

Utilizing DNA Evidence to Investigate Cold Case Sexual Assaults through CODIS

Increasing public safety through sexual assault response



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Introduction

On behalf of the Bureau of Justice Assistance (BJA), the National Sexual Assault Kit Initiative Training and Technical Assistance (SAKI TTA) Team wants to thank you for your partnership and willingness to grow your knowledge about sexual assault reform.

This booklet combines our key DNA and Combined DNA Index System (CODIS) briefs into a single product. In this booklet, you will find a number of resources to further your understanding of DNA testing, reporting, and screening; information in this booklet will also assist you in fostering a strong foundation for working with a private vendor laboratory, if you choose to pursue this within your SAKI grant. Amy Jeanguenat, our DNA subject matter expert and one of the many fantastic SAKI TTA partners, carefully crafted the DNA briefs.

In addition to DNA resources, you will also find briefs focused on CODIS and surrounding disciplines. These briefs consist of tips for better communication flow when using the CODIS database, discuss the importance of incorporating elimination samples into your CODIS workflow, and highlight best practices for law enforcement agencies to pursue an investigation following a positive CODIS hit. Jim Markey and Jordan Satinsky, two of SAKI TTA's subject matter experts, authored these briefs with members of law enforcement in mind.

Again, thank you for your interest in sexual assault reform. We hope this booklet betters your understanding of DNA- and CODIS-related topics!

—SAKI TTA Team

Author Bios

Amy Jeanguenat

Amy Jeanguenat has spent her career working in the private forensic industry supporting efforts worldwide to prevent and eliminate DNA backlogs, refining operational logistics, and providing quality and technical system support. This includes helping to manage the successful completion of sexual assault kit outsourcing projects from Houston, Texas, and Detroit, Michigan. As a laboratory director and technical leader, Mrs. Jeanguenat managed a staff of more than 100 forensic DNA scientists that completed over 14,000 cases and 80,000 database samples annually. Mrs. Jeanguenat has a Bachelor of Science in Biology from Michigan State University and a Master of Forensic Sciences from The George Washington University. Currently Mrs. Jeanguenat works as the principal consultant for Mindgen, LLC, with a mission to improve forensic DNA analysis, understand the effects of mindfulness and human factors on human performance, and reduce the pressure and stress realized by forensic scientists and leaders.



Jim Markey

James Markey (retired) is a 30-year veteran of the Phoenix Police Department. He was a detective sergeant to the adult sex crime unit and supervised more than 7,000 sexual assault investigations, which included more than 80 serial rapists. He developed the Phoenix Police Department Sexual Assault Cold Case Team and led several high-profile serial rape cases. Mr. Markey is an Arizona Peace Officer Standards and Training Board instructor and a certified instructor for Franklin-Covey in the Nobility of Policing. He has trained hundreds of law enforcement investigators on sex crimes, crime scene investigation, interviewing and interrogation, DNA and untested and backlog evidence, and cold case investigations. Mr. Markey co-wrote a law enforcement help manual and has written articles for the *FBI Law Enforcement Bulletin* and the *Violence Against Women Journal*. He has a Bachelor's degree in criminal justice and a Master's degree in educational leadership.



Jordan Satinsky

Detective Lieutenant Jordan Satinsky is employed by the Montgomery County Police Department in Maryland. Lieutenant Satinsky is currently assigned as the Deputy Director of the Special Victims Investigations divisions. He has been a law enforcement officer since 1999. Lieutenant Satinsky has worked as a patrol officer, an investigator, a patrol supervisor, an investigative supervisor, and a deputy station commander. During his career, Lieutenant Satinsky has investigated property crimes, child sex/physical abuse, adult sex crimes, elder/vulnerable adult abuse, domestic violence, and homicide. Lieutenant Satinsky founded the Sex Assault Unit for the county police and was instrumental in integrating the police department into the local Family Justice Center. He also founded the Montgomery County Police Department's Sexual Assault Response Team. He is a police instructor for investigations and leadership, and travels across the country to teach members of police departments and allied agencies. Lieutenant Satinsky was a member of the SAFER working group; he is currently a member of the SAKI TTA Team. His career has allowed him to develop an Adult Sex Crimes Unit in a major county police agency. Lieutenant Satinsky not only created the unit, but he also trained the detectives assigned to the unit.



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DNA Education

DNA technology continues to advance the usability of sexual assault evidence. In the past, presumptive detection of semen or direct observation of sperm was required to perform a DNA test on sexual assault evidence, including evidence found in a sexual assault kit (SAK). Thanks to increased sensitivity in DNA detection, male DNA can now be detected—and even isolated—with DNA markers specific to the Y-chromosome. Specialized DNA extraction techniques that separate male sperm cells from female epithelial cells can also now be automated for increased efficiency.

With these changes, male DNA can be detected in the same sample that is used for DNA typing, thus preserving the sample. This process, known as male DNA screening, can also help a DNA analyst determine the suitability of DNA testing and the type of methodologies and technologies to use for processing. Workflows can be streamlined to detect minute amounts of DNA from cold case samples.

The following briefs provide a strong foundation for DNA education:

- ◆ [DNA Testing 101: Sexual Assault Kits](#)
- ◆ [Understanding DNA Testing and Reporting: Unsubmitted Sexual Assault Kits](#)
- ◆ [Understanding Male DNA Screening to Eliminate and Prevent Sexual Assault Kit Backlogs](#)

The information in these resources explains common DNA terminology, the basic steps sexual assault evidence flows through in a laboratory setting, and reporting/conclusion criteria. If your jurisdiction uses a private vendor laboratory for SAK testing and analysis, please see the appendix for establishing a positive relationship with that laboratory.

DNA Testing 101: Sexual Assault Kits

Screening

Biological Fluid Screening: Use of physical methods, biochemical assays, or microscopy to detect, characterize, or identify biological fluids or tissues. In sexual assault cases, biological fluid screening can be helpful in identifying semen, seminal fluid, spermatozoa, saliva, and blood.

Male DNA Screening: Use of a quantification assay that detects human and male DNA to screen cases using a step already present in the DNA workflow. This method can determine if enough male DNA is present to proceed with short tandem repeat (STR) testing, Y-STR testing, or both.

Testing

STR Testing: Commonly used nuclear forensic DNA test that targets areas in the DNA that are short, tandem, and repeated. It is the difference in the number of repeats at each location that differ among individuals; this information is compiled to create a DNA profile.

Y-STR Testing: Targets STR regions only on the Y-chromosome found in males. This test generates a Y-STR profile. Y-STR testing can be useful in cases with high levels of female DNA, male-to-male mixtures, and when a known male sample is available for comparison.

Crime analysts complete the following steps to test biological evidence from a victim's sexual assault kit (SAK).

Workflow



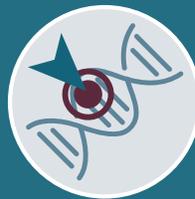
1. Swab from a SAK is cut and placed in a test tube.



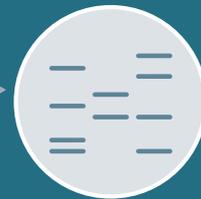
2. Chemicals are added to remove cellular material from the swab and purify the DNA. In a differential extraction, two fractions are created when possible sperm cells are separated from non-sperm cells.



3. The amounts of human and male DNA in a sample are determined by quantification. This may be used as a screening step to determine if the sample continues with DNA analysis or not.



