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Shelby County Report on Forensic Evidence Processing and Needs

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MESSAGE FROM THE EXECUTIVE DIRECTOR

Identifying forensic needs in Memphis/Shelby County and the best way to meet any such needs have been the subjects of much discussion over the past two years.

In 2024, a team led by Dr. James McCutcheon issued a report on its Memphis crime lab feasibility study. This study was funded by the city of Memphis and focused in particular on the needs of the Memphis Police Department.

The Shelby County Board of Commissioners then funded a study to include all of law enforcement in Shelby County and not limited to Memphis. The funding went to the Memphis Shelby Crime Commission which in turn entered an agreement with the University of Memphis for the Public Safety Institute (PSI) to conduct the study. This report is the result of that study.

I thank the PSI research team led by Dr. James McCutcheon for its diligent work resulting in this report. And I thank the many stakeholders who provided input into the study. It would not have been possible without their cooperation and input.

The full report is available at https://www.memphis.edu/psi/research.

Bill Gibbons, Executive Director
Public Safety Institute

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EXECUTIVE SUMMARY

Shelby County funded the Public Safety Institute to conduct an assessment of the need for forensic services across Shelby County and its municipal cities, including Memphis, Bartlett, Germantown, Collierville, and Millington. Interviews were conducted with representatives of each law enforcement agencies to review their current capacity, as well as to identify key areas of focus. Based on these interviews and case metrics on evidence collection and submission, this report provides key recommendations in five critical areas: 1) evidence storage, 2) transportation of evidence, 3) digital forensics, 4) Rapid DNA, and 5) ballistic analysis.

Current storage facilities at 201 Poplar, suburban sites, and those Memphis Police Department utilizes would be more efficient through centralization. Centralizing storage would strengthen chain-of-custody, reduce risks to sensitive materials, and improve efficiency for all participating agencies. Transporting forensic evidence to the TBI Jackson Crime Lab from Shelby County relies on scheduling drop-offs with assigned investigators transporting evidence. The current study shows agencies provided both positive and negative feedback regarding the current systems. One recommendation proposes strengthening the appointment-based drop-off model by developing a county-managed pickup and delivery system. This would involve hiring trained personnel to handle transport at a minimum of 3 times per week and acquiring a dedicated, secure vehicle outfitted for forensic use. This approach would ensure timely delivery, improve security, reduce strain on investigators, and standardize chain-of-custody practices across jurisdictions. Property storage is considered a top priority for the current study, while transportation of forensic evidence is priority two.

All agencies highlighted digital forensics as a crucial part of a criminal investigation. The increasing volume and expected growth of digital evidence, including cell phone and computer data, demands local capacity beyond current capabilities. Another recommendation involves increased funding for enhancement and increasing collaboration among departments to increase efficacy and limit costs. Digital forensic enhancement is this study's number three priority.

Priority four is the utilization of Rapid DNA technology, supporting investigation in the short-term, while DNA evidence is further analyzed by TBI. With each test costing approximately $170–$200, strategic and prioritized implementation is the foundation of

our fourth recommendation. Cases should be prioritized for Rapid DNA testing, based on metrics such as the severity of the case. Importantly, we advise increased training and presentations on the capabilities of Rapid DNA to agencies within the county before decisions are made.

Firearm-related crimes remain a point of emphasis across all agencies, and this topic represents priority five in the current study. Recently, the City of Memphis announced funding for a dedicated firearm examiner and DNA analyst at TBI who will work City of Memphis cases. Given the current TBI staffing limitations, hiring and training a local examiner could take 1–2 years. To accelerate impact, a DNA analyst could also assist with forensic DNA analysis on firearms, helping prioritize and expedite firearm-related cases. Additionally, the City of Memphis and Shelby County developing an agreement on sharing the new analysts would provide clearer processing as the analysts would not have to differentiate evidence between Memphis and the remainder of the county. Importantly, through our interviews we learned TBI would be willing to expand the MOU to support additional analysts at TBI to focus on Memphis and all of Shelby County.

All of the above provide options that strengthen and enhance forensic evidence processing. Collectively, the interviews and data provided in this report support the need for enhancement to address current and future gaps.

