequencies.

Guidelines are a set of general principles used to provide direction and parameters for decision making.

Integral component is that portion of an academic course that is so significant and necessary to the understanding of the subject matter as a whole, that the course would be considered incomplete without it.

Internal validation is the accumulation of test data within the laboratory to demonstrate that established methods and procedures perform as expected in the laboratory.

Known sample is biological material whose identity or type is established. An example of a known sample is a sample contributed by the close biological relative of a missing person.

Laboratory is a facility: (1) employing at least two full time employees who are qualified DNA analysts; and (2) having and maintaining the capability to perform the DNA analysis on database and/or known samples at that facility.

Laboratory support personnel (or equivalent role, position, or title as designated by the Laboratory Director) are employee(s) who perform laboratory duties exclusive of analytical techniques on database and/or known samples.

LDIS is the **L**ocal **D**NA **I**ndex **S**ystem; please see definition of CODIS**.**

Methodology is used to describe the analytical processes and procedures used to support a DNA typing technology: for example, extraction methods (manual vs. automated); quantitation methods (slot blot, fluorometry, real-time); typing test kit; and platform (capillary electrophoresis, real-time gel and end-point gel systems).

Molecular biology is the study of the theories, methods, and techniques used in the study and analysis of gene structure, organization, and function.

Multi-laboratory system is used to describe an organization that has more than one laboratory performing database DNA analysis.

Multiplex system is a test providing for simultaneous amplification of multiple loci that is either prepared commercially or by a laboratory.

Negative amplification control is used to detect DNA contamination of the amplification reagents. This control consists of only amplification reagents without the addition of template DNA.

NDIS is the **N**ational **D**NA **I**ndex **S**ystem. NDIS is one component of CODIS – the national and highest level index containing the DNA records contributed from participating federal, state and local laboratories.

NIST is the **N**ational **I**nstitute of **S**tandards and **T**echnology.

Offender is an individual who is required by statute to submit a sample for DNA analysis and databasing. The term "offender" includes individuals who are convicted of or arrested for a crime or juveniles adjudicated delinquent for an offense and required by state or federal law to provide a DNA sample for analysis and databasing.

On-site visit is a scheduled or unscheduled visit by one or more representatives of the outsourcing laboratory to the vendor laboratory work site to assess and document the vendor laboratory's ability to perform analysis on outsourced database, known or casework reference samples.

Outsourcing is the utilization of a vendor laboratory to provide DNA services in which the NDIS participating laboratory takes or retains ownership of the DNA data for entry into CODIS. Outsourcing does not require the existence of a contractual agreement or the exchange of funds.

Ownership occurs when any of the following criteria are applicable: the originating laboratory will use any samples, extracts or any materials from the vendor laboratory for the purposes of database testing (i.e. a vendor laboratory prepares an extract that will be analyzed by the originating laboratory); the originating laboratory will interpret the data generated by the vendor laboratory; the originating laboratory will issue a report on the results of the analysis; or the originating laboratory will enter or search a DNA profile in CODIS from data generated by the vendor laboratory.

Performance check is a quality assurance measure to assess the functionality of laboratory instruments and equipment that affect the accuracy and/or validity of database, known or casework reference sample analysis.

Platform is the type of analytical system utilized to generate DNA profiles such as capillary electrophoresis, real-time gel, and end-point gel instruments or systems.

Polymerase Chain Reaction (PCR) is an enzymatic process by which a specific region of DNA is replicated during repetitive cycles which consist of the following:

1. Denaturation of the template;
2. Annealing of primers to complementary sequences at an empirically determined temperature and;
3. Extension of the bound primers by a DNA polymerase.

Positive amplification control is an analytical control sample that is used to determine if the PCR performed properly. This control consists of the amplification reagents and a known DNA sample.

Precision characterizes the degree of mutual agreement among a series of individual measurements, values and/or results.

Preferential amplification is the unequal sampling of the two alleles present in a heterozygous locus primarily due to stochastic (random) fluctuation arising when only a few DNA molecules are used to initiate the polymerase chain reaction.

Procedure (protocol, SOP or other equivalent) is an established practice to be followed in performing a specified task or under specific circumstances.

Proficiency testing is a quality assurance measure used to monitor performance and identify areas in which improvement may be needed. Proficiency tests may be classified as:

1. An internal proficiency test, which is produced by the agency undergoing the test.
2. An external proficiency test, which may be open or blind, is a test obtained from an approved proficiency test provider.

Qualified auditor is a current or previously qualified DNA analyst who has successfully completed the FBI DNA Auditor's training course.

Quality system is the organizational structure, responsibilities, procedures, processes and resources for implementing quality management.

Quantitative PCR is a method of determining the concentration of DNA in a sample by use of the polymerase chain reaction.

Reagent blank control is an analytical control sample that contains no template DNA and is used to monitor contamination from extraction to final fragment or sequence analysis. This control is treated the same as, and parallel to, the database, known or casework reference samples being analyzed.

Reference material (certified or standard) is a material for which values are certified by a technically valid procedure and accompanied by, or traceable to, a certificate or other documentation that is issued by a certifying body.

Reproducibility is the ability to obtain the same result when the test or experiment is repeated.

Review is an evaluation of documentation to check for consistency, accuracy, and completeness.

SDIS is the **S**tate **D**NA **I**ndex **S**ystem; please see definition of CODIS.

Second agency is an entity or organization external to and independent of the laboratory.

Semi-annual is used to describe an event that takes place two times during one calendar year, with the first event taking place in the first six months of that year and the second event taking place in the second six months of that year and where the interval between the two events is at least four months and not more than eight months.

Service is the performance of those adjustments or procedures specified which are to be performed by the user, manufacturer or other service personnel in order to ensure the intended performance of instruments and equipment.

State CODIS administrator is the CODIS Administrator who serves asthe central point of contact for a State with the NDIS Custodian and is responsible for ensuring other participating laboratories in that State comply with the terms and conditions for participation in the National DNA Index System.

Technical leader (or equivalent role, position, or title as designated by the Laboratory Director) is an employee who is accountable for the technical operations of the laboratory and who is authorized to stop or suspend laboratory operations.

Technical review is an evaluation of reports, notes, data, and other documents to ensure there is an appropriate and sufficient basis for the scientific conclusions.

Technical reviewer is an employee who is a current or previously qualified analyst in the methodology being reviewed that performs a technical review of analytical results and is not an author of the applicable report.

Technician (or equivalent role, position, or title as designated by the Laboratory Director) is an employee who performs analytical techniques on database, known or casework reference samples under the supervision of a qualified analyst. Technicians do not interpret data, reach conclusions on typing results, or prepare final reports.

Technology is used to describe the type of DNA analysis performed in the laboratory, such as RFLP, STR, YSTR or mitochondrial DNA.

Test kit is a pre-assembled set of reagents that allows the user to conduct a specific DNA extraction, quantitation or amplification.

Traceability is the property of a result of a measurement whereby it can be related to appropriate standards, generally international or national standards, through an unbroken chain of comparisons.

Underlying scientific principle is a rule concerning a natural phenomenon or function that is a part of the basis used to proceed to more detailed scientific functions.

Validation is a process by which a procedure is evaluated to determine its efficacy and reliability for DNA database analysis and includes the following:

1. Developmental validation is the acquisition of test data and determination of conditions and limitations of a new or novel DNA methodology for use on database, known or casework reference samples.
2. Internal validation is an accumulation of test data within the laboratory to demonstrate that established methods and procedures perform as expected in the laboratory.

Vendor laboratory is a government or private laboratory that provides DNA analysis services to another laboratory or agency and does not take ownership of the DNA data for purposes of entry into CODIS.

Work product is the material that is generated as a function of analysis, which may include extracts, amplified product and amplification tubes or plates as defined by the laboratory.

3. QUALITY ASSURANCE PROGRAM

STANDARD 3.1 The laboratory shall establish, follow and maintain a documented quality system that is appropriate to the testing activities and is equivalent to, or more stringent than, what is required by these Standards.

3.1.1 The quality system shall be documented in a manual that includes or references the following elements:

3.1.1.1 Goals and objectives

3.1.1.2 Organization and management

3.1.1.3 Personnel

3.1.1.4 Facilities

3.1.1.5 Sample control

3.1.1.6 Validation

3.1.1.7 Analytical procedures

3.1.1.8 Equipment calibration and maintenance

3.1.1.9 Documentation/Reports

3.1.1.10 Review

3.1.1.11 Proficiency testing

3.1.1.12 Corrective action

3.1.1.13 Audits

3.1.1.14 Safety

3.1.1.15 Outsourcing

STANDARD 3.2 The laboratory shall maintain and follow a procedure regarding document retention that specifically addresses proficiency tests, analytical results, sample receipt and processing records, sample retention, hit confirmation, corrective action, audits, training records, continuing education and court testimony monitoring.