4. Based on the quantification results, the specific STR regions being examined are amplified to yield many copies of those regions during a process known as polymerase chain reaction. This amplification yields larger amounts of DNA, which in turn means more accurate and reliable results for later techniques.



5. DNA fragments are separated by size via applying a voltage to each sample during capillary electrophoresis. As DNA passes through a detection window, it is excited by a laser beam and visualized.

DNA Profile:
TPOX: 8,9,3
FGA: 23,28
D7: 9,13
AMEL: X, Y



6. Computerized data acquisition helps analyze results and generate a DNA profile of the STR regions examined.

Reporting

DNA Testing Results

- **No further testing:** Insufficient biological fluid or male DNA exists to warrant DNA testing.
- **No results:** Insufficient biological material exists to generate DNA profile.
- **Partial profile:** Genetic information was obtained from some of the STR regions tested.
- **Full profile:** Genetic information was obtained from all STR regions tested.
- **Mixture profile:** Sample contains DNA from more than one contributor.
- **CODIS eligible:** DNA profile meets the quality requirements for entry and search in CODIS.

A hit occurs when a DNA profile matches another profile in CODIS.

Offender Hit: Known DNA profiles from individuals associated with arrestee or offender profiles match against a profile entered from a crime scene, identifying a possible perpetrator.

Forensic Hit: Foreign DNA profiles from two or more crime scenes are matched together, but the source of the DNA profile remains unknown.

CODIS: The Combined DNA Index System, or CODIS, blends forensic science and computer technology into a tool for linking violent crimes. It enables federal, state, and local forensic laboratories to exchange and compare DNA profiles electronically, thereby linking serial violent crimes to each other and to known offenders. (Definition taken from the FBI's Combined DNA Index System website.)

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Understanding DNA Testing and Reporting: Unsubmitted Sexual Assault Kits

Technological advances in DNA testing and leveraging the use of database searches in the Combined DNA Index System (CODIS) have, in part, driven testing of cold-case evidence and unsubmitted sexual assault kits, known as SAKs. If there is documentation, such as a police report, that a crime occurred, any foreign DNA obtained from evidence may be valuable to help identify a perpetrator and link with other crimes through a database search. Through the Department of Justice's Bureau of Justice Assistance National Sexual Assault Kit Initiative (SAKI), funding opportunities and support are available to include testing all unsubmitted SAKs for DNA.

Significant efforts are being conducted to inventory stored sexual assault kits, but partially tested SAKs also may warrant reexamination. Older evidence still may be suitable for DNA testing, even if it was previously tested using biological fluid screening only or with early DNA tests, such as restriction fragment length polymorphism (RFLP). The results of these examinations may even help determine whether there is viable evidence to proceed with additional testing using newer DNA technology. Even if evidence was partially or mostly consumed during prior testing, extracts and other byproducts of previous processes may be used.

CHALLENGE:

Obtain CODIS-eligible DNA from serology negative cases

- ◆ DNA quantification and amplification kits are more sensitive for screening semen.
- ◆ Enzymes used in serological detection break down over time.
 - Not detectable if digital penetration or no ejaculation
 - Viable DNA still possible
- ◆ DNA extracts can provide viable DNA to test using
 - Expanded short tandem repeat (STR) loci kits
 - Y-STR loci kits

Out of 132 sexual abuse samples, 19 samples were positive for male DNA using Y-chromosome markers that previously screened negative using traditional serology techniques such as prostate specific antigen and microscopy techniques.¹

(Stange et al., 2014)

Vulva and low vaginal swabs were recovered from a 19-year-old female 8 hours after an alleged sexual assault incident. No spermatozoa were detected. The samples were submitted for Y-STR testing and a full Y-STR profile was obtained.²

(McDonald et al., 2015)

STR Technology: Prominent DNA Test

DNA is an acronym for deoxyribonucleic acid. Found within the nucleus of the cells in our body, DNA is known as the biological blueprint of life. Nuclear DNA is passed down generation to generation, with half a person's DNA coming from each parent. Humans are very similar to other humans but, excluding identical twins, there are small differences in our DNA that can tell us apart. Forensic DNA testing focuses on the parts of the DNA that are different between humans.

Common forensic nuclear DNA tests look at short tandem repeats (STRs) in our DNA, where

- ◆ **short** refers to small segments of DNA,
- ◆ **tandem** refers to being right next to each other, and
- ◆ **repeats** means replication.

A forensic DNA test examines the number of times an STR repeats, known as an allele (see Example 1). Because half a person's DNA comes from each parent, each person will have two repeats (alleles) at each location tested (see Example 2). A DNA profile is created when many STRs (typically 15–24 locations) are examined. The DNA profile also indicates whether the profile is female (X,X) or male (X,Y).

Example 1. STR Profile at Three Marker Locations

STR Location	Allele 1	Allele 2
D8S1179	10	12
FGA	24	24
Amelogenin	X	Y

Note: In Example 1, D8S1179 is the name of an STR location examined. The results at this location are 10,12 (see Example 2). FGA is a second STR location examined, and the results are 24,24. Amelogenin is a sex determining marker; the results X,Y indicate the DNA is from a male.

Example 2. STR Structure, D8S1179

TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA
= 10 repeats

TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA-TCTA
= 12 repeats

STR technology is important in forensics. Because data can be obtained from a small amount of sample (i.e., pin drop), the regions are stable but also highly variable between humans, and the regions can be targeted simultaneously for efficiency. These features also make this technology popular for paternity testing, ancestry testing, and human identification in mass disasters and missing persons.

Expanded DNA Testing: Y-Chromosome and Mitochondrial DNA

Other types of DNA tests can be encountered in a forensic setting. Y-chromosome testing looks at STR regions on the male Y chromosome, which is passed down through the paternal lineage (i.e., father to son). This testing can be useful when very little male DNA is detected in the presence of high amounts of female DNA. By focusing on the male DNA, forensic examiners can develop a Y-STR profile, essentially ignoring the impact of the female DNA. This makes Y-chromosome testing a viable option for detecting low levels of male DNA in sexual assault kits.

Another type of DNA test uses mitochondrial DNA (mtDNA). Instead of looking at nuclear DNA, pieces of mitochondrial DNA—found within the cell but outside the nucleus—are sequenced to create a mtDNA profile. This type of DNA is passed down maternally (i.e., from mother to her children) and is useful for testing hair shafts, where nuclear DNA is not present, or skeletal remains that often have compromised nuclear DNA. Due to inheritance patterns, Y-STR and mtDNA profiles cannot uniquely identify an individual, but these

tests can provide very important information to help with an investigation.

DNA: The Laboratory Process

DNA is the same throughout all the cells in each person and commonly can be obtained from biological fluids (i.e., blood, saliva, semen), hair roots, skin cells, tissue, and skeletal elements. Consequently, evidence submitted for possible DNA testing can vary greatly (see Example 3). A forensic examiner may attempt to identify a possible biological fluid or submit items directly to DNA testing. Using chemicals, the examiner will remove possible DNA from the submitted substrate (i.e., swab) and purify it. Next, the amount of human DNA retained from the item is determined; at this stage, the amount of male DNA present also can be established. Depending on the scenario, screening for male DNA is a vital process in some sexual assault kit workflows. If the amount of DNA recovered is below established detection limits, laboratories may choose to not proceed with further testing. However, by processing further, DNA is copied by targeting the STR regions that are different between humans. The STR regions are separated and, using computer software, the forensic examiner records the test result at each location and summarizes the results and any comparisons, conclusions, and statistics in a forensic case report.