LIST OF ABBREVIATIONS

AFIS – Automated Fingerprint Identification System
ANSI – American National Standards Institute
ANAB – ANSI National Accreditation Board
ATF – Bureau of Alcohol, Tobacco, Firearms, and Explosives
BLS – Bureau of Labor Statistics
CODIS – Combined DNA Index System
CJIS – Criminal Justice Information Services
CGIC – Crime Gun Intelligence Center
DNA – Deoxyribonucleic Acid
FBI – Federal Bureau of Investigation
GSR – Gunshot Residue
HMICFRS – Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services (UK)
ICAC – Internet Crimes Against Children
ISO/IEC – International Organization for Standardization / International Electrotechnical Commission
LIMS – Laboratory Information Management System
MGU – Multiagency Gang Unit
MPD – Memphis Police Department
MOU – Memorandum of Understanding
NDIS – National DNA Index System
NIBIN – National Integrated Ballistic Information Network
NIJ – National Institute of Justice
NIST – National Institute of Standards and Technology
OSAC – Organization of Scientific Area Committees (for Forensic Science)
PMC – PubMed Central
QAS – Quality Assurance Standards (FBI)
SAK – Sexual Assault Kit
SCSO – Shelby County Sheriff's Office
SLAs – Service-Level Agreements
SOP – Standard Operating Procedure
SNP – Single Nucleotide Polymorphism
SVU – Special Victims Unit
SWGDE – Scientific Working Group on Digital Evidence
TACIR – Tennessee Advisory Commission on Intergovernmental Relations
TBI – Tennessee Bureau of Investigation
VCU – Violent Crimes Unit

INTRODUCTION

In 2024, a study contracted by the City of Memphis examined the feasibility and the need for a forensic crime lab in Memphis, Tennessee. While the study did provide financial estimates for starting a new lab, the study, conducted by Precision Criminal Justice Consulting, also made specific recommendations for modifying existing infrastructure, including sourcing additional funding, space, equipment and personnel within the current Tennessee Bureau of Investigation (TBI) framework (McCutcheon et al., 2024). This study suggested that such improvements can assist in developing capacity toward additional units and a forensic crime lab. As such, the recent city-led report provided a useful overview of forensic capabilities and laid out some future considerations. However, it also created additional questions. Five areas stood out as needing more attention: storage of evidence, transportation of evidence, digital forensics, Rapid DNA, and ballistic forensics.

The Shelby County Board of Commissioners awarded funding to the Memphis Shelby County Crime Commission to assess the need for forensic services not just in Memphis but the remainder of the county and suburban cities of Bartlett, Germantown, Collierville, and Millington. In turn, the Crime Commission entered an agreement with the University of Memphis for the Public Safety Institute to conduct the study and to provide an objective and comprehensive assessment of current forensic service capabilities in Shelby County, Tennessee. The study aims to identify gaps and areas where improvements or expansions are warranted, as they benefit both Memphis and larger Shelby County. Simultaneous to this effort, the Tennessee Advisory Commission on Intergovernmental Relations (TACIR) has examined the potential option of increasing satellite lab capacity across the State of Tennessee, noting physical lab space is the predominant factor in limiting forensic lab capacity.

Definition

To begin, proposals range from enhancing current services to developing a high functional full-service crime laboratory to process a wide range of evidence types. For this reason, understanding what a forensic crime lab is - and its components - are central to this discussion. A forensic crime laboratory is a routinely validated and accredited public

or private facility with personnel equipped with training to receive, preserve, process, analyze, and interpret physical evidence for use in criminal investigations and court prosecutions (National Institute of Justice, n.d.; Scientific Working Group on Laboratory Accreditation, 2018). A crime laboratory is subject to national standards, but also, international accrediting bodies, which starts with scientific methodology that requires:

- Validated scientific methods, based on accreditation and standards of evidence processing;
- Workspaces, controlled and large enough for evidence processing;
- Forensic scientists/analysts, qualified by certifications in their expertise area and experience;
- Technology, validated based on ANSI National Accreditation Board (ANAB) / International Organization for Standardization (ISO) 17025 standards; and
- Evidence preservation and processing, a systematic process of evidence intake, chain-of-custody, and secure storage, which meets both legal and accreditation requirements.

Accreditation is the foundation of forensic crime lab designation. Gravel (2002) discusses the implications of accreditation on laboratory credibility:

> *In today's world, recognition of such competence generally requires that laboratories which have implemented the requirements of the standard obtain accreditation. This accreditation is the mark of recognition of their competence. Accreditation involves assessment and, like all audit-associated activities, assessment of technical competence requires trained assessors to deliver these assessments. Assessors must be fully cognizant of each of the requirements in the standard* (Gravel, J. E. J. (Ned). 2002. *Principles Behind the Requirements of ISO/IEC 17025.* June 6. Canadian Association for Environmental Analytical Laboratories (CAEAL) (p. 1)). *(Interpretation of international standard ISO/IEC 17025 requirements.)*

In summation, forensic crime laboratories must abide by standards of operation through accreditation and validation. In comparison, forensic units rely on training and certification and are not required to face the accreditation/validation to which full-service laboratories are subject. These are the requirements of crime laboratories, small to large, and set the foundation for all forensic evidence processing laboratories. While equipment and capabilities are critical, forensic science is tied to a rigorous accreditation

process. Operational tasks are not technically a lab without this foundation, even if the process requires sophisticated analysis. As capabilities and disciplines expand and accreditation is earned, the operation or organization of units can be recognized as a forensic crime laboratory.