STANDARD 3.3 The quality system as applicable to DNA shall be reviewed annually independent of the audit required by Standard 15. The review of the quality system shall be completed under the direction of the technical leader and the approval by the technical leader shall be documented.

4. ORGANIZATION AND MANAGEMENT

STANDARD 4.1 The laboratory shall:

4.1.1 Have a managerial staff with the authority and resources needed to discharge their duties and meet the requirements of the Standards in this document.

4.1.2 Have a technical leader who is accountable for the technical operations. Multi-laboratory systems shall have at least one technical leader.

4.1.3 Have a CODIS administrator who is accountable for CODIS on-site at each individual laboratory facility utilizing CODIS.

4.1.4 Have at least two full time employees who are qualified DNA analysts.

4.1.5 Specify and document the responsibility, authority, and interrelation of all personnel who manage, perform or verify work affecting the validity of the DNA analysis.

4.1.6 Have a documented contingency plan that is approved by laboratory management if the technical leader position is vacated.

5. PERSONNEL

STANDARD 5.1 Laboratory personnel shall have the education, training and experience commensurate with the examination and testimony provided. The laboratory shall:

5.1.1 Have a written job description for personnel, that may be augmented by additional documentation that defines responsibilities, duties and skills.

5.1.2 Have a documented training program for qualifying all analyst/technician(s).

5.1.2.1 The laboratory's training program shall include a training manual covering all DNA analytical procedures that the analyst/technician will perform. Practical exercises shall include the DNA methodologies used in the laboratory's database program.

5.1.2.1.1 If the databasing laboratory is processing known or casework reference sample(s) as evidence, the laboratory's training program shall also include evidence handling and courtroom testimony.

5.1.2.2 The training program shall teach and assess the technical skills and knowledge required to perform DNA analysis.

5.1.2.2.1 The training program shall require an individual's demonstration of competency. The laboratory shall maintain documentation of the successful completion of such competency test(s).

5.1.2.2.2 When hiring experienced analyst/technician(s), the technical leader shall be responsible for assessing their previous training and ensuring it is adequate and documented. Modification to the training program may be appropriate and shall be documented by the technical leader.

5.1.2.2.3 All analyst/technician(s), regardless of previous experience shall complete a competency test(s) covering the routine DNA methodologies to be used prior to participating in independent database analysis.

5.1.3 Have a documented program to ensure technical qualifications are maintained through participation in continuing education.

5.1.3.1 Continuing education: The technical leader, CODIS administrator, and analyst(s) shall stay abreast of developments within the field of

DNA typing by attending seminars, courses, professional meetings or documented training sessions/classes in relevant subject areas at least once each calendar year. A minimum of eight cumulative hours of continuing education are required annually and shall be documented.

5.1.3.1.1 If continuing education is conducted internally, the title of the program, a record of the presentation, date of the training, attendance list, and the curriculum vitae of the presenter(s) shall be documented and retained by the laboratory.

5.1.3.1.2 If the continuing education is conducted externally, the laboratory shall maintain documentation of attendance through a mechanism such as certificates, program agenda/syllabus, or travel documentation. Attendance at a regional, national or international conference shall be deemed to provide a minimum of 8 hours of continuing education.

5.1.3.1.3 Programs based on multimedia or internet delivery shall be subject to the approval of the technical leader. Participation in such programs shall be formally recorded and its completion shall be submitted to the technical leader for review and approval. The documentation shall include the time required to complete the program.

5.1.3.2 The laboratory shall have a program approved by the technical leader for the annual review of scientific literature that documents the analysts' ongoing reading of scientific literature. The laboratory shall maintain or have physical or electronic access to a collection of current books, reviewed journals, or other literature applicable to DNA analysis.

5.1.4 Maintain records on the relevant qualifications, training, skills and experience of the technical personnel.

STANDARD 5.2 The technical leader shall meet the following qualifications:

5.2.1 Minimum educational requirements: The technical leader of a laboratory shall have, at a minimum, a Master's degree in a biology-, chemistry- or forensic science- related area and successfully completed 12 semester or equivalent credit hours from a combination of undergraduate and graduate course work covering the following subject areas: biochemistry, genetics, molecular biology, and statistics or population genetics.

5.2.1.1 The 12 semester or equivalent credit hours shall include at least one graduate level course registering three (3) or more semester or equivalent credit hours.

5.2.1.2 The specific subject areas listed in 5.2.1 shall constitute an integral component of any course work used to demonstrate compliance with this Standard.

5.2.1.3 Individuals who have completed course work with titles other than those listed in 5.2.1 shall demonstrate compliance with this Standard through a combination of pertinent materials such as a transcript, syllabus, letter from the instructor or other document that supports the course content.

5.2.1.4 If the degree requirements of Standard 5.2.1 were waived by the American Society of Crime Laboratory Directors (ASCLD) in accordance with criteria approved by the Director of the Federal Bureau of Investigation (FBI), such a documented waiver is permanent and portable.

5.2.2 Minimum experience requirements: The technical leader shall have three years of forensic, databasing or human identification DNA laboratory experience obtained at a laboratory where DNA testing was conducted for identification, databasing or forensic purposes. As of the effective date of this revision, any newly appointed technical leader shall have a minimum of three years of human DNA (current or previous) experience as a qualified analyst on database or forensic samples. The technical leader shall have previously completed the FBI sponsored auditor training or successfully complete the FBI sponsored auditor training within one year of appointment.

5.2.3 The technical leader shall be responsible for the following:

5.2.3.1 General duties and authority

5.2.3.1.1 Oversee the technical operations of the laboratory.

5.2.3.1.2 Authority to initiate, suspend and resume DNA database operations for the laboratory or an individual.

5.2.3.2 The minimum specific responsibilities to be performed by the technical leader include the following:

5.2.3.2.1 To evaluate and document approval of all validations and methods used by the laboratory and to propose new or modified database procedures to be used by analysts.

5.2.3.2.2 To review the academic transcripts and training records for newly qualified analysts and approve their qualifications prior to independent database analysis and document such review.

5.2.3.2.3 To approve the technical specifications for outsourcing agreements.

5.2.3.2.4 To review internal and external DNA Audit documents and, if applicable, approve corrective action(s) and document such review.

5.2.3.2.5 To review, on an annual basis, the procedures of the laboratory and document such review.

5.2.3.2.6 To review and approve the training, quality assurance and proficiency testing programs in the laboratory.

5.2.4 Accessibility: The technical leader shall be accessible to the laboratory to provide onsite, telephone or electronic consultation as needed. A multi-laboratory system may have one technical leader over a system of separate laboratory facilities. For multi-laboratory systems the technical leader shall conduct a site visit to each laboratory at least semi-annually.

5.2.4.1 The technical leader shall be a full time employee of the laboratory or multi-laboratory system.

5.2.4.1.1 In the event that the technical leader position of a laboratory is vacated and there is no individual in the laboratory or multi-laboratory system who meets the requirements of this Standard and will serve as a technical leader, the laboratory shall immediately contact the FBI and submit their contingency plan within 14 days to the FBI for its approval.

Work in progress by the laboratory may be completed during this 14 day period but new database DNA analysis shall not be started until the plan is approved by the FBI.

5.2.5 Newly appointed technical leaders shall be responsible for the documented review of the following:

5.2.5.1 Validation and methodologies currently used by the laboratory; and

5.2.5.2 Educational qualifications and training records of currently qualified analysts.

STANDARD 5.3 The CODIS administrator shall be an employee of the laboratory and meet the following qualifications:

5.3.1 Minimum educational requirements. The CODIS administrator shall meet the educational requirements for an analyst as defined in Standard 5.4. A CODIS administrator appointed prior to the effective date of this revision shall be deemed to have satisfied the minimum educational requirements; satisfaction of these minimum educational requirements shall be applicable to the specific laboratory the CODIS administrator is employed by prior to the effective date of this revision and shall not be portable.

5.3.2 Minimum experience requirements. A CODIS administrator shall be or have been a current or previously qualified forensic or database DNA analyst as defined in Standard 5.4 with documented mixture interpretation training. A CODIS administrator appointed prior to the effective date of this revision who is not or has never been a qualified analyst (with documented training in mixture interpretation) shall be deemed to have satisfied the minimum experience requirements upon completion of FBI sponsored CODIS training; satisfaction of these minimum experience requirements shall be applicable to the specific laboratory the CODIS administrator is employed by prior to the effective date of this revision and shall not be portable.