Example 3. Items Commonly Submitted for DNA Testing

Bedding	Swabs from firearms
Bones	Fingernail scrapings
Bottles, straws, cups	Hair
Cigarette butts	Ligatures
Clothing: hats, shirts, pants, sneakers, underwear, gloves	Sex kits: vaginal swabs, anal swabs, oral swabs
Swabs from surfaces: window, steering wheel, door	Swabs of possible stains: blood, saliva, semen
Condoms and wrappers	Weapon handles

DNA Reports and Conclusions

Forensic DNA reports have common, standardized elements that include report date, case identifier, description of the technology, DNA locations tested or chemistry utilized, description of the evidence examined, results, disposition of evidence, and the signature and title of the person authorizing the report. When applicable, conclusions and a quantitative or qualitative interpretation statement are

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included. If the case was screened for biological fluids (i.e., semen, blood, saliva), a section or separate report will explain the screening, results and conclusions, and whether the item proceeded to or is recommended for DNA testing. For laboratories that screen sexual assault kits with DNA, the lack or presence of DNA and decisions to further proceed with DNA testing also should be clearly communicated.

Depending on the amount of DNA and its quality, the result may have data at every location tested (a full profile) or data at some of the locations tested (a partial profile). If no DNA is detected—for example, no DNA is deposited on an item tested or the DNA is degraded due to varying conditions over time, temperature, and humidity—there will be no results. Profiles that contain data from more than one individual are referred to as DNA mixtures. Because one person may have up to two different alleles at each location, three, four, or more alleles detected at a single location indicate multiple contributors. The totality of the profile is used to determine the results and make conclusions.

The DNA profile from an evidence item can be compared to known profiles obtained from the victim, suspect, or elimination samples. Results are commonly referred to as inconclusive, excluded, or included. When a result is *inconclusive*, there is typically not enough information, or the information is too complex to make a definitive conclusion; the DNA from that item is not reliable for making comparisons. An *exclusion* supports that a known profile cannot be contained within the profile generated from the evidence item, whereas an *inclusion* supports the known profile cannot be omitted from the DNA profile generated from the evidence item. Sometimes an inclusion also will be called a match, when there is a single DNA profile from one individual. An inclusion or match always should be supported with a quantitative statistical calculation that helps to explain the rarity of the inclusion (e.g., a random match probability or likelihood ratio).

Lack or presence of DNA should always be examined within the totality of all the evidence in an investigation. When there is an inclusion, a quantitative statistic represents the rarity of the DNA profile, and cannot convey the chance the person committed or did not commit the crime. Thus, DNA cannot convey guilt or innocence. Currently, DNA evidence cannot determine the age of the DNA or the age of the donor, but research is being conducted in these areas.

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Understanding Male DNA Screening to Eliminate and Prevent Sexual Assault Kit Backlogs

Reducing manual steps and optimizing automation will be essential as laboratories look for sustainable methods to enhance the efficiency of processing sexual assault kits (SAKs). Many forensic laboratories screen SAKs for biological fluid, such as semen; this process can take approximately 4–7 hours per kit.^{1,2} Following biological fluid screening, the samples deemed probative for possible DNA are selected for differential extraction—a process that separates sperm cells from non-sperm cells. The trained capacity and number of hours needed to screen thousands of kits, let alone proceed with DNA testing, can cripple crime laboratories. Thus, laboratories need alternative approaches to reduce bottlenecks in the screening process.

Male DNA Screening

Male DNA screening—also known as Y-Marker screening or Direct-to-DNA—has been used in large outsourcing projects, such as the testing of SAKs in New York City, Los Angeles, Houston, and Detroit. However, this approach has not been widely adopted throughout public and government crime laboratories.

Male DNA screening shifts the emphasis from screening cases for biological fluid to screening cases with quantification, a step already used in DNA processing to determine how much DNA a sample contains.³ Because modern commercial quantification kits determine how much (1) human DNA (i.e., both male and female DNA) and (2) male DNA a sample contains, quantification can be used in the screening process and can take less than 1 hour per kit.

The screening portion shifts to a step that already exists in DNA processing; therefore, male DNA screening can be automated for high-throughput testing. Male DNA screening does not detect seminal fluid or semen.

However, screening for male DNA will help detect possible probative samples from cases involving digital penetration or other touching, no ejaculation, or azoospermic males who currently screen negative in biological fluid screening. In one study, male DNA screening proved more effective

than biological fluid screening at detecting male DNA from vaginal swabs, external genitalia, and dried secretions.⁴ For cases that may have been improperly stored or aged, male DNA screening may be a better predictor of the success of obtaining a DNA profile where enzymes that detect biological fluids may have degraded.

Methods of Male DNA Screening

Male DNA screening is commonly applied in two ways—the difference between the approaches is when the screening step occurs in relation to the differential extraction.

Approach A: Screen Before Differential Extraction

With this approach, a small cutting is taken from a sample. A fast and crude DNA extraction is performed, then the sample proceeds to quantification with male DNA screening.¹

This approach quickly identifies any male-DNA-negative samples, allowing a scientist to proceed with DNA analysis by returning to the evidence and taking another sampling of male-DNA-positive samples.

Approach B: Screen After Differential Extraction

As part of this approach, a larger cutting is taken for DNA testing. A differential extraction is performed, then the sample proceeds to quantification with male DNA screening.³

This approach identifies any male-DNA-negative samples, allowing a scientist to proceed with DNA testing on the remaining extract for male-DNA-positive samples.

Approach A	Approach B
<ul style="list-style-type: none">◆ Uses less sample◆ Is less labor intensive upfront◆ Requires male-DNA-positive evidence to be sampled and extracted a second time	<ul style="list-style-type: none">◆ Is more labor intensive on the front-end◆ Is more efficient in workflows using automation of differential extractions or sperm preferential extractions

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Male DNA Screening Is Not Y-STR Testing

Male DNA screening occurs during the quantification stage of DNA testing. Estimates of the amount of total human DNA and male DNA present in the sample occur during quantification. The estimate of male DNA and the ratio of human DNA to male DNA are used to guide further DNA testing, such as short tandem repeat (STR) and/or Y-STR testing.

Y-STR testing occurs during the amplification stage of DNA testing and follows quantification. Y-STR testing targets short tandem repeat loci found on the male Y-chromosome. Y-STR testing may be useful in the following situations:

- ◆ To analyze a sample when a large amount of female DNA exists in the presence of a small amount of male DNA
- ◆ To clarify the number of males in a sample
- ◆ To provide clarity for inconclusive STR results
- ◆ To aid in the power of exclusion.

Male DNA Reporting

Although consistent reporting guidelines do not exist for male DNA screening established in the United States, some trends have been identified. Generally, results will fall into one of five categories:

1. Positive for male DNA (i.e., male DNA detected and suitable for DNA testing)
2. Positive for male DNA but in the presence of a high ratio of total human DNA (i.e., male DNA detected but generally unsuitable for STR testing, though it may be suitable for Y-STR testing)
3. Negative for male DNA (i.e. no male DNA detected above the detection threshold)
4. No results (i.e., no DNA present above the detection threshold)
5. Inconclusive (i.e., based on the assay it is not possible to confirm reliably the presence of male DNA).