Over time, if additional forensic services are added and the operation pursues and achieves accreditation under recognized standards, it could expand into a broader forensic crime laboratory. If a piecemeal approach is taken including (1) the expansion of forensic disciplines, (toxicology, firearm toolmark analysis, and full DNA analytical capabilities), (2) quality assurance and management, and (3) accreditation, this would move the combination of existing and future units into being a full forensic crime laboratory.

In the United States, accreditation for a forensic crime laboratory is usually handled by the ANSI National Accreditation Board (ANAB), previously known as the American Society of Crime Laboratory Directors (ASCLD) Laboratory Accreditation Board (LAB). Following recognized standards such as International Organization for Standardization/International Electrotechnical Commission (ISO/IEC) 17025: *General Requirements for the Competence of Testing and Calibration Laboratories*, the process involves an on-site review by technical experts who look closely at (1) how the lab is managed, (2) the training and qualifications of its staff, (3) the accuracy of its equipment, and (4) whether the methods it uses are valid and reliable. Accreditation is not permanent and has to be renewed through regular inspections and proficiency testing. Validation and accreditation are not quick processes. Method validation for a new forensic discipline can take several months to more than a year, depending on the complexity of the testing and the number of procedures involved. The accreditation process itself, from application to final approval, often requires 12 to 18 months, including preparation, documentation, on-site assessment, and any corrective actions identified during the review.

Accreditation matters because it gives a lab's work credibility in court. Judges, prosecutors, and defense attorneys need to know that any forensic results came from sound, tested methods, handled by qualified professionals, and under a system designed to avoid mistakes. Without accreditation, there is a greater risk that evidence could be challenged or not allowed in a case. Accreditation also provides an outside check on the lab's work and oversight that the lab is meeting accepted scientific standards, not just its own internal rules. This builds public trust, supports the integrity of forensic work, and

marks the point when a specialized forensic unit can truly be called a forensic crime laboratory. Accreditation serves as an independent quality control measure that holds laboratories accountable to recognized scientific standards.

Based on the above discussion, a few base options exist:

1) Maintain current policies and procedures for all agencies in the area and fund updates and enhancements as needed by each agency;
2) Address current gaps and increase efficiency of evidence collection, storage, transportation, and analysis locally, partnering with TBI;
3) Address current gaps and increase efficiencies with the goal of expanding local forensic services to develop a Memphis/Shelby County Forensic Crime Lab in the future; or
4) Begin the process of developing and budgeting for a full-service forensic crime lab, locally, with creation of a committee that represents all local agency stakeholders to locate a property and a plan in which to staff and sustain the new local Forensic Crime Lab.

In other words, Memphis and Shelby County either chooses to strengthen and enhance processes and fill gaps in accordance with the partnership with TBI, or replaces processes that TBI currently does for Memphis and the other agencies in the county. Determining the best option or middle ground for the above base options depends on need, budget, and feasibility. The current study seeks to assist with providing an objective account of current processes and needs, with recommendations for the most pressing matters. For this reason, building on interviews conducted previously with the Memphis Police Department (MPD), we conducted interviews with the Shelby County's Sheriff's Department and suburban police agencies in Shelby County, as well as collected quantitative data from individual agencies on the volume of evidence processed, equipment costs, and salary information. The report first summarizes the results of these interviews across major points of discussion, then focuses on each of the areas in which forensic need was identified, to provide recommendations. For ease, using the information we have obtained, the recommendations listed at the end of the report are based on need in relation to the protection and enhancement of current processes.

LAW ENFORCEMENT INTERVIEWS

Interviews with representatives from the Shelby County Sheriff's Office (SCSO), Bartlett Police Department, Germantown Police Department, Collierville Police Department, and Millington Police Department were conducted between February and May 2025. Interviewees included high-ranking officials, such as chiefs of police, down to investigators and detectives specifically assigned to forensic evidence. An additional discussion session was held with the TBI to review current capacity and needs broadly.