5.3.3 Minimum CODIS training requirements. The CODIS administrator shall participate in FBI sponsored training in CODIS software within six months of assuming CODIS administrator duties if the administrator had not previously attended such training. The CODIS administrator shall successfully complete the FBI sponsored Auditor training within one year of assuming their administrator duties if the administrator had not previously attended such training.

5.3.4 The CODIS administrator shall be responsible for the following:

5.3.4.1 Administration of the laboratory's CODIS network.

5.3.4.2 Scheduling and documentation of the CODIS computer training of database analysts.

5.3.4.3 Assurance that the security of data stored in CODIS is in accordance with state and/or federal law and NDIS operational procedures.

5.3.4.4 Assurance that the quality of data stored in CODIS is in accordance with state and/or federal law and NDIS operational procedures.

5.3.4.5 Assurance that matches are dispositioned in accordance with NDIS operational procedures.

5.3.5 The CODIS administrator shall be authorized to terminate an analyst's or laboratory's participation in CODIS until the reliability and security of the computer data can be assured in the event an issue with the data is identified.

5.3.5.1 The state CODIS administrator shall have the authority over all CODIS sites under his/her jurisdiction to terminate an analyst's or laboratory's participation in CODIS until the reliability and security of the computer data can be assured in the event an issue with the data is identified.

5.3.6 A laboratory shall not upload DNA profiles to NDIS in the event that the CODIS administrator position is unoccupied.

STANDARD 5.4 The analyst shall be an employee of the laboratory and meet the following qualifications:

5.4.1 Minimum educational requirements. The analyst shall have a bachelor's (or its equivalent) or an advanced degree in a biology-, chemistry- or forensic science- related area and shall have successfully completed college course work (graduate or undergraduate level) covering the following subject areas: biochemistry, genetics, molecular biology; and course work and/or training in statistics and/or population genetics as it applies to forensic or databasing DNA analysis.

5.4.1.1 The specific subject areas listed in Standard 5.4.1 shall be an integral component of any coursework for compliance with this Standard.

5.4.1.2 Analysts appointed or hired after the effective date of these revisions shall have a minimum of nine cumulative semester hours or equivalent that cover the required subject areas.

5.4.1.3 Analysts who have completed course work with titles other than those listed in 5.4.1 above shall demonstrate compliance with this Standard through a combination of pertinent materials, such as a transcript, syllabus, letter from an instructor, or other document that supports the course content. The technical leader shall document approval of compliance with this Standard.

5.4.2 Minimum experience requirements. The analyst shall have six (6) months of human DNA laboratory experience with at least three (3) months in a forensic or database DNA laboratory. If prior human DNA laboratory experience is accepted by a laboratory, the prior experience shall be documented and augmented by additional training, as needed, in the analytical methodologies, platforms and interpretations of human DNA results used by the laboratory.

5.4.2.1 The analyst shall complete the analysis of a range of samples routinely encountered in database analysis prior to independent work using DNA technology.

5.4.2.2 The analyst shall successfully complete a competency test(s) before beginning independent DNA analysis.

STANDARD 5.5 The technician shall meet the following qualifications:

5.5.1 Documented training specific to their job function(s).

5.5.2 Successful completion of a competency test(s) before participating in DNA analysis.

STANDARD 5.6 Laboratory technical support personnel shall have documented training specific to their job function(s).

6. FACILITIES

STANDARDS 6.1 The laboratory shall have a facility that is designed to ensure the integrity of the analyses and the samples.

6.1.1 Access to the laboratory shall be controlled and limited in a manner to prevent access by unauthorized personnel. All exterior entrance/exit points require security control. The distribution of all keys, combinations, etc…, shall be documented and limited to the personnel designated by laboratory management.

6.1.2 Except as provided in 6.1.4, techniques performed prior to PCR amplification such as sample accessioning, DNA extractions, and PCR setup shall be conducted at separate times or in separate spaces from each other. Standard 6.1.4 is applicable if robotic workstations are used by the laboratory.

6.1.3 Except as provided in 6.1.4, amplified DNA product, including real time PCR, shall be generated, processed and maintained in a room(s) separate from the sample accessioning, DNA extractions and PCR setup areas. The doors between rooms containing amplified DNA and other areas shall remain closed.

6.1.4 A robotic workstation may be used to carry out DNA extraction, quantitation (if applicable), PCR setup and/or amplification in a single room, provided that the analytical process has been validated in accordance with Standard 8. If the robot performs analysis through amplification, the robot shall be housed in a separate room from that used for initial sample accessioning.

6.1.5 The laboratory shall have and follow written procedures for cleaning and decontaminating facilities and equipment.

7. SAMPLE CONTROL

STANDARD 7.1 The laboratory shall have and follow a documented sample inventory control system to ensure the integrity of database and known samples. This system shall ensure that:

7.1.1 Database, known and casework reference samples shall be marked with a unique identifier or the laboratory shall have and follow a method to distinguish each sample throughout the processing (such as plate or rack mapping) that may not require the assignment of unique identifiers.

7.1.2 Documentation of sample identity, collection, receipt, storage, and disposition shall be maintained.

7.1.2.1 If the databasing laboratory is processing known or casework reference sample(s) as evidence, a chain of custody shall be documented and maintained in hard or electronic format. The chain of custody shall include the signature, initials or electronic equivalent of each individual receiving or transferring the known or casework reference sample(s), the corresponding date for each transfer, and the known or casework reference sample(s) transferred.

7.1.3 The laboratory shall have and follow documented procedures designed to minimize loss, contamination, and/or deleterious change of samples and work product in progress.

7.1.4 The laboratory shall have secure areas for sample storage including environmental control consistent with the form or nature of the sample.

STANDARD 7.2 Where possible, the laboratory shall retain the database sample for retesting for quality assurance and sample confirmation purposes.

8. VALIDATION

STANDARD 8.1 The laboratory shall use validated methodologies for DNA analyses. There are two types of validations: developmental and internal.

STANDARD 8.2 Developmental validation shall precede the use of a novel methodology for DNA database analysis.

8.2.1 Developmental validation studies shall include, where applicable, characterization of the genetic marker, species specificity, sensitivity studies, stability studies, reproducibility, database-type samples, population studies, mixture studies, precision and accuracy studies, and PCR-based studies. PCR-based studies include reaction conditions, assessment of differential and preferential amplification, effects of multiplexing, assessment of appropriate controls, and product detection studies. All validation studies shall be documented.

8.2.2 Peer-reviewed publication of the underlying scientific principle(s) of a technology shall be required.

STANDARD 8.3 Except as provided in Standard 8.3.1.1, internal validation of all manual and robotic methods shall be conducted by each laboratory and reviewed and approved by the laboratory's technical leader prior to using a procedure for database applications.

8.3.1 Internal validation studies conducted after the date of this revision shall include as applicable: database-type samples, reproducibility and precision, sensitivity and stochastic studies, and contamination assessment. Internal validation studies shall be documented and summarized. The technical leader shall approve the internal validation studies.

8.3.1.1 Internal validation data may be shared by all locations in a multi-laboratory system. Each laboratory in a multi-laboratory system shall complete, document and maintain applicable precision, sensitivity and contamination assessment studies. The summary of the validation data shall be available at each site.

8.3.2 Internal validation shall define quality assurance parameters and interpretation guidelines.

8.3.3 A complete change of detection platform or test kit (or lab assembled equivalent) shall require internal validation studies.

8.3.4 For inclusion into NDIS of profiles reviewed by an expert system, the expert system shall be validated in accordance with applicable NDIS operational procedures.

8.3.5 Internal validation of robotics shall be conducted and documented to the extent they are used by the database laboratory.

STANDARD 8.4 Before the introduction of a methodology into the database laboratory, the analyst or examination team shall successfully complete a competency test(s) to the extent of his/her participation in database analyses.

STANDARD 8.5 The performance of a modified procedure shall be evaluated by comparison with the original procedure using similar DNA samples.

STANDARD 8.6 Each additional critical instrument shall require a performance check. Modifications to an instrument, such as a detection platform, that do not affect the analytical portion of the instrument shall require a performance check.

STANDARD 8.7 Modifications to software, such as an upgrade, shall require a performance check prior to implementation. New software or significant software changes that may impact interpretation or the analytical process shall require a validation prior to implementation.

9. ANALYTICAL PROCEDURES

STANDARD 9.1The laboratory shall have and follow written analytical procedures approved by the technical leader. The standard operating procedures are to be reviewed annually by the technical leader independent of the audit required by Standard 15 and this review shall be documented.

9.1.1 The laboratory shall have and follow a standard operating procedure for each analytical method used by the laboratory. The procedures shall specify reagents, sample preparation, extraction, equipment and controls which are standard for DNA analysis and data interpretation.

STANDARD 9.2 The laboratory shall use reagents that are suitable for the methods employed.