Summarizing Case Studies

Case metrics from New York, Los Angeles, Detroit, and Houston can be useful in decision making.^{5,6,7,8} Among the 4 jurisdictions, 7,811 kits were analyzed for metrics. Of these

kits, eligibility for query against the Combined DNA Index System (CODIS) was 35%–65% and CODIS hit rates were 13%–29%. The New York project has been completed for more than a decade, and so now there is more information on post-CODIS hit follow-up—especially from Manhattan. Of the cases in which an assailant was identified via DNA, the case did not proceed to indictment when the statute of limitations was expired or the victim was missing, recanted, or did not want to proceed.⁶ As such, the indictment rates are currently fewer than 2%. Shifting semen confirmation to the indictment stage would significantly decrease the time and effort involved in laboratory processing.

Unless semen detection is required for a particular legal charge, a DNA profile may be the only evidence needed to proceed with indictment.

Moving Forward

Some multi-disciplinary working groups that have been formed through recent grant initiatives have determined that identifying biological fluid could be essential to the case.⁵ However, this does not mean utilizing biological screening as the means to identify probative DNA is necessary. Laboratories that use Y-Marker screening often have protocols in place to perform serological tests for identifying biological fluid if specifically requested.

As agencies have moved into other phases of their backlog projects, multi-disciplinary teams have determined that biological fluid screening could be eliminated. As a result, a male DNA screening approach is being adopted throughout agencies, such as the Michigan State Police, for all sexual assault kits.⁵

Conclusion

Male DNA screening will not identify biological fluid or tissue type; however, this approach has many benefits that may not be realized with a biological fluid screening approach. These benefits include the following:

- ◆ Automate high-throughput processing
- ◆ Reduce cost and time to screen a SAK
- ◆ Increase identification of probative samples submitted for DNA
- ◆ Aid in determining success of obtaining a DNA profile.

Effective education, training, and communication among law enforcement officials, prosecutors, and forensic scientists can determine optimized approaches to address legislative requirements and utilize modern forensic technology.

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Combined DNA Index System (CODIS)

Using DNA databases amplifies the power of DNA typing. Databases store DNA profiles of evidence samples and known samples. As these databases grow larger, the effectiveness of linking and solving crimes also increases.

DNA databases have helped exonerate the wrongly convicted, identify potential perpetrators in cold cases, and link offenders to serial crimes. Effective use of DNA databases involves continual communication and support among law enforcement officials, crime laboratory personnel, prosecutors, and policy makers. Changes to legislation regarding offender collection policies, elimination of DNA backlogs, and DNA testing in real-time all contribute to the efficiency and success of investigations aided by DNA databases.

In the United States, the Federal Bureau of Investigation (FBI) launched the Combined DNA Index System (CODIS) in 1998. The DNA Identification Act of 1994 authorized the establishment of this nationwide database and specified the requirements for maintaining data. The following required criteria help to ensure the integrity of the database. Participating laboratories must

- ◆ comply with the FBI Quality Assurance Standards (QAS) for Forensic DNA Testing Laboratories;
- ◆ be accredited by a nationally recognized nonprofit, forensic professional organization;
- ◆ demonstrate compliance with FBI QAS by undergoing an external audit every 2 years; and
- ◆ be federal, state, or local criminal justice agencies; access to DNA data is limited in accordance with federal law.

The following two briefs complement each other by introducing how CODIS supports the solvability of sexual assault cases:

- ◆ **Data and Communication Flow in CODIS**
- ◆ **Use of Elimination Samples as a Gateway for CODIS Entry**

Data and Communication Flow in CODIS

The Combined DNA Index System (CODIS) is a dynamic system to provide aid in investigations through a tiered architectural approach: Local indexes flow into their respective state index, whereby eligible profiles flow into the National DNA Index System (NDIS). These architectural indexes further comprise searchable indexes, such as the following¹:

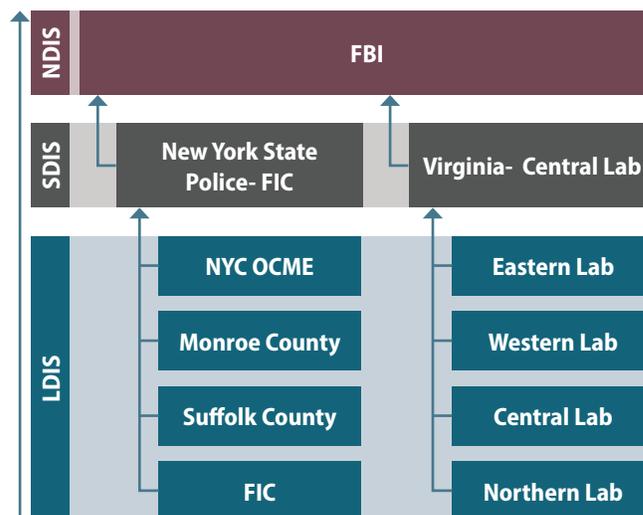
- ◆ **Offender.** DNA profiles from individuals convicted of crimes
- ◆ **Arrestee.** Based on state law, DNA profiles taken from individuals at the time of arrest
- ◆ **Forensic.** Foreign DNA profiles from crimes scene not matched to a victim, suspect, or elimination samples

Unidentified Human Remains, Missing Persons, Biological Relatives of Missing Persons, and Pedigree Tree are all indexes that support the national missing persons program.¹

Each state will have a local laboratory that maintains and operates the State Database Index System (SDIS) and is designated as the SDIS lab. Other public and federal participating laboratories in the state are designated Local Database Index System (LDIS) labs, which transmit data to share with the SDIS indexes; LDIS data communicate with other LDIS data through SDIS. The FBI maintains the national database. If profiles in SDIS meet the NDIS eligibility requirements, the profiles will be searched against eligible profiles from other states (see Figure 1).²

Communication occurs in this tiered approach to achieve effective data sharing, while allowing agencies to operate their local and state databases according to applicable federal, state, and local legislation. Participating agencies have collaborative agreements with other agencies for data sharing and searching assistance.

Figure 1. Tiered Approach of Communication in CODIS



Note: Partial example of architectural indexes and communication flow within CODIS. A tiered approach allows for each lab to operate its participation in CODIS according to applicable federal, state, and local legislation, while allowing the FBI to operate NDIS.

Due to varying SDIS requirements, based on jurisdiction-specific legislation or upload policies, some SDIS-level profiles are never searched at the NDIS level.³ However, requests can be conducted to search a specific SDIS database. Each laboratory will have a CODIS administrator who can provide specific instructions, sometimes based on state codes, for requesting information and searches outside jurisdiction.

Searches at the LDIS and SDIS levels occur as needed, upon upload, as requested, or according to a schedule outlined by standard operating procedures. Searching and transmission of data to NDIS occurs according to a predetermined weekly schedule for each state.² This schedule helps control the volume of data input and prevents bottlenecks that may slow down the transmission and search algorithms.