Capacity

Capacity for running forensics in-house varied greatly across agencies. Some suburban agencies covered digital forensics only, processed vehicles, or maintained a single property room, while other agencies conducted forensic analyses. Importantly, all agencies noted that they have some limited capacity to process evidence in-house, but also either partnered with the Sheriff's Office, MPD, or TBI. For instance, the Multiagency Gang Unit (MGU) and its National Integrated Ballistic Information Network (NIBIN) team is a consistent resource for investigation and providing correlations on firearms for all of the suburban agencies. TBI also provides a point of contact for all agencies; as they rely on TBI's Jackson Crime Laboratory for testing forensic evidence such as sexual assault kits (SAKs).

However, it was unclear from our interviews how often evidence was actually sent to TBI; often times there were comments that evidence was typically sent to TBI only when the Shelby County District Attorney was proceeding with a case for trial. More often, evidence was sent to the MPD or SCSO, including digital forensics, ballistics, and latent prints. Having lab access was important to all agencies, but more important was the connection to the lab – having open communication, ease of making appointments, and feedback. Agencies prioritized having a connection to the lab so that their cases could be handled efficiently and without a break in the chain-of-custody.

Process

Agencies were divided over the need for having a local forensic crime lab within Memphis/Shelby County. All agencies agreed that having analysts housed within the current infrastructure at the TBI lab in Jackson who were focused specifically on Shelby County cases

would be a good idea. While some agencies were in favor of a local lab, others were in favor of a satellite TBI office located in Memphis. However, many interviewees did not relay any concerns with the current processes of dropping off locally. While appointments could be made to have evidence picked up for processing locally, all entities still needed to drive to Jackson in other instances.

Depending on the capacity of the investigative team, having an individual officer out for half or even a full day away to transport evidence created more strain with the officer being pulled from patrol or investigation. Some agencies also highlighted that it was sometimes difficult to secure an appointment for drop-off. Confusion on drop-off or time slots secured by larger agencies were the primary concerns. Many interviewees asked us, the researchers, who would fund or oversee a new lab. No agency wanted an individual current agency to oversee a shared crime lab, but all agencies spoke positively about TBI and potentially being able to use a satellite lab.

Sustainability was another point that came up during interviews. If an error in testing was made, it would hurt the image of the lab, maybe long-term, and impact prosecution of cases. Keeping staffing levels was also a concern, as per news reports, The Metro Nashville Crime Lab has recently experienced a backlog due to staffing and retention concerns, an issue most forensic crime laboratories must address.

Partnerships

Most suburban agencies had some relationship with the MPD, but it was less common for them to have relationships among themselves. Despite this, several agencies highlighted the desire for sharing resources when it comes to digital forensics, highlighting the increase of digital forensic evidence each agency is currently processing. They also suggested a bridge to connect investigators across entities, to be better able to share information and communication, even beyond the county and across the state. The idea of “buy in” among agencies was also expressed towards the necessity of being a stakeholder in the sharing of information. All agencies were interested in continuing or expanding their partnership with TBI.

Overall

Goals and desires for each of the agencies, while varying due to their specific context, focused broadly on increasing capacity and service. All agencies wanted more staffing, whether at TBI or internally, in terms of having more investigators or staff devoted to forensics. For agencies suggesting collaboration, comments indicated a willingness to volunteer staff for a collaborative unit, but not by sacrificing existing staff positions. Multiple agencies also expressed the desire for increased training in collecting and storing evidence, particularly when it came to who could move evidence for transport.

Overall, all agencies agreed that improvements can be made in current processes and that there are gaps that can be filled locally when it comes to testing. Most agencies were interested in expanding locally, while relying on TBI for ballistic firearm analysis, toxicology, and DNA analysis. They were aware of the progress of new technologies such as Rapid DNA but were not always sure how it should be best implemented and cautioned for the need for additional guidance from TBI.

As for digital forensics, many were pleased with their current processes but were not always consistent in how they stored or processed evidence. Some agencies volunteered that they would see a benefit from working with other peer agencies on digital forensics, perhaps in a shared space. Lastly, most agencies were aware of the turnaround time for ballistic firearm analysis from TBI Jackson's Crime Lab. They all explained that they would like to see it improved and were supportive of an Memorandum of Understanding (MOU) with TBI to provide additional analysts to focus on all of Shelby County cases.

VOLUME AND TURNAROUND TIME

While the interviews with each suburban agency provided guidance as to the scope of the current capacity and need, several agencies also provided quantitative data on evidence submission to TBI within each of the highlighted areas. These results are discussed in further detail below.

Table 1.