9.2.1 The laboratory shall have written procedures for documenting commercial reagents and for the formulation of in-house reagents.

9.2.2 Commercial reagents shall be labeled with the identity of the reagent and the expiration date as provided by the manufacturer or as determined by the laboratory.

9.2.3 In-house reagents shall be labeled with the identity of the reagent, the date of preparation and/or expiration, and the identity of the individual preparing the reagent.

STANDARD 9.3 The laboratory shall identify critical reagents and evaluate them prior to use in the database laboratory. These critical reagents shall include, but are not limited to, the following:

9.3.1 Test kits for performing quantitative PCR and genetic typing

9.3.2 Thermostable DNA polymerase, primer sets and allelic ladders, used for genetic analysis that are not tested as test kit components under Standard 9.3.1.

STANDARD 9.4 The laboratory shall have and follow a documented procedure for the resolution, verification and reporting/notification of database matches.

STANDARD 9.5 The laboratory shall monitor the analytical procedures using the following controls and standards.

9.5.1. Where quantitation is used, quantitation standards shall be used.

9.5.2 Positive and negative amplification controls associated with samples being typed shall be amplified concurrently in the same instrument with the samples at all loci and with the same primers as the database, known and casework reference samples. All samples typed shall also have the corresponding amplification controls typed.

9.5.3 Reagent blank controls associated with each extraction set being analyzed shall be:

9.5.3.1 Extracted concurrently;

9.5.3.2 Amplified utilizing the same primers, instrument model and concentration conditions as required by the sample(s) with the most sensitive volume conditions of the extraction set; and

9.5.3.3 Typed utilizing the same instrument model, injection conditions and most sensitive volume conditions of the extraction set.

9.5.4 Allelic ladders and internal size makers for variable number tandem repeat sequence PCR based systems.

9.5.5 The laboratory shall check its DNA procedures annually or whenever substantial changes are made to a procedure against an appropriate and available NIST standard reference material or standard traceable to a NIST standard.

STANDARD 9.6 The laboratory shall have and follow written guidelines for the interpretation of data. An NDIS approved and internally validated Expert System may be used to complete the data interpretation process.

9.6.1 The laboratory shall verify that all control results meet the laboratory's interpretation guidelines for all data to be entered into CODIS.

STANDARD 9.7 The laboratory shall have and follow a documented policy for the detection and control of contamination.

10. EQUIPMENT CALIBRATION AND MAINTENANCE

STANDARD 10.1 The laboratory shall use equipment suitable for the methods employed.

STANDARD 10.2 The laboratory shall have and follow a documented program for conducting performance checks, calibration and recertification of instruments and equipment.

10.2.1 At a minimum, the following critical instruments or equipment shall require annual performance checks:

10.2.1.1 Thermometer traceable to national or international standard(s) that is used for conducting performance verification checks.

10.2.1.2 Balances/scales

10.2.1.3 Thermal cycler temperature verification system

10.2.1.4 Thermal cycler including quantitative-PCR system where utilized

10.2.1.5 Electrophoresis detection systems

10.2.1.6 Robotic systems

10.2.1.7 Genetic analyzers

10.2.1.8 Mechanical pipettes

10.2.2 The following critical equipment require quarterly recertification:

10.2.2.1 Expert systems approved for use at NDIS

STANDARD 10.3 The laboratory shall have a schedule and follow a documented program to ensure that instruments and equipment are properly maintained. The laboratory shall retain documentation of maintenance, service or calibration.

STANDARD 10.4 New critical instruments and equipment, or critical instruments and equipment that have undergone repair, service or calibration shall undergo a performance check before use in database analysis.

10.4.1 At a minimum, the following critical equipment shall undergo a performance check and/or recertification following repair, service or calibration:

10.4.1.1 Electrophoresis detection systems

10.4.1.2 Robotic systems

10.4.1.3 Genetic analyzers

10.4.1.4 Thermal cycler including quantitative-PCR where utilized

10.4.1.5 Expert systems approved for use at NDIS

11. DOCUMENTATION/REPORTS

STANDARD 11.1 The laboratory shall have and follow written procedures for maintaining documentation for database, known or casework reference samples. The laboratory shall maintain all analytical documentation generated by analysts related to database analyses. The laboratory shall retain, in hard or electronic format, sufficient documentation for each technical analysis to support the profile data such that another qualified individual could evaluate and interpret the data.

STANDARD 11.2 Except as otherwise provided by state or federal law, the laboratory shall have and follow written procedures to ensure the confidentiality of the database, known or casework reference samples and the information in DNA databases and DNA records.

11.2.1 The laboratory shall have and follow written procedures for the release of DNA records and database, known or casework reference samples in accordance with applicable state and federal law.

11.2.2 The laboratory shall have and follow written procedures for the release of personally identifiable information relating to DNA records in accordance with applicable state and federal law.

11.2.2.1 The laboratory shall have and follow a procedure for the release of personally identifiable information in connection with a database hit.

12. REVIEW

STANDARD 12.1 The laboratory shall have and follow written procedures for reviewing DNA records and DNA database information, including the verification and resolution of database matches. The review of DNA data generated external to the laboratory is governed by Standard 17.

12.1.1 An individual conducting technical reviews shall be or have been an analyst qualified in the methodology being reviewed.

STANDARD 12.2 The laboratory shall perform a technical review of all DNA records prior to uploading or searching in SDIS. Completion of the technical review shall be documented and the technical review of a DNA record shall include the following elements:

12.2.1 A review of all notes, all worksheets, and the electronic data (or printed electropherograms or images) supporting the results.

12.2.2 A review of all DNA types to verify that they are supported by the raw or analyzed data (electropherograms or images). The review of the DNA types may be accomplished by an NDIS-approved and internally validated expert system.

12.2.3 A review of all controls, internal lane standards and allelic ladders to verify that the expected results were obtained.

12.2.4 A review to confirm that reworked samples have appropriate controls.

STANDARD 12.3 The release of personally identifiable information associated with a database hit shall require an administrative review of the official correspondence. The administrative review shall include the following elements, any or all of which may be included within the technical review:

12.3.1 A review of the supporting administrative documentation and the correspondence for clerical errors, accuracy of information and adherence to agency policy.

12.3.2 A review of the individual's biographical data, qualifying offense, and DNA profile generated from reanalysis, as applicable.

12.3.3 The laboratory shall have and follow a procedure to document the completion of the administrative review.

STANDARD12.4 The laboratory shall document the elements of a technical and administrative review.

STANDARD 12.5 The laboratory shall have and follow a documented procedure to address unresolved discrepant conclusions between analysts and reviewer(s).

STANDARD 12.6. The laboratory shall have a system in place to ensure that the correct CODIS specimen categories have been assigned.

STANDARD 12.7 The laboratory shall have and follow a program that documents the annual monitoring of the testimony of laboratory personnel.

13. PROFICIENCY TESTING

STANDARD 13.1 Analysts, technical reviewers, technicians, and other personnel designated by the technical leader, shall undergo semi-annual external proficiency testing in each technology performed to the full extent in which they participate in database analysis. Semi-annual is used to describe an event that takes place two times during one calendar year, with the first event taking place in the first six months of the calendar year and the second event taking place in the second six months of that calendar year and where the interval between the two events is at least four months and not more than eight months. Such external proficiency testing shall be an open proficiency testing program and shall be submitted to the proficiency testing provider in order to be included in the provider's published external summary report.

13.1.1 Individuals routinely utilizing both manual and automated methods shall be proficiency tested in each method at least once per year to the full extent in which they participate in database analysis.

13.1.2 Newly qualified individuals shall enter the external proficiency testing program within six months of the date of their qualification.

13.1.3 For purposes of tracking compliance with the semi-annual proficiency testing requirement, the laboratory shall define, document and consistently use the date that the proficiency test is performed as the received date, assigned date, submitted date, or the due date.

13.1.4 Except as provided in Standard 13.1.4.1, each analyst shall be assigned and complete his/her own external proficiency test.

13.1.4.1 Laboratories that use a team approach to database analysis may do so on external proficiency tests. However, all analysts, technical reviewers and technicians shall be proficiency tested at least once per year in each of the DNA technologies, including test kits for DNA typing, and each platform in which they perform database analysis.

13.1.5 Typing of all CODIS core loci or CODIS core sequence ranges shall be attempted for each technology performed.

13.1.6 The laboratory shall maintain the following records for proficiency tests:

13.1.6.1 The test set identifier,
13.1.6.2 Identity of the analyst, and other participants, if applicable,

13.1.6.3 Date of analysis and completion,

13.1.6.4 Copies of all data and notes supporting the conclusions,

13.1.6.5 The proficiency test results,

13.1.6.6 Any discrepancies noted, and

13.1.6.7 Corrective actions taken.

13.1.7 The laboratory shall include, at a minimum, the following criteria for evaluating proficiency test results:

13.1.7.1 Inclusions and exclusions, if applicable, as well as all reported genotypes and/or phenotypes are correct or incorrect according to consensus results or are within the laboratory's interpretation guidelines.