When CODIS aids an investigation, that means there was a “hit” either in the forensic index that established a possible link between crimes, or between the forensic index and a reference index (e.g., offender, arrestee), identifying a suspected perpetrator.⁴

CODIS investigation “hits”:

- ◆ **Forensic index**—link between crimes
- ◆ **Forensic & reference indexes**—link between indexes that identifies a possible perpetrator

All hits will be reviewed to verify the match or consistency between linked profiles and the eligibility and qualification of the samples. In some situations, samples may be pulled and reanalyzed. After verification, a written notification of the investigation aided will be maintained for records and provided to the investigator, usually in the form of a CODIS hit report.⁴ As of November 2016, CODIS has produced over 355,535 hits, assisting in more than 340,554 investigations and demonstrating the success of the CODIS program.⁵

References:

1. Federal Bureau of Investigation (FBI). Combined DNA Index System (CODIS) Brochure. Retrieved from <https://www.fbi.gov/file-repository/combined-dna-index-system-codis-brochure.pdf/view>
2. Federal Bureau of Investigation (FBI) Laboratory. (2017, January 1). National DNA Index System (NDIS) Operational Procedures Manual, Version 5. Retrieved from <https://www.fbi.gov/file-repository/ndis-procedures-manual-ver4-approved-04272016.pdf/view>
3. Butler, John. (2011, July 21). Advanced Topics in Forensic DNA Typing: Methodology. Waltham, MA: Elsevier Academic Press.
4. Federal Bureau of Investigation (FBI). Frequently Asked Questions on CODIS and NDIS. Retrieved from <https://www.fbi.gov/services/laboratory/biometric-analysis/codis/codis-and-ndis-fact-sheet>
5. Federal Bureau of Investigation (FBI). (2016, November). CODIS-NDIS Statistics. Retrieved from <https://www.fbi.gov/services/laboratory/biometric-analysis/codis/ndis-statistics>

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Amy Jeanguenat, MFS, has spent her career working in the private forensic industry supporting efforts worldwide to prevent and eliminate DNA backlogs. Mrs. Jeanguenat helped manage the successful completion of sexual assault kit outsourcing projects from Houston, TX, and Detroit, MI. Currently, Mrs. Jeanguenat works as the principal consultant at Mindgen, LLC.

Use of Elimination Samples as a Gateway for CODIS Entry

One of the gateways governing whether a foreign DNA profile can be entered into the Combined DNA Index System (CODIS) involves the request and documentation of consent to collect DNA from specified individuals for elimination samples.

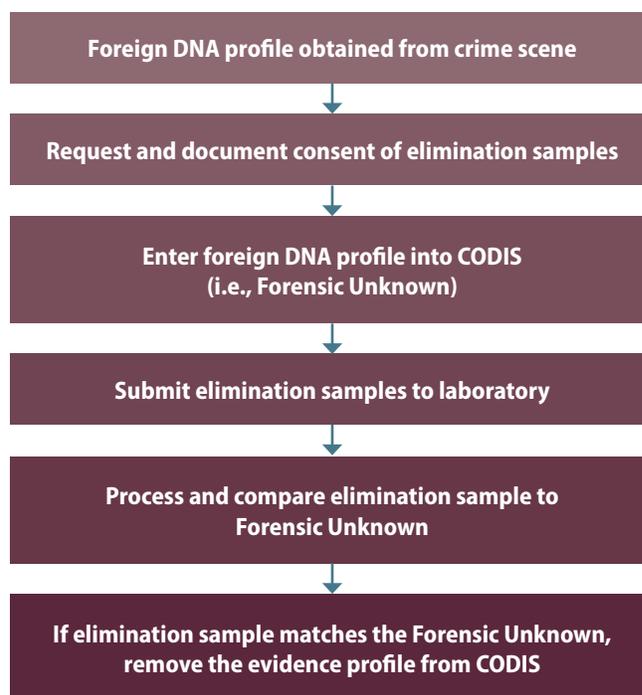
Elimination samples are voluntarily collected DNA samples from individuals not involved in the alleged crime, although their DNA may be obtained from items associated with a crime scene. For example, in a sexual assault, crime scene items generally are collected from body swabs, underwear, and even bedding. Thus, a consensual partner, who has engaged in sexual activity with the victim in days leading up to the sexual criminal allegation, may be a contributor to DNA profiles obtained from the crime scene.

The DNA profiles from elimination samples are used exclusively to manually compare with any crime scene DNA profile(s) to identify foreign DNA (i.e., DNA foreign to the victim, consensual partner, or any other appropriate elimination sample). This helps ensure the DNA profiles—entered into CODIS as the forensic unknown(s)—are from foreign DNA that may identify a putative perpetrator. Elimination samples are, therefore, not stored or compared in the CODIS database.¹ See Figure 1 for a National DNA Index System (NDIS)-accepted process flow regarding the use of elimination samples.²

Elimination samples are not always easily collected, especially in reinvestigating cold cases. The law enforcement official is required to request and document consent for a DNA sample obtained from these individuals.¹ There is reasonable expectation that efforts will be made to collect and process elimination samples. However, with proper written documentation, the forensic unknown sample still can be entered into CODIS before the DNA comparison of the elimination sample to the forensic unknown takes place.² This action allows the investigation to continue and utilize the benefits of CODIS. If an elimination sample is submitted later for testing, which results in an inclusion or match between the elimination sample profile and the forensic unknown profile, the forensic profile must be removed from CODIS.

Laboratories may have submission guidelines that modify the NDIS-supported flow and impact proper documentation of a request to collect elimination samples. Communicate with the laboratory to understand how this gateway can best be used to support the efforts of the National Sexual Assault Kit Initiative.

Figure 1. NDIS-Supported Process for Using Elimination Samples



References:

1. Federal Bureau of Investigation (FBI) Laboratory. (2017, January 1). National DNA Index System (NDIS) Operational Procedures Manual, Version 5. Retrieved from <https://www.fbi.gov/file-repository/ndis-procedures-manual-ver4-approved-04272016.pdf/view>
2. Scientific Working Group on DNA Analysis Methods (SWGDM). (2016, December 5). Recommendations for the efficient DNA processing of sexual assault evidence kits. Retrieved from: http://media.wix.com/ugd/4344b0_4daf2bb5512b4e2582f895c4a133a0ed.pdf

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Continuing the Investigation

Correctly navigating the criminal justice process from testing sexual assault kits (SAKs) in the laboratory to conducting a law enforcement investigation proves vital to convicting an offender. The previous section of this booklet discussed how laboratories work with SAKs and develop information for potential entry into the Combined DNA Index System (CODIS). This next section discusses the law enforcement investigative process. What do we do once we have results from a SAK? How should we proceed? To address these questions, the SAKI TTA Team has developed an easy-to-follow triage method for addressing cold case sexual assault investigations with CODIS hits (both forensic and offender).

Developing clear and concise policies on how to handle tested SAKs should be a priority for law enforcement agencies, regardless of whether a tested SAK returns a DNA profile. Agencies should develop a policy on how to prioritize their investigative steps in a cold case sexual assault investigation once a SAK is analyzed, a sample is uploaded, and CODIS returns with an offender or a forensic hit.

Important Tips to Remember

- ◆ Focus on the victim. The victim is the center of the case and should be treated as such.
- ◆ Ensure proper victim notification, as well as a complete and thorough review of the case file.
- ◆ Maintain open lines of communication among law enforcement, the prosecutor's office, the forensic laboratory, and all other partners involved with the case.
- ◆ Offer the victim access to appropriate services and relevant agencies.

The following two briefs emphasize moving forward with an investigation after a DNA profile has been successfully obtained from a tested SAK and resulted in a CODIS hit:

- ◆ **Prioritizing Cold Case CODIS Hit Follow-up: Strategies for Sexual Assault Investigators**
- ◆ **Cold Case CODIS Hit Review and Investigation: Additional Strategies for Sexual Assault Investigators**

Prioritizing Cold Case CODIS Hit Follow-up: Strategies for Sexual Assault Investigators

Overview

The SAKI TTA Team developed this guidance document to provide information on the appropriate actions to take when sexual assault investigators receive a CODIS hit notification—when a suspect has been identified in a cold case, either through a DNA match or other investigative means. However, investigators should not rely on these factors alone when making decisions. New information may be revealed and circumstances involving the suspect(s) may change during an investigation, thus requiring an updated evaluation/assessment and follow-up strategy in the case.