AGENCY / UNIT	CASES WITH EVIDENCE	EVIDENCE TESTED INTERNALLY	EVIDENCE SENT TO MPD (NIBIN)	EVIDENCE SENT TO SCSO (AFIS)	EVIDENCE SENT TO TBI	RESULTS RETURNED (TRACKED)
SCSO – VIOLENT CRIMES UNIT	9	–	–	–	Firearms (6), GSR (2), DNA (1)	Still processing DNA (1 case)
SCSO – SPECIAL VICTIMS UNIT	24 rape kits	–	–	–	24 rape kits (20 completed; 5 conclusive; 3 prosecuted)	Partial (tracked)
SCSO – FINGERPRINTS	559 prints submitted	Conducted at 201 Poplar	–	559 prints	–	158 identified
SCSO – PHONES	144 phones examined	Conducted at Narcotics Unit	–	–	–	Not specified
GERMANTOWN POLICE DEPT.	290 cases	18 items	132 ballistic items	140 fingerprint items	Not tracked	Not tracked

Table 1 provides data from two of the agencies interviewed in the study. In 2024, the Violent Crimes Unit (VCU) of the Shelby County Sheriff's Office (SCSO) submitted evidence to TBI in nine cases. Of these, eight cases have been solved by arrest, and the submitted evidence is being processed in preparation for trial. One case remains unsolved with no suspect information; in that instance, DNA evidence was submitted to TBI and is still in the process of being analyzed. The evidence submitted by VCU in 2024 included six firearms for toolmark analysis, two gunshot residue (GSR) cases, and one DNA case.

The Special Victims Unit (SVU) also submitted evidence to TBI in 2024, forwarding 24 rape kits for testing. Twenty of these kits have been completed, with five yielding conclusive results. In each of the five cases with conclusive outcomes, the suspect had already been identified by detectives prior to the receipt of results. Of those five cases, three are expected to move forward to prosecution.

Alongside TBI submissions, SCSO conducts its own in-house testing. In 2024, fingerprint analysis accounted for 559 submissions, resulting in 158 identified prints. Fingerprint examinations are conducted at 201 Poplar. Digital evidence work is also performed locally. In 2024, 144 phones were submitted for examination by SCSO. These examinations are carried out by one sergeant and three patrol officers serving as phone examiners. The work is conducted at an off-site facility housed within the Narcotics Unit.

SCSO also provided salary information for technicians in this category. SCSO currently staffs six fingerprint technician positions at an approximate annual salary of $63,000 per technician, with four of these positions filled and two vacancies remaining. This is the only salary information we obtained from the SCSO.
Data were also provided by Germantown Police Department, which provides a glimpse into

the volume of forensic evidence that a larger suburb processes. In 2024, the Germantown Police Department collected forensic evidence in 290 cases. Of these, a small portion was tested internally, while the majority was sent to external partners for specialized analysis. Specifically, 18 items were tested internally by Germantown staff. An additional 132 items were submitted to the MPD's NIBIN unit for ballistic evidence testing, and 140 items were sent to the SCSO Automated Fingerprint Identification System (AFIS) unit for fingerprint analysis.

TBI provided an 18-month breakdown for all Jackson volume it accepts from west Tennessee and Shelby County. This provides the number of items received, completed, pending, turnaround time, and rush turnaround time for all evidence. Table 2 shows a breakdown of forensic biology or DNA evidence. In short, based on the forensic volume, turnaround time is either average or above industry averages for public laboratories and some private laboratories.

Table 2.

JACKSON	AVERAGE MONTHLY FEB 2024-JULY 2025
FORENSIC BIOLOGY - VIOLENT	
REQUESTS RECEIVED	13.0
REQUESTS COMPLETED	12.9
REQUESTS PENDING	88.1
AVERAGE TURNAROUND - WEEKS	30.6
RUSH CASE TURNAROUND - WEEKS	7.0
FORENSIC BIOLOGY - NON-VIOLENT	
REQUESTS RECEIVED	5.0
REQUESTS COMPLETED	5.0
REQUESTS PENDING	41.9
AVERAGE TURNAROUND - WEEKS	32.9
RUSH CASE TURNAROUND - WEEKS	21.6
FORENSIC BIOLOGY - SAK + OTHER	
REQUESTS RECEIVED	11.9
REQUESTS COMPLETED	17.2
REQUESTS PENDING	59.1
AVERAGE TURNAROUND - WEEKS	23.9
RUSH CASE TURNAROUND - WEEKS	3.3
FORENSIC BIOLOGY - SAK ONLY	
REQUESTS RECEIVED	28.7
REQUESTS COMPLETED	28.1

REQUESTS PENDING	85.6
AVERAGE TURNAROUND - WEEKS	13.8
RUSH CASE TURNAROUND - WEEKS	6.1

Table 3 shows the TBI Jackson Forensic Lab's firearm analysis. The overall case volume at TBI has remained relatively stable, but Shelby County's contributions have increased. In 2023, TBI Jackson received 62 requests from Shelby County. This number increased to 92 requests in 2024, nearly 50% increase in submissions. This trend demonstrates Shelby County's growing reliance on the Jackson laboratory for firearms verification.