13.1.7.2 All results reported as inconclusive or not interpretable are consistent with written laboratory guidelines.

13.1.7.2.1 The technical leader shall review any inconclusive result for compliance with laboratory guidelines.

13.1.7.3 All discrepancies/errors and subsequent corrective actions shall be documented.

13.1.7.4 All final reports are graded as satisfactory or unsatisfactory.

13.1.7.4.1 A satisfactory grade is attained when there are no analytical errors for the DNA profile typing data.

13.1.7.4.1.1 Administrative errors and corrective actions, as applicable, shall be documented.

13.1.8 All proficiency test participants shall be informed of his/her final test results and this notification shall be documented.

13.1.9 The technical leader shall be informed of the results of all participants and this notification shall be documented. The technical leader shall inform the CODIS administrator of all non-administrative discrepancies that affect the typing results and/or conclusions at the time of discovery.

STANDARD 13.2 The laboratory shall use an external proficiency test provider that is in compliance with the current proficiency testing manufacturing guidelines established by the American Society of Crime Laboratory Directors/ Laboratory Accreditation Board or be in compliance with the current International Organization for Standardization.

14. CORRECTIVE ACTION

STANDARD 14.1 The laboratory shall establish and follow a corrective action plan to address when discrepancies are detected in proficiency tests and database analysis. A laboratory corrective action plan shall define what level/type of discrepancy are applicable to this practice and identify (when possible) the cause, effect of the discrepancy, corrective actions taken and preventative measures taken (where applicable) to minimize its reoccurrence. Documentation of all corrective actions shall be maintained in accordance with Standard 3.2.

STANDARD 14.2 Corrective actions shall not be implemented without the documented approval of the technical leader.

15. AUDITS

STANDARD 15.1 The laboratory shall be audited annually in accordance with these standards. The annual audits shall occur every calendar year and shall be at least 6 months and no more than 18 months apart.

STANDARD 15.2 At least once every two years, an external audit shall be conducted by an audit team comprised of qualified auditors from a second agency(ies) having at least one team member who is or has been previously qualified in the laboratory's current DNA technologies

and platform and one team member who is currently or was previously a qualified analyst from a databasing laboratory.

15.2.1 Each analyst, CODIS administrator and technical leader shall have his/her education, experience and training qualifications evaluated and approved during two successive, separate external audits conducted after July 1, 2004. Approval of an individual's education, experience and training qualifications shall be documented in the audit document.

15.2.2 Each validation study shall be evaluated and approved during one external audit. Approved validation studies shall be documented in the audit document.

STANDARD 15.3 For internal audits, the auditor or audit team shall have the following expertise: currently qualified auditor and currently or previously qualified as an analyst in the laboratory's current DNA technologies and platform.

STANDARD 15.4 Internal and external audits shall be conducted utilizing the FBI DNA Quality Assurance Standards Audit Document.

STANDARD 15.5 Internal and external DNA Audit documents and, if applicable, corrective action(s) shall be submitted to the technical leader for review to ensure that findings, if any, were appropriately addressed.

15.5.1 For NDIS participating laboratories, all external audit documentation and laboratory responses shall be provided to the FBI within 30 days of laboratory receipt of the audit documents or report.

STANDARD 15.6 Internal and external audit documentation shall be retained and available for inspection during subsequent audits.

16. SAFETY

STANDARD 16.1 The laboratory shall have and follow a documented environmental health and safety program. This program shall include the following:

16.1.1 A blood borne pathogen and chemical hygiene plan

16.1.2 Documented training on the blood borne pathogen and chemical hygiene plan.

STANDARD 16.2 The laboratory's environmental health and safety plan shall be reviewed once each calendar year and such review shall be documented.

17. OUTSOURCING

STANDARD 17.1 A vendor laboratory performing database DNA analysis shall comply with these Standards and the accreditation requirements of federal law.

17.1.1 An NDIS participating laboratory that outsources DNA sample(s) to a vendor laboratory to generate DNA data that will be entered into or searched in CODIS shall require the vendor laboratory to provide documentation of compliance with these Standards and the accreditation requirements of federal law. The NDIS participating laboratory shall maintain such documentation.

STANDARD 17.2 Except as provided in Standard 17.2.1, an NDIS participating laboratory's technical leader shall document approval of the technical specifications of the outsourcing agreement with a vendor laboratory before it is awarded. Such documentation shall be maintained by the NDIS participating laboratory.

17.2.1 A vendor laboratory that is performing DNA analysis for a law enforcement agency or other entity and generating DNA data that may be entered into or searched in CODIS shall not initiate analysis for a specific sample or set of samples until documented approval has been obtained from the appropriate NDIS participating laboratory's technical leader of acceptance of ownership of the DNA data.

STANDARD 17.3 An NDIS participating laboratory shall not upload or accept DNA data for upload to or to search in CODIS from any vendor laboratory or agency without the documented prior approval of the technical specifications of the outsourcing agreement and/or documented approval of acceptance of ownership of the DNA data by the NDIS participating laboratory's technical leader.

STANDARD 17.4 An NDIS participating laboratory shall have, follow and document appropriate quality assurance procedures to verify the integrity of the data received from the vendor laboratory including, but not limited to, the following:

17.4.1 Random reanalysis of database, known or casework reference samples;

17.4.2 Inclusion of QC samples;

17.4.3 Performance of an on-site visit by an NDIS participating laboratory or multi-laboratory system outsourcing DNA sample(s) to a vendor

laboratory or accepting ownership of DNA data from a vendor laboratory. The laboratory shall have and follow a procedure to perform an on-site visit(s) of the vendor laboratory that shall include, at a minimum, the following elements:

17.4.3.1 A documented initial on-site visit prior to the vendor laboratory's beginning of DNA analysis for the laboratory.

17.4.3.2 The on-site visit shall be performed by the technical leader or designated employee of the NDIS participating laboratory who is a qualified or was previously a qualified DNA analyst in the technology, platform and typing amplification test kit used to generate the DNA data.

17.4.3.3 If the outsourcing agreement extends beyond one year, an annual on-site visit shall be required. Each annual on-site visit shall occur every calendar year and shall be at least 6 months and no more than 18 months apart.

17.4.3.3.1 An NDIS participating laboratory may accept an on-site visit conducted by another NDIS participating laboratory using the same technology, platform and typing amplification test kit, for the generation of the DNA data and shall document the review and approval of such on-site visit.

STANDARD 17.5 An NDIS participating laboratory shall have, follow and document appropriate technical review procedures to verify the integrity of the data received from the vendor laboratory.

17.5.1 A technical review of DNA data prior to the upload to or search of DNA data in SDIS shall include the following elements:

17.5.1.1 A review of all DNA types to verify that they are supported by the raw or analyzed data (electropherograms or images).

17.5.1.2 A review of all associated controls, internal lane standards and allelic ladders to verify that the expected results were obtained.

17.5.1.3 Verification of the DNA types, and the correct specimen category for entry into CODIS.

17.5.2 A technical review of a vendor laboratory's DNA data shall be performed by an analyst or technical reviewer employed by the NDIS participating laboratory who is qualified or was previously qualified in the technology, platform and test kit used to generate the DNA data and participates in the laboratory's proficiency testing program. A portion of this review may be accomplished through the use of an NDIS-approved and internally validated expert system.

Appendix F: Palm Beach County Sheriff's Office Forensic Biology Unit Case Acceptance Protocol

Addendum to the 2002 Crime Laboratory Evidence Submission Manual

The Forensic Biology Unit provides serological and DNA laboratory services to all Palm Beach County agencies for the purpose of providing assistance in criminal investigations and judicial proceedings. Evidence may be submitted, in accordance with these guidelines, by contacting the Evidence Coordinator in the Forensic Biology Unit.

These guidelines set the standard requirements for routine submission of evidence to the Forensic Biology Unit Crime Laboratory system. The Forensic Biology Unit acknowledges that, in some circumstances, there may be a need to analyze evidence that falls outside the stated guidelines.

A. Cases Handled

Submissions of all exhibits must be in connection with criminal investigations. No examinations will be conducted for private individuals or corporations. The Forensic Biology Manager will take responsibility for the prioritization of cases.

B. Initiation of Case Acceptance

In order have serological or DNA analysis conducted on casework evidence, the case must be called in to the PBSO Evidence Coordinator. An ASAP case will be considered only after a written request outlining the reason(s) for the prioritization is submitted to the Evidence Coordinator. Prior to an ASAP request consideration, the requestor must have written approval from their supervisor. Exceptions will be made by the Forensic Biology Manager depending on the type of case.