CODIS Hit Notification Organization System

The CODIS Hit Notification system guidelines were developed in the early 2000s with NIJ grant funding based on experience and peer evaluation from law enforcement subject matter experts from sexual assault units. The following organizational levels outline a prioritization process for proper staffing and CODIS hit follow-up, with the understanding that all CODIS hits should be reviewed in a timely manner. Jurisdictions should evaluate these guidelines to determine how this system will align with their current standard operating procedures.

1. Notification of CODIS Hit Information Initial Follow-up After CODIS Hit Notification and Timeline of Events

A CODIS hit will be assigned to an investigator and their supervisor within 5 days of the initial CODIS hit notification. They will receive all information and paperwork generated by a crime laboratory related to the CODIS hit.

Upon assignment, the investigator should complete the following steps:

- ◆ Review details of the hit.
- ◆ Complete initial research on the named suspect.
- ◆ Assess priority of completing follow-up based on organizational level (see text boxes).

¹ Involves a basic criminal/intelligence database search of the suspect's name and returns relevant information that shows a current home or work address, or shows that the suspect is in Department of Corrections (DOC) custody.

Organization Level 1

- a. Suspect is in custody (in or out of state) or is not in custody and has at least one arrest/conviction for a prior sex offense.
- b. Suspect's release date is within 12 months.
- c. Suspect has at least one arrest/conviction for a prior sex offense.
- d. Suspect can be located with minimal effort.¹
- e. There is a high degree of confidence the CODIS hit belongs to the suspect and not the victim's consensual partner or another person.
- f. Victim has been located and is willing to participate in investigation and prosecution processes.
- g. The case appears to have a high likelihood of judicial success.

Organization Level 2

- a. Suspect is in custody (in or out of state).
- b. Suspect's release date is more than 1 year away.
- c. Suspect has prior and post DNA matches for another crime.
- d. Suspect is not in custody but could be located with minimal effort.¹
- e. An elimination sample from the victim's consensual partner has not been collected; however, the consensual partner can be located.
- f. Victim can be located with minimal effort¹ and, based on the investigative filing, is believed to want to prosecute.
- g. The case appears to have a reasonable likelihood of judicial success.

Organization Level 3

- a. Suspect is not in custody and has no prior sex offenses or has been in custody for more than 10 years.
- b. An elimination sample from the victim's consensual partner has not been collected and the consensual partner cannot be located.
- c. Suspect is not in custody and has no prior violent offenses.
- d. Victim cannot be located.

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- ◆ Determine, if appropriate, the probative relationship the CODIS hit may have to the case.

Days After Being Assigned a CODIS Hit...	The Investigator Will...
3	Initiate appropriate case follow-up
30	Supplement the case in the department's Records Management System (RMS), specifically noting the following: <ul style="list-style-type: none"> ◆ Type of CODIS hit (e.g., to offender, to another case) ◆ Details about suspect, including the following: <ul style="list-style-type: none"> ▪ Name and identifying information ▪ Current location, if known ▪ Status (e.g., in or out of custody) ◆ Type of activity attempted to initially locate the victim electronically ◆ Follow-up action(s)² initially taken, if any.

Delayed Timeline for CODIS Hit Notifications

The timeframe for the following table is based on days since the initial CODIS hit notification.

If No Investigative Steps Are Taken Within...	Then...
30 days	The investigator and/or supervisor will document the reason(s) for the delay in the RMS.
60 days	The case will be escalated to the next level of command. A follow-up escalation will occur for each missed timeframe.
90 days	

2. General Investigative Follow-up

General Reminders for Investigators
Complete a comprehensive case file review.
Do not rely solely on DNA evidence to prove the case.
Ensure the integrity of the database hit by obtaining a confirmation DNA sample from the suspect.
Check for any prior crimes.
Document new CODIS hit information by creating a supplemental report to add to original investigative report.
Ensure the CODIS hit subject is designated under the appropriate investigative class in the RMS with as much personally identifiable information as possible.

Doing the Research and Preparing the Case

- ◆ Document details about the suspect's location (e.g., believed whereabouts, unknown location, known location/cannot establish contact). An interview should be conducted once the suspect is located.
- ◆ Pull the case file and all corresponding documentation.^{3,4}
- ◆ Classify the hit as probative or not probative.
 - **Probative hit:** Research the hit/suspect's current location using available resources.
 - **Non-probative hit/hit that hinders case progress:** Complete a supplemental report in the RMS to document reasons for this classification.
- ◆ Review the case file and original police report for the possibility that the CODIS hit may be from a consensual partner.⁵
- ◆ Run inquiries to gather as much available intelligence on hit/suspect.⁶
- ◆ Obtain the suspect's photograph from around the time of the assault (mugshots are acceptable).

Possible Signs of a Consensual Partner

- ◆ Police report or medical/SANE report indicates consensual partner.
- ◆ Elimination swab was not obtained.
- ◆ CODIS hit matches name of consensual partner listed in police report or medical SANE report.
- ◆ CODIS hit identifies a suspect that doesn't match the victim's original suspect description.

Involving the Victim

- ◆ Prior to contacting the suspect identified from the CODIS hit, the victim may need to be notified to determine case status and their engagement back into the criminal justice system.⁷

² Examples include conducting background searches for locations of suspect and victim, interviewing suspect and victim, and locating any witnesses not originally interviewed.

³ Examples include RMS, RMS-Archives, Invize, Laserfiche, and Evidence Section File.

⁴ Older case files may be stored with the Archives Unit.

⁵ This cannot always be easily determined. Police report or medical SANE report may indicate this information.

⁶ Examples include RMS, P2P, and criminal history.

⁷ Follow department protocol on victim notification.

- ◆ Follow current victim notification protocols.
 - Contact the victim by phone (when appropriate); discuss scheduling an in-person meeting to review the case.
 - Assure the victim they are safe at this time.
 - Schedule a convenient place/time to meet.
- ◆ Meet with the victim in person
 - Show the suspect's photograph(s) to determine if the victim recognizes the suspect.⁸
 - Discuss the CODIS hit and document the victim's response.
 - Obtain a photograph of the victim from around the time of the rape, if available.
 - Explain the CODIS hit confirmation process and protocol for providing regular status updates.
 - Offer to have a rape crisis advocate contact the victim.

3. Suspect Contact Considerations

Preparing to Interview the Suspect

- ◆ Review all intelligence gathered on the CODIS hit suspect.
- ◆ Determine the suspect's status and location.
- ◆ Identify a preferred interview strategy.
- ◆ Have a search warrant ready to serve in preparation for contacting the suspect and collecting a DNA sample.⁹

Suspect Interview Considerations

- ◆ Record (audio and/or video) all contact with the suspect.
- ◆ Have a picture of the victim at time of assault and/or crime scene pictures.
 - If the suspect denies contact with the victim or crime scene, consider showing pictures of the victim and scene.
- ◆ Determine the suspect's familiarity with the crime.
 - Does the suspect recognize the victim?
 - Has the suspect ever been to the location of crime?
 - Does the suspect recognize the crime scene?

Strategy for Interviewing Suspects

If the suspect denies any knowledge or contact, ensure those statements are accurately recorded and follow-up questions pertaining to specific details are consistent with the denial.