Turnaround times illustrate the challenge. Over the past 18 months, the average turnaround at TBI Jackson was 62.9 weeks, or approximately 441 days. In 2023, Jackson's turnaround time averaged 479.5 days, compared to 238 days at the Nashville Metro laboratory. In rush cases, Jackson averaged 11.8 weeks, or about 83 days, while Nashville averaged 80 days. By comparison, the Arkansas State Crime Laboratory reported an average turnaround of 515 days in 2023, underscoring that extensive backlogs in firearms analysis are not unique to Tennessee but a regional challenge.

Table 3.

JACKSON - FIREARMS ANALYSIS	AVERAGE MONTHLY FEB 2024-JULY 2025
FIREARMS ANALYSIS	
REQUESTS RECEIVED	11.8
REQUESTS COMPLETED	6.8
REQUESTS PENDING	195.2
AVERAGE TURNAROUND - WEEKS	62.9
RUSH CASE TURNAROUND - WEEKS	11.8

It should be noted, while only examining the first months of 2025, the turnaround time for the TBI Jackson Lab is 399 days. In short, data shows TBI Jackson turnaround time is trending lower. The number of cases received has remained approximately constant. The proportion of cases received from Shelby County has increased. Based on the feasibility study conducted last year (McCutcheon, et al. 2024), Metro Nashville's turnaround time is quicker than TBI Jackson's Lab when limited to firearm analysis.

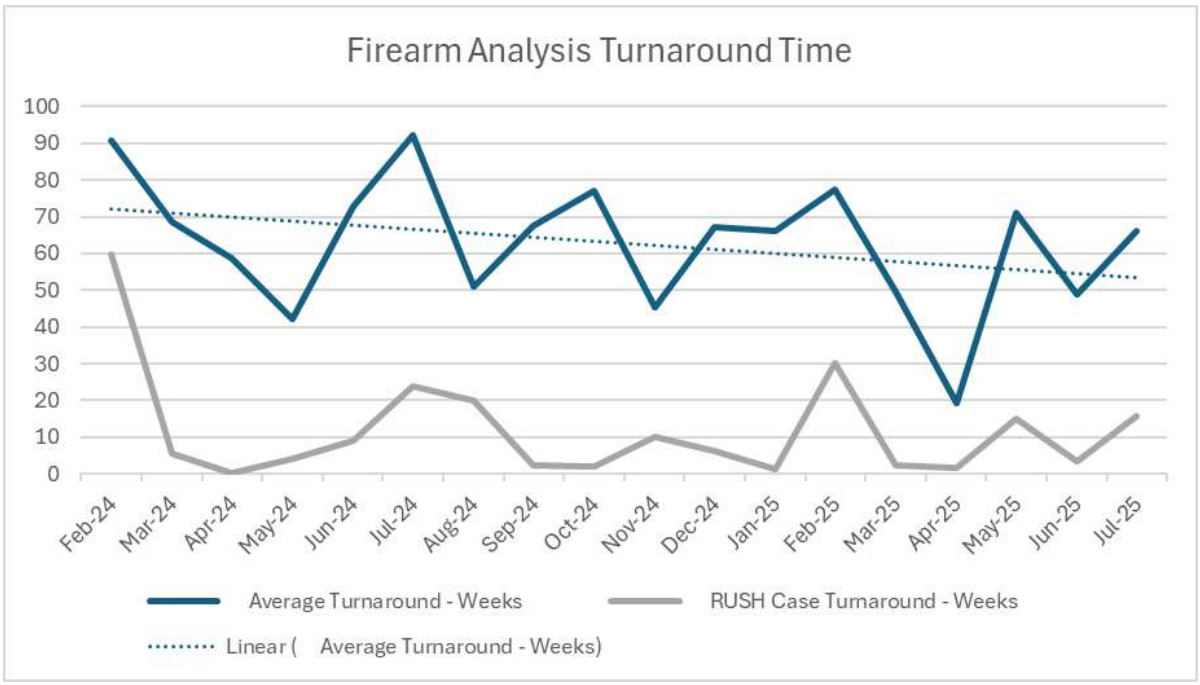
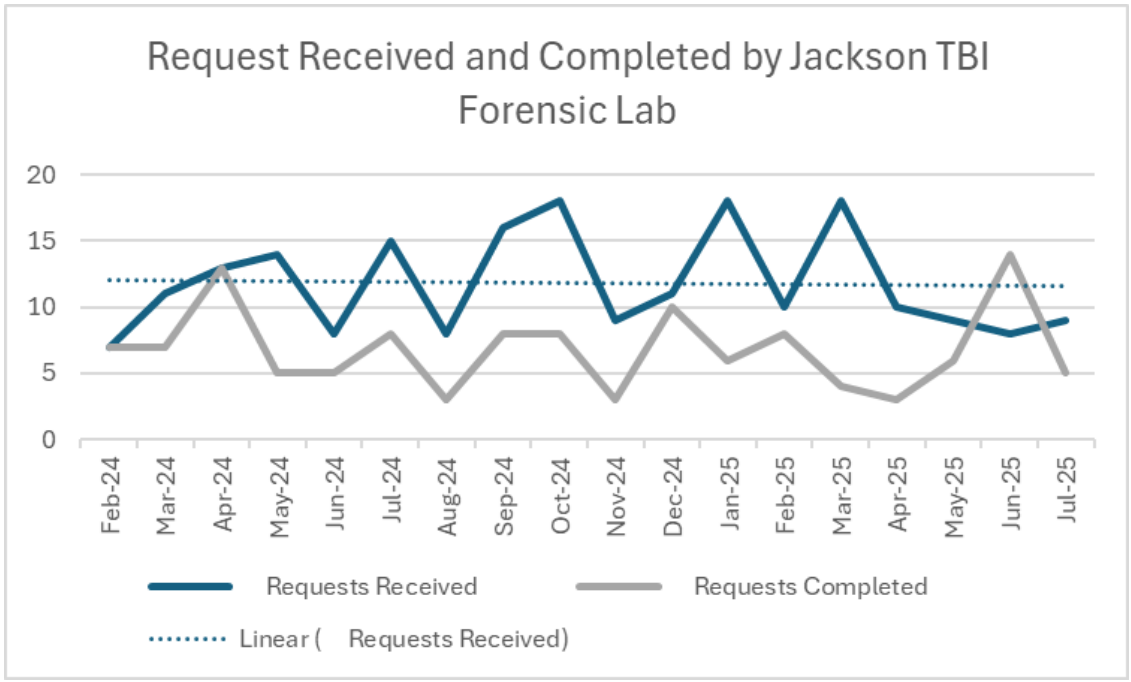