C. Case Acceptance Guidelines

Exhibits must be submitted in compliance with the case acceptance guidelines of the Forensic Biology Unit. Case acceptance guidelines provide the requirements for submission of evidence for serological and/or DNA analysis.

1. DNA testing will be complete when an association is established from probative evidence. (For example an association is established between the 09-2008 PBSO Case Acceptance Protocol subject and the victim). A scenario must be provided with the submitted evidence. The scenario will establish the value of each item as to its likelihood to provide probative results or an investigative lead. If an investigative report is submitted, the submitter must highlight those items that establish the association.
2. In general, the following case acceptance protocols must be followed
    - If elimination and/or victim standards are associated with the evidence, they must be submitted in order for a case to be assigned. (e.g. owner of hi-jacked vehicle).
    - If a suspect(s) has been identified, the standard from the suspect(s) must be submitted in order for the case to be assigned. The DNA database cannot be used in lieu of the submission of a suspect standard. Any exception must be approved by the CODIS Administrator.
    - Each item in the submission must be detailed on the property receipt.
    - All evidence must be submitted before the case will be assigned.
    - If the agency has not submitted all of the evidence, including the standards, within 60 days of calling in the case to be worked, the case will be placed on the inactive casework log.
    - Only the items requested for analysis may be submitted.
3. The type and number of items accepted per submission is based on case type. For all case types, known standards from elimination, victim(s) or subject(s) will not count against the number of items that may be submitted. An item is expected to be comprised of one piece of evidence (i.e. one piece of clothing, swabbing of blood

from a single area, or one weapon). If items are received packaged together, the number of items in the package will be considered to be the number of items submitted (i.e. pants, shirt and shoes packaged together will be considered three items.)

a. **Sexual Assaults:**
   - The first submission is limited to a sexual assault evidence kit plus one pair of underwear (if not already in the kit) and one condom, if applicable.
   - If the kit is negative additional items such as clothing or bedding may be submitted in a separate submission – limited to 5 items per submission.
   - If the kit is positive no additional items will be accepted for biology, unless case circumstances (such as multiple perpetrators) dictate the need for additional processing.

b. **Homicides:**
   - Biology evidence is limited to 9 probative items per submission.
   - If probative biology results are obtained, additional items will not be examined, unless case circumstances dictate the need for additional processing
   - If no probative results are found on the first submission, the next tier of probative items may be submitted with the approval of the assigned analyst.

c. **Burglary/property crimes:**
   - The first submission is limited to 2 items for biology – typically blood sample(s) from the scene, or items left by the perpetrator (cigarette butt, item of clothing).
   - If a profile is developed, additional items will not be examined, unless case circumstances (such as multiple perpetrators) dictate the need for additional analysis.

d. **Other case types (robbery, assault, etc.)**
   - Each submission is limited to 4 items.
   - If a profile is developed, additional items will not be examined, unless case circumstances (such as multiple perpetrators) dictate the need for additional analysis.

e. **Criminal Parentage Cases:**
   - Submissions must include a buccal swab (preferred) or liquid blood (purple topped tube) standard from mother or alleged mother, father or alleged father, the child and if necessary, the product of conception (frozen with no preservatives).
   - No partial submissions will be accepted, unless dictated by case circumstances (such as the mother is deceased or maternity is in question and the father is unknown).

4. Touch Evidence:

   a. Touch Evidence is defined as evidence which has no visible staining and would contain DNA that only results from touching an item with the skin. Touch evidence does not include cigarette butts, swabbing from cans, bottles, straws or other items in which the substance being tested is most likely saliva. Touch evidence does not include items submitted for wearer such as shirts, shoes, hats, etc. where there is probability of prolonged contact.

   b. Touch evidence will be accepted for possible DNA analysis when there is a high degree of likelihood that the evidence submitted will provide probative results or investigative leads. A high degree of likelihood may be established by means of witness corroboration, visual monitoring systems, or sound deductive reasoning.

   c. Touch evidence will not be processed by the Forensic Biology Unit if another investigative unit has processed the evidence without wearing gloves.

   d. Items submitted for touch evidence processing will comply with existing policy relating to the number of items of evidence that may be submitted based upon case type.

e. Swabbings of items such as the exterior of cars, dwellings, businesses etc. will not be worked unless there is a high degree of likelihood an association of the perpetrator and the evidence may be established by means of witness corroboration, visual monitoring systems, or sound deductive reasoning.

f. Swabbings from public common areas will not be worked (e.g. public telephones, business doors, pens on counter) unless there is a high degree of likelihood an association of the perpetrator and the evidence may be established by means of witness corroboration, visual monitoring systems, or sound deductive reasoning.

Case Acceptance Protocol and DNA Request Form

Submit by Email | Print Form

PBSO CASE #:

NON PBSO AGENCY NAME/CASE #:

FBU USE ONLY
ACTIVE DATE
INITIALS

POINT OF CONTACT

NAME | PHONE | E-MAIL

OFFENSE TYPE: Select Offense Type | ASA NAME | TRIAL DATE?

VICTIM INFORMATION VICTIM(S) ? ☐ Y ☐ N # of VICTIMS ☐

STANDARDS OBTAINED?	NAME	STANDARDS OBTAINED?	NAME
☐ Y ☐ N		☐ Y ☐ N	
☐ Y ☐ N		☐ Y ☐ N	

ELIMINATION INFORMATION ELIMINATION(S) ? ☐ Y ☐ N # of ELIMINATIONS ☐

STANDARDS OBTAINED?	NAME	STANDARDS OBTAINED?	NAME
☐ Y ☐ N		☐ Y ☐ N	
☐ Y ☐ N		☐ Y ☐ N	

SUSPECT INFORMATION SUSPECT(S) ? ☐ Y ☐ N # of SUSPECTS ☐ GLOVES WORN?

STANDARDS OBTAINED?	NAME	DOB	STANDARDS OBTAINED?	NAME	DOB
☐ Y ☐ N			☐ Y ☐ N		
☐ Y ☐ N			☐ Y ☐ N		

SUPPORTING EVIDENCE *Are any of the following available to show a high degree of likelihood that the evidence submitted will provide an investigative lead? If so, please explain in CASE SCENARIO.*

☐ Y ☐ N Witness Statements ☐ Y ☐ N Video Surveillance ☐ Y ☐ N Deductive Reasoning

EVIDENCE LIST *Homicide = 9 items post conference*
Property Crimes = 2 items
**standards do not count towards item eliminations*
Sexual Assault = Sexual assault kit & underwear or condom
All other Crimes = 4 items
***If swabs, state what was swabbed. "DNA swabs" are unacceptable*

1.
2.
3.
4.
5.
6.
7.
8.
9.

CASE SCENARIO *Briefly describe what occurred and how the items in the EVIDENCE LIST are related to the crime, including why the submitted standards are necessary. If a sexual assault, submit any consensual partner standards if intercourse occurred within 72 hours.*

Appendix G: San Diego Police DNA Evidence Collection Guidelines

EVIDENCE VALUABLE FOR DNA TESTING

Body Fluids

Bloodstains
Saliva or spit stains
Semen stains
Urine stains or liquid but NOT collected from inside the toilet bowl
Fecal material- swab outside surface of feces avoiding inner contents with two cotton swabs, do not submit actual feces to Property

Clothing/ Personal Belongings thought to be from the perpetrator

Clothing left at the scene, including hats, masks, shirts, pants, and jackets
Shoes and other footwear
Headphones, watches, glasses, jewelry
Latex, leather, or fabric gloves
Worn shoelaces used to constrain a victim
Lip balm, lipstick
Combs, hair brush
Keys, pens, pencils

Food/ Eating Utensils

Partially consumed food such as burritos, candy bars, cheese (please have Property freeze it)
Gum or sunflower seeds that have been chewed
Any beverage container where it is possible that a perpetrator drank from it (pour the contents out before impounding)
Forks, spoons, or chopsticks used to eat with
Used straws or toothpicks

General Evidence

Tools (if thought to belong to the perpetrator)
Cigarette butts
Cell phones
Cigarette lighters
Guns discarded by perpetrators
Baseball bats
Knives
Shotgun shells even if fired
Hairs when there is a possibility that they have a root
Plastic bags in contact with perpetrator for a period of time
Envelope where the stamp or envelope seal may have been licked
Dirty ear swabs

EVIDENCE NOT VALUABLE FOR DNA TESTING

NOTE: Although not valuable as DNA evidence the types of items listed below may yield valuable latent fingerprint evidence