- ◆ Consider whether an arrest will be made and ensure the prosecutor has been consulted.
- ◆ After the interview, complete a Request for Forensic Services (e.g., Evidence Submission Form) to submit the confirmation suspect swab to the Crime Laboratory; this request allows the Crime Laboratory to verify the CODIS hit. Follow-up with the Evidence Custodian to verify the swab is sent.
- ◆ Notify the victim after the suspect's swab is collected and the interview is complete. Keep the victim informed of changes in the case status and verification process.
- ◆ Assess the need to obtain a warrant for suspect arrest after receiving the CODIS Confirmation Report that indicates verification. Ensure the prosecutor has been consulted. (Note: If the victim advises that the subject from the CODIS hit was a consensual partner and not the suspect, then DNA collection is not required. Direct the CODIS Administrator to close out the hit.

4. Other Considerations

- ◆ Determine if a statute of limitations exists. If the case is outside the identified statute of limitations, then the suspect will not need to be located and contacted. These facts will be documented in a supplemental report.
- ◆ Review additional crime analysis based on CODIS hit case information. Attempt to identify any other cases that may be related to this case.

⁸ Don't tell the victim the photo is of the suspect prior to showing the photo.

⁹ This is to obtain necessary confirmation buccal swabs for laboratory examination and comparison. Do not present this document to the suspect until the end of the interview.

Cold Case CODIS Hit Review and Investigation: Additional Strategies for Sexual Assault Investigators

Overview

This is the second installment of the SAKI TTA Team's CODIS brief follow-up investigative series. In this installment, the SAKI TTA Team will provide information on next steps to take in an investigation after the CODIS hit notification and prioritization process. (For guidance on prioritization of hits, see *Prioritizing Cold Case CODIS Hit Follow-up*: https://sakitta.org/resources/docs/SAKI_CODIS_FollowUpProtocol_Brief_final.pdf).

The following brief highlights further steps—including comprehensive case file review, comprehensive background investigation, physical evidence check, victim involvement, and moving toward prosecution—to ensure a successful case closure. Investigators should not rely on these factors alone when making decisions. New information may be revealed and circumstances involving the suspect(s) may change during an investigation, thus requiring an updated evaluation/assessment to, and follow-up strategy for, the case.

Comprehensive File Review

After the initial review of CODIS hits, investigators should determine which cases to address first. Once a prioritization scheme is developed, it is pertinent that investigators employ a comprehensive review of the original case. The case file holds extremely important information about the relationship between the suspect and victim, witnesses, evidence taken at the time of the incident, and investigative leads. The case file should also lead the cold case investigator to the original investigator (if available). The original investigator may be able to provide invaluable information not captured in the case file.

- ◆ Review all documents.
- ◆ Did the CODIS hit match to another case or to an offender?
 - If the CODIS hit was a “case to case hit,” locate the other case file and incorporate it into your case file.
 - If the match belongs to another police jurisdiction, contact the other jurisdiction and initiate coordination of investigative follow-up.
 - ◆ Make sure clear responsibilities are defined.
 - ◆ Obtain a complete copy of this report, if possible.

- Identify clear assignment and tasks to be completed by each agency.
- Discuss case with original investigator (if available).
 - ◆ Remember that updated DNA testing is more accurate and sensitive compared to antiquated forms of DNA testing. CODIS hits are based on this new technology, not investigators' skills.
- ◆ Determine what piece of evidence from the crime scene or SAK matched to the offender. Is this an intimate sample or another evidence sample that may not be from the SAK?
 - Is there additional testing of evidence that we will need?
 - Is there any electronic evidence that can be secured and reviewed?
- ◆ Is other evidence available to you?
 - Avoid using a CODIS hit as the only evidence.
 - Determine if any evidence is probative.
- ◆ Determine if this is a “stranger” assault. If yes, do the originally reported facts support the CODIS hit offender? (i.e., Is the physical description similar in both?)
- ◆ Determine if the offender was known to the victim. If yes, are there strategies to address this?
- ◆ Consider whether this CODIS hit may belong to a victim's consensual partner.
- ◆ Is there a need to try to locate a consensual partner, if indicated in the original report?
- ◆ Complete a written supplemental report and place it in the cold case file.

Comprehensive Background of Offender

- ◆ If incarcerated
 - Where are they incarcerated?
 - What are they in custody for (e.g., violent crime)? Prior rapes indicate this person is a serial rapist.
 - How long will they be in custody? If they are due to be released, do we have probable cause at this point to charge them? Our investigative timeline may be expedited by this information.

- ◆ If not incarcerated
 - Is a search and seizure warrant needed?
 - Develop an arrest plan
 - ◆ When authoring an arrest warrant application, use “VICTIM” instead of the victim’s name. Use the victim’s age at the time of the incident. (Charges are public documents and we want to avoid re-traumatizing the victim.)
 - Are they currently alive?
 - ◆ If no, consider contacting the victim to inform them of the suspect’s death (and consider enlisting the help of a victim advocate in this contact).
 - Consider developing travel plans to the offender’s location; interviewing same; and obtaining a confirmation sample, if necessary.
- ◆ Determine if suspect is still in a relationship with the victim, if applicable.
- ◆ Identify strategies for when the offender interview will be conducted based on the offender history and details of this offense.
- ◆ Conduct offender interview(s) at the later stages of the investigations. It is critical to have knowledge of all available information about the crime, victim, and offender prior to contacting the offender.
- ◆ Was the offender previously interviewed regarding this investigation?
 - If yes, what were the statements they made?
 - Consider re-interviewing the suspect.
- ◆ Review other criminal police reports involving this offender. If the offender made contact with police, what was it like?
- ◆ Adhere to all constitution protections involving custody/ non-custody and interviewing of offenders.
- ◆ If the offender is out of state, determine their jurisdiction.
 - Can you obtain assistance from police in this location? Be careful if you make contact with this jurisdiction, as you may not want them to communicate with the offender at this point.
 - Initiate travel plans to the other jurisdiction.
- If no, consider re-contacting the victim given the new DNA evidence to ensure they still do not want to pursue a case.
- If no (and the victim is one of many involved in a serial-perpetrator case), discuss how to proceed.
- ◆ Are there enough facts and information in the victim’s original statement to develop, at a minimum, probable cause?
- ◆ How much additional information is needed from the victim to advance the case and support criminal charges against the offender?
- ◆ Visit the scene of the crime
 - Was there something that was missed the first time around/during the initial evaluation of the crime scene?
 - What has changed since the incident occurred?
- ◆ Review your strategy for victim contact and notification.
- ◆ Develop a comprehensive victim interview plan. Consult with the prosecutor for the interview type and depth necessary for this interview.
 - What additional information is needed?
 - What additional information would be helpful?
 - Consider what information you can share with the victim.
 - Employ a trauma-informed interview process.
 - ◆ Consider asking the victim to write down what happened, as opposed to a verbal interview.

Moving Forward to Prosecution

- ◆ Locate witnesses; interview them, if necessary.
- ◆ Discuss involvement of the media.
- ◆ Identify any other items of evidence and status.
 - Are they still in police possession?
 - What is their current condition?
 - Consider possible additional lab testing. Will this additional testing further charges or answer remaining questions about the case?
- ◆ Obtain all of the victim’s medical records.
- ◆ Confer with the prosecutor as to what they would like to have prior to filing charges.
- ◆ Have a second investigator review the case.

Intensify the Search

- ◆ In the original report, did the victim express a desire to pursue this case?

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Appendix

For various reasons (including lack of resources, personnel, and/or funds), some jurisdictions may choose to outsource their sexual assault kits to a private vendor laboratory for testing and analysis. If this scenario applies to your jurisdiction, then refer to the following document about establishing a positive relationship with a private vendor laboratory.

Unsubmitted Sexual Assault Kit Processing: Five Objectives Toward Forming a Positive Relationship with a Private Vendor Laboratory

Over the past couple of years, there has been an influx in funding from the Department of Justice's Bureau of Justice Assistance (BJA) and National Institute of Justice (NIJ), and the New York County District Attorney's Office (DANY) to support sexual assault kit (SAKs) tracking, inventory, processing, and prosecution. Consequently, there is an influx in DNA testing needs. Outsourcing DNA testing for projects that require an immediate surge in resources is a great way to use private partners with minimal impact to current crime laboratory initiatives. Larger, private DNA outsourcing laboratories have proven abilities for scaling up production, performing high-throughput testing, and bringing online technology adoptions to continuously improve processes. However, even for laboratories with high-volume experience, the current SAK grant timelines of 2 to 3 years can be demanding.

Because project and contract specifications differ among jurisdictions, contacting private vendors directly helps clarify capacity and any limitations associated with meeting specific needs, such as validation, training, Laboratory Information Management System software updates, and other changes that may affect the vendor laboratory's default workflow. Based on contract specifications, some jurisdictions' projects may be able to start immediately, while others may be delayed. The following five objectives are a guide toward establishing positive partnerships with vendor laboratories for the submission and testing of SAKs:

Creating Positive Partnerships with Laboratories: Five Objectives

1. Open Communication
2. Create a Shared Vision
3. Visit the Site
4. Provide Feedback
5. Be Creative

1. Open Communication. Once the need for outsource testing of SAKs is identified, immediately start engaging with private DNA laboratory vendors. Leveraging an external vendor for DNA analysis testing typically is known as DNA outsourcing. Vendors can provide education and material describing their experience, technical process, and how outsourcing DNA analysis testing works. This type of information is essential to writing an effective request for proposal (RFP) or request for quote, and determining expected costs.

Once a vendor is selected, choose someone from your agency who can act as a liaison to the vendor laboratory and be the main point of contact. In addition, request the same from the vendor, so that communication can be streamlined. Limiting points of contact for questions and inquiries will reduce redundant communication and misunderstandings, and allow for a smoother process.

From the RFP process through the actual submittal for analysis, capacity commonly changes in terms of testing needs by the submitting agency and the vendor laboratory's availability to meet those needs. Ensure the vendor is aware of any potential changes to technical specifications, submission rates, legislation, or turnaround time requirements to help reduce associated delays.

2. Create a Shared Vision. Work early with the vendor to create a processing plan that includes a clear timeline of expected SAK shipments, laboratory report and data package return, and SAK shipment return. The technical specifications should be clearly written and agreed to by both parties. Expect to negotiate if the scope or specifications are changed following proposal submittal; a lot of criteria can affect processing timelines and the cost of the sample or SAK. For unsubmitted SAKs, some agencies may have to work around expiring statutes of limitation (SOL). The number of these critical expiring SOL sexual assault kits and timeline for processing should be prioritized between the submitting agency and vendor. Having representation from the agency's own testing laboratory can benefit creating the processing plan.

If the shared vision is created during the contract process, ideally the contract should consider identifying the following:

- ◆ Number of SAKs to be submitted
- ◆ Expected submission rates
- ◆ Required technical specifications (i.e., type of DNA amplification kit)
- ◆ DNA workflow and pricing with possible alternatives (as applicable)
- ◆ Legislation-enforced or ideal turnaround times
- ◆ Specific data package requirements
- ◆ Main points of contact

Consider submitting a small batch of SAKs (i.e., 10% to 20% of an expected submission batch) as the first shipment. This will help the vendor laboratory to implement contract specifications and allow time for the submitting agency to adjust needs and requirements after reviewing the returned data package. Further adjustments then can be made before a process is implemented on a larger scale.

3. Effective Site Visit. Documentation of an on-site visit at the vendor laboratory is a Federal Bureau of Investigation Quality Assurance Standard audit requirement and should be coordinated between the agency's local laboratory and the vendor lab. A site visit provides the means for the agency's local laboratory to accept ownership of the work produced by the vendor for means of participating in the Combined DNA Index System, known as CODIS. Many items such as standard operating procedures and validation summaries can be provided ahead of time and reviewed remotely. Effective on-site visits should be a stepping stone to building a positive relationship and understanding the outsourcing process.

Use time wisely:

Review past audits instead of trying to conduct a new one. Discuss nonconformances, corrective and preventive action plans, and how these plans have been documented or communicated.

Understand what a case file and data package will look like and how to best review them.

Go through examples of complex mixture interpretation and report statements.

Review the shared vision and technical specifications to make sure everything is clear, and document any agreed changes.

Meet the management team, especially the agency-specific liaisons.

Discuss challenges, issues, and any future needs.

4. Provide Feedback. Providing feedback to the vendor, once the outsourcing has started, is a critical element. Let the vendor know the services you appreciate, as well as what is causing stress or anxiety. Early feedback gives the vendor time to react before a small issue becomes a large one. Feedback also helps to guarantee that certain services that are appreciated will continue or improve in the future. The vendor laboratory may also have suggestions for the submitting agency about changes that could aid in more efficient processing. Constructively discussing points of contention often leads to collaborative solutions to keep the project on track and successful. Consider establishing a regular monthly or quarterly feedback meeting, depending on the scope of the project. For newer projects, more frequent feedback meetings may be needed to establish expectations.

5. Be Creative. Outsourcing SAKs does not need to be performed the same way that SAKs are currently processed in the agency's laboratory. There are certain technical specifications, such as the DNA amplification kit, that need to be consistent for review purposes. However, there may be more effective ways to use money and still achieve the expected quality of results. Coordinate with the agency's local laboratory and be open to new ideas and pilot processes or technology changes. Pilot programs provide needed research to the community, support for future budgets, and often resolve a problem. Creative

outsourcing solutions have been born from public and private partnerships such as Male DNA Screening, Models for Property Crime Outsourcing,¹ and Deploying a Rapid DNA Laboratory.²

Through efforts conducted by BJA, DANY, and NIJ, many SAK outsourcing projects are being conducted simultaneously throughout the country. Due to the time needed for procurement, organizing shipments, and reviewing and uploading resulting profiles, the actual time for testing is less than 1 year in some jurisdictions. While the private industry is fee-for-service, the magnitude of submissions in the United States likely will create delays in being able to on-board all agencies concurrently. Although there is pressure for each submitting agency to show progress, a vendor may use trained resources more effectively by spacing the overall testing of submitted SAKs over the grant periods, resulting in better quality service during the testing phase. An agency should not hesitate to reach out to its BJA grant manager with any concerns about commitments and to inquire about an extension. Vendor laboratories are continuously balancing resources, enhancing capacity with technology changes, and on-boarding new personnel to help mitigate delays. Lapses in communication, vision, and feedback can have a negative impact on project success. These objectives may be leveraged to formulate a relationship with a chosen vendor. Remember, a partnership is not created out of a contract but is cultivated over time, if nourished.

Creative Ways to Yield Quality Results:

- ◆ Coordinate with local laboratories
- ◆ Explore new ideas
- ◆ Embrace pilot programs
- ◆ Accept technology changes
- ◆ Investigate outsourcing partnerships

References:

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