Figure 1.

Figure 2.



EVIDENCE STORAGE AND TRANSPORTATION

The feasibility study conducted for the City of Memphis (McCutcheon, et al., 2024) found that storage of evidence is in need of upgrades. Evidence is stored at either 201 Poplar, the agency itself, or a large undisclosed warehouse. Currently, Memphis and Shelby County are only responsible for storing evidence before and after forensic analysis. As discussions of expansion move forward, it is crucial to highlight the gaps in storage and transport that already exist. Proper evidence storage is fundamental to the integrity of the justice process. When evidence is stored in older buildings that do not have more modern climate controls, it risks increase for loss, contamination, or delays in retrieval, all of which can undermine investigations and prosecutions. The current organization of evidence storage decreases efficacy of staff and raises questions about maintaining chain-of-custody at the highest standards. The following concerns were listed in the City of Memphis study (McCutcheon, et al., 2024):

- Limited storage capacity: Current evidence storage operates at reduced capacity, which impacts the county and city, with facilities described as strained and unable to fully support the growing volume of forensic evidence.
- Aging infrastructure: Facilities used for evidence storage are in need of maintenance and modernization. Issues such as unreliable utilities, inadequate climate control, were all cited as concerns in handling of sensitive evidence at certain sites.
- Cleanliness and organization: Interviews conducted in the city's feasibility study revealed that the storage spaces, while functional, require improvements in cleanliness, organization, and layout. These factors influence both efficiency and security.
- Dual-use space concerns: Some evidence intake and initial testing occur in the same spaces where long-term storage is maintained. While efficient for processing and booking, this raises questions about the integrity of chain-of-custody and whether security safeguards are sufficient in a multi-use environment.
- Accessibility issues: Certain storage areas are not handicap accessible, and limited infrastructure (such as lack of reliable equipment setup areas due to poor environmental conditions) further restrict use of the space.
- Delays in retrieval: Officers noted that retrieving evidence from storage sometimes causes delays. Although not universal, this needs to be examined further.
- Security safeguards: The need for strengthened safeguards, such as more secure storage solutions and controlled access, was raised to ensure sensitive materials remain protected.

- Technology and system integration: Current storage operations would benefit from upgraded technology, including broader access to AFIS and improved electronic tracking systems, to reduce reliance on external transfers and speed up workflows.

One major hurdle is that the digital tracking systems used by different municipalities are not consistent. Each department maintains its own property and evidence management system, and these systems cannot communicate with one another. This creates fragmentation in the chain-of-custody record, as evidence moved from one jurisdiction to another may have gaps or duplicative entries. Inconsistent tracking also makes it difficult to conduct countywide audits, since there is no single system of record. Nationally, best practices call for integrated property management systems or laboratory information management systems (LIMS) that use standardized barcodes and digital logs to ensure continuity across agencies. At a minimum, current systems should be reviewed to determine a means to connect evidence from the beginning to the end.

At 201 Poplar, evidence is stored by local municipalities both before trial and after disposition. As cases are resolved, evidence is moved from the bottom floor of 201 Poplar to the Criminal Court Clerk's Office on the third floor. Until July 1st of this year, the Clerk's Office had been storing evidence at pretrial, during trial, and after resolution. While this process has been changed moving forward so that the Criminal Court Clerk's Office is only storing evidence upon case disposition, it will take time to transition all evidence into its proper location as cases move through the system.

While 201 Poplar has large capacity, its size makes it difficult to maintain environmental stability. If the building experiences a power outage or an HVAC failure, repairs take time. This occurred last March, and during our interviews we learned that DNA evidence is stored at both the bottom floor of 201 Poplar and on the 3rd floor. While portable A/C units may be a short-term solution for certain areas, particularly smaller spaces in 201 Poplar where disposed case evidence is held, a centralized evidence facility with built-in environmental controls and redundancy would provide greater protection for all evidence stored.

Proper storage conditions are fundamental to preserving the integrity of forensic evidence. While a property and evidence room is not a laboratory, the material housed there should be held to the same climate control standards that govern accredited forensic facilities. Biological and digital evidence are both vulnerable to heat, humidity, and environmental fluctuations, which can lead to degradation, data loss, or questions about admissibility in court. Some current storage spaces in Shelby County, many of which lack climate systems or

backup safeguards, do not meet these standards. Without climate-controlled facilities, refrigeration, and safeguards (such as alarms on refrigeration units), the risk of compromised evidence increases, undermining both investigations and prosecutions.

The importance of evidence storage and transportation is central to ensuring case strength. DNA and other biological evidence should be stored under controlled environmental conditions. According to NIST/NIJ working-group guidance, long-term storage should be thermostatically maintained between 60–75 degrees Fahrenheit with relative humidity below 60 percent. In *House v. Bell,* 547 U.S 518 (2006), a Tennessee case decided by the U.S. Supreme Court, blood vials were improperly stored in a shared box and transported in a vehicle without climate controls, leading to hemolysis or spoilage. The Court found that this mishandling raised serious questions about the evidence's integrity, underscoring how improper storage can undermine confidence in forensic conclusions. Such rulings show that failures in evidence management risk delays and can alter trial outcomes and erode prosecutorial credibility.

In addition to property storage, another point of investigation is transportation of evidence. The secure transport of forensic evidence to TBI's Crime Laboratory in Jackson or to a Shelby County courtroom currently presents logistical inefficiencies and strains resources for MPD, SCSO, and surrounding jurisdictions. At present, law enforcement agencies coordinate evidence drop-off to TBI's Jackson's Lab through scheduled appointments at a designated field office or transport the evidence themselves.

The City of Memphis study (McCutcheon, et al., 2024) highlighted that MPD's transportation of evidence to TBI relied on mixed modes of drop-off. It includes using a small sedan to transport evidence, including firearms, forensic DNA evidence, and drugs, to TBI without security.

Current Options: Storage

To address these challenges, renovation of current facilities and/or construction of new site is recommended. One option is a new shared property and evidence facility. This facility would consolidate evidence storage from existing locations into a secure, purpose-built building designed with proper climate systems, access controls, and space for future growth. Centralizing operations would streamline intake, cataloging, and retrieval, improve security, and provide a consistent system for all agencies operating in the county. Once cases are disposed, evidence can then be moved to the Criminal Court Clerk's Office at 201 Poplar. The following proposed prioritizes both functionality and efficiency, ensuring evidence can be

processed and stored in a way that safeguards its admissibility in court while giving investigators and