Clothing/Personal Belongings

Victim clothing or belongings touched or grabbed by the perpetrator such as jackets, wallets, credit cards, or keys

Surfaces

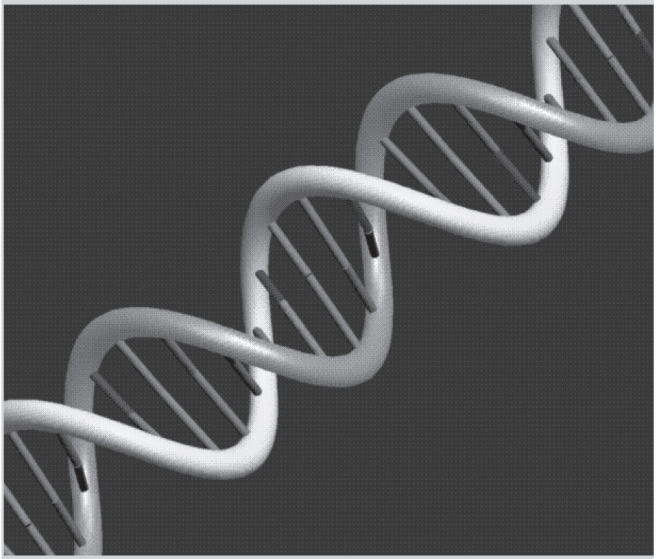
Any surface that the perpetrator **temporarily** touches that has been exposed to routine contact from the victim and/or the public. Some examples include:

Door knob/handles
Drawer pulls and safe handles
Objects moved from one location to another by the perpetrator
Swabs of common use counters such as a store or bank
Swabs of steering wheels, door handles, shifters from a vehicle where the perpetrator had possession of the vehicle for only a few hours in routine auto theft cases
Swabs of public phone booth or ATM
Anything used to tie or bind a victim (zip ties are an exception)
Duct tape used to bind a victim looking for the suspect (unless the tape looks as though it was torn using their teeth)
Smudges of surfaces such as windows or desks unless the surface is clean and there is confidence of prolonged contact with perpetrator
Padlocks that have been forced open
Paper documents such as receipts or letters
Rocks or bricks thrown through windows or at cars
Fired brass cartridge casings
Wooden sticks or branches (baseball bats or similar items are exceptions)
Public use items such as a pen at a bank counter
Shopping cart or cash drawers touched by suspect

COLLECTION KITS AVAILABLE FROM THE LABORATORY

Biological Stain Collection Kits: for the collection of biological stains (e.g. spit, blood, etc) or possible DNA from touched surfaces.

Reference Mouth Swab Collection Kits: for the collection of reference samples from victims, suspects, witnesses, or consensual partners.



Kits can be obtained from the Laboratory on the 6th floor of SDPD Headquarters. The Laboratory can also be reached by calling 619-531-2577.

PACKAGING GUIDELINES

Package all evidence in MANILA ENVELOPES or PAPER BAGS

- Do NOT package evidence in plastic

Clearly label ALL packaging

- Case number, date of collection, officer/detective collecting, Item number, suspect and victim (if known) MUST be on all packages
- Completely fill out label information on Biological Stain and Reference Mouth Swab Collection Kits

Always wear latex gloves when collecting or packaging evidence

Do NOT talk or breathe heavily over the evidence

Biological Stain Collection Kits are meant for the collection of biological stains from large items (e.g. a car) or immoveable items (e.g. a brick wall)

Evidence and Reference samples are NOT to be packaged together

- Evidence and reference samples can be impounded under the same property tag

Collect and package reference samples ONE AT A TIME to minimize sample mix up

Liquid samples such as urine can be packaged in plastic screw-cap containers

Do NOT add additional layers of paper packaging

REFERENCE SAMPLE COLLECTION

Reference samples from victims and suspects associated with crime cases should be collected whenever possible. They should be included as part of any DNA request submitted to the Laboratory .

A suspect's rap sheet may indicate a sample has been collected for the purpose of inclusion in the CODIS database. However, the Crime Laboratory does not have complete access to this database, and so a separate reference sample **MUST** be collected from a suspect whenever an investigator has access to the suspect.

IMPOUNDING EVIDENCE INTO PROPERTY

Department procedure 3.02 details the protocol for impounding general evidence. The following are guidelines for impounding DNA evidence:

Biological Stain Collection Kits, Reference Mouth Swab Collection Kits, and partially eaten food should be stored frozen. The item packaging as well as the remarks section of the Property Tag should indicate that.

Physical items of evidence with biological stains on them should be stored at room temperature.

If bulk evidence is wet or contains wet stains notify Property so that it may be dried prior to storage.

Appendix H: National Academy of Sciences Recommendations from *Strengthening Forensic Science in the United States: A Path Forward*

Recommendation 1

To promote the development of forensic science into a mature field of multidisciplinary research and practice, founded on the systematic collection and analysis of relevant data, Congress should establish and appropriate funds for an independent federal entity, the National Institute of Forensic Science (NIFS). NIFS should have a full-time administrator and an advisory board with expertise in research and education, the forensic science disciplines, physical and life sciences, forensic pathology, engineering, information technology, measurements and standards, testing and evaluation, law, national security, and public policy. NIFS should focus on:

a. establishing and enforcing best practices for forensic science professionals and laboratories;

b. establishing standards for the mandatory accreditation of forensic science laboratories and the mandatory certification of forensic scientists and medical examiners/forensic pathologists—and identifying the entity/entities that will develop and implement accreditation and certification;

c. promoting scholarly, competitive peer-reviewed research and technical development in the forensic science disciplines and forensic medicine;

d. developing a strategy to improve forensic science research and educational

e. programs, including forensic pathology;

f. establishing a strategy, based on accurate data on the forensic science community, for the efficient allocation of available funds to give strong support to forensic methodologies and practices in addition to DNA analysis;

g. funding state and local forensic science agencies, independent research projects, and educational programs as recommended in this report, with conditions that aim to advance the credibility and reliability of the forensic science disciplines;

h. overseeing education standards and the accreditation of forensic science programs in colleges and universities;

i. developing programs to improve understanding of the forensic science disciplines and their limitations within legal systems; and

j. assessing the development and introduction of new technologies in forensic investigations, including a comparison of new technologies with former ones.

Recommendation 2

The National Institute of Forensic Science (NIFS), after reviewing established standards such as ISO 17025, and in consultation with its advisory board, should establish standard terminology to be used in reporting on and testifying about the results of forensic science investigations. Similarly, it should establish model laboratory reports for different forensic science disciplines and specify the minimum information that should be included. As part of the accreditation and certification processes, laboratories and forensic scientists should be required to utilize model laboratory reports when summarizing the results of their analyses.

Recommendation 3

Research is needed to address issues of accuracy, reliability, and validity in the forensic science disciplines. The National Institute of Forensic Science (NIFS) should competitively fund peer-reviewed research in the following areas:

a. Studies establishing the scientific bases demonstrating the validity of forensic methods.

b. The development and establishment of quantifiable measures of the reliability and accuracy of forensic analyses. Studies of the reliability and accuracy of forensic techniques should reflect actual practice on realistic case scenarios, averaged across a representative sample of forensic scientists and

laboratories. Studies also should establish the limits of reliability and accuracy that analytic methods can be expected to achieve as the conditions of forensic evidence vary. The research by which measures of reliability and accuracy are determined should be peer reviewed and published in respected scientific journals.

c. The development of quantifiable measures of uncertainty in the conclusions of forensic analyses.

d. Automated techniques capable of enhancing forensic technologies.

Recommendation 4

To improve the scientific bases of forensic science examinations and to maximize independence from or autonomy within the law enforcement community, Congress should authorize and appropriate incentive funds to the National Institute of Forensic Science (NIFS) for allocation to state and local jurisdictions for the purpose of removing all public forensic laboratories and facilities from the administrative control of law enforcement agencies or prosecutors' offices.

Recommendation 5

The National Institute of Forensic Science (NIFS) should encourage research programs on human observer bias and sources of human error in forensic examinations. Such programs might include studies to determine the effects of contextual bias in forensic practice (e.g., studies to determine whether and to what extent the results of forensic analyses are influenced by knowledge regarding the background of the suspect and the investigator's theory of the case). In addition, research on sources of human error should be closely linked with research

conducted to quantify and characterize the amount of error. Based on the results of these studies, and in consultation with its advisory board, NIFS should develop standard operating procedures (that will lay the foundation for model protocols) to minimize, to the greatest extent reasonably possible, potential bias and sources of human error in forensic practice. These standard operating procedures should apply to all forensic analyses that may be used in litigation.

Recommendation 6

To facilitate the work of the National Institute of Forensic Science (NIFS), Congress should authorize and appropriate funds to NIFS to work with the National Institute of Standards and Technology (NIST), in conjunction with government laboratories, universities, and private laboratories, and in consultation with Scientific Working Groups, to develop tools for advancing measurement, validation, reliability, information sharing, and proficiency testing in forensic science and to establish protocols for forensic examinations, methods, and practices. Standards should reflect best practices and serve as accreditation tools for laboratories and as guides for the education, training, and certification of professionals. Upon completion of its work, NIST and its partners should report findings and recommendations to NIFS for further dissemination and implementation.

Recommendation 7

Laboratory accreditation and individual certification of forensic science professionals should be mandatory, and all forensic science professionals should have access to a certification process. In determining appropriate standards for accreditation and certification, the National Institute of Forensic Science (NIFS) should take into account established and recognized international standards, such as those published by the International Organization for Standardization (ISO). No person (public or private) should be allowed to practice in a forensic science discipline or testify as a forensic science professional without certification. Certification requirements should include, at a minimum, written examinations, supervised practice, proficiency testing, continuing education, recertification procedures, adherence to a code of ethics, and effective disciplinary procedures. All laboratories and facilities (public or private) should be accredited, and all forensic science professionals should be certified, when eligible, within a time period established by NIFS.

Recommendation 8

Forensic laboratories should establish routine quality assurance and quality control procedures to ensure the accuracy of forensic analyses and the work of forensic practitioners. Quality control procedures should be designed to identify mistakes, fraud, and bias; confirm the continued validity and reliability of standard operating procedures and protocols; ensure that best practices are being followed; and correct procedures and protocols that are found to need improvement.

Recommendation 9

The National Institute of Forensic Science (NIFS), in consultation with its advisory board, should establish a national code of ethics for all forensic science disciplines and encourage individual societies to incorporate this national code as part of their professional code of ethics. Additionally, NIFS should explore mechanisms of enforcement for those forensic scientists who commit serious ethical violations. Such a code could be enforced through a certification process for forensic scientists.

Recommendation 10

To attract students in the physical and life sciences to pursue graduate studies in multidisciplinary fields critical to forensic science practice, Congress should authorize and appropriate funds to the National Institute of Forensic Science (NIFS) to work with appropriate organizations and educational institutions to improve and develop graduate education programs designed to cut across organizational, programmatic, and disciplinary boundaries. To make these programs appealing to potential students, they must include attractive scholarship and fellowship offerings. Emphasis should be placed on developing and improving research methods and methodologies applicable to forensic science practice and on funding research programs to attract research universities and students in fields relevant to forensic science. NIFS should also support law school administrators and judicial education organizations in establishing continuing legal education programs for law students, practitioners, and judges.

Recommendation 11

To improve medicolegal death investigation:

a. Congress should authorize and appropriate incentive funds to the National Institute of Forensic Science (NIFS) for allocation to states and jurisdictions to establish medical examiner systems, with the goal of replacing and eventually eliminating existing coroner systems. Funds are needed to build regional medical examiner offices, secure necessary equipment, improve administration, and ensure the education, training, and staffing of medical examiner offices. Funding could also be used to help current medical examiner systems modernize their facilities to meet current Centers for Disease Control and Prevention-recommended autopsy safety requirements.

b. Congress should appropriate resources to the National Institutes of Health (NIH) and NIFS, jointly, to support research, education, and training in forensic pathology. NIH, with NIFS participation, or NIFS in collaboration with content experts, should establish a study section to establish goals, to review and evaluate proposals in these areas, and to allocate funding for collaborative research to be conducted by medical examiner offices and medical universities. In addition, funding, in the form of medical student loan forgiveness and/or fellowship support, should be made available to pathology residents who choose forensic pathology as their specialty.

c. NIFS, in collaboration with NIH, the National Association of Medical Examiners, the American Board of Medicolegal Death Investigators, and other appropriate professional organizations, should establish a Scientific Working Group (SWG) for forensic pathology and medicolegal death investigation. The SWG should develop and promote standards for best practices, administration, staffing, education, training, and continuing education for competent death scene investigation and postmortem examinations. Best practices should include the utilization of new technologies such as laboratory testing for the molecular basis of diseases and the implementation of specialized imaging techniques.

d. All medical examiner offices should be accredited pursuant to NIFS endorsed standards within a timeframe to be established by NIFS.

e. All federal funding should be restricted to accredited offices that meet NIFS-endorsed standards or that demonstrate significant and measurable progress in achieving accreditation within prescribed deadlines.

f. All medicolegal autopsies should be performed or supervised by a board certified forensic pathologist. This requirement should take effect within a timeframe to be established by NIFS, following consultation with governing state institutions.

Recommendation 12

Congress should authorize and appropriate funds for the National Institute of Forensic Science (NIFS) to launch a new broad-based effort to achieve nationwide fingerprint data interoperability. To that end, NIFS should convene a task force comprising relevant experts from the National Institute of Standards and Technology and the major law enforcement agencies (including representatives from the local, state, federal, and, perhaps, international levels) and industry, as appropriate, to develop:

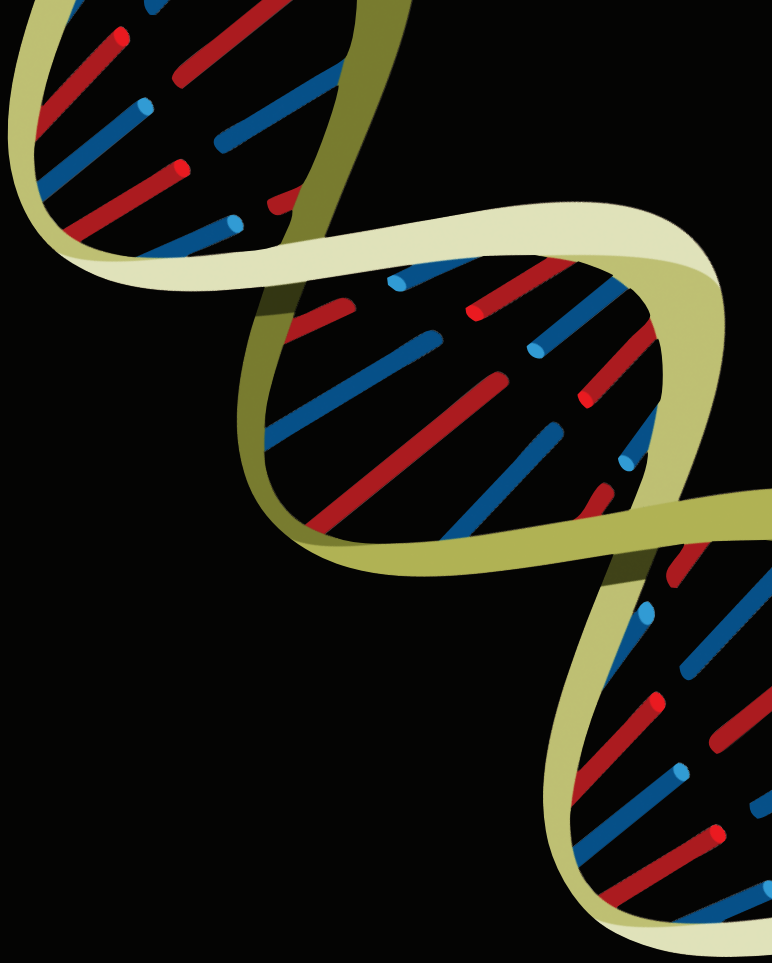
standards for representing and communicating image and minutiae data among Automated Fingerprint Identification Systems. Common data standards would facilitate the sharing of fingerprint data among law enforcement agencies at the local, state, federal, and even international levels, which could result in more solved crimes, fewer wrongful identifications, and greater efficiency with respect to fingerprint searches; and

baseline standards—to be used with computer algorithms—to map, record, and recognize features in fingerprint images, and a research agenda for the continued improvement, refinement, and characterization of the accuracy of these algorithms (including quantification of error rates).

Recommendation 13

Congress should provide funding to the National Institute of Forensic Science (NIFS) to prepare, in conjunction with the Centers for Disease Control and Prevention and the Federal Bureau of Investigation, forensic scientists and crime scene investigators for their potential roles in managing and analyzing evidence from events that affect homeland security, so that maximum evidentiary value is preserved from these unusual circumstances and the safety of these personnel is guarded. This preparation also should include planning and preparedness (to include exercises) for the interoperability of local forensic personnel with federal counterterrorism organizations.

Excerpted from "Strengthening Forensic Science in the United States: A Path Forward." Online publication available at www.nap.edu and a free PDF download of the Executive Summary is available at http://books.nap.edu/catalog/12589.html.



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September 2010
e08027302
ISBN: 978-1-935676-27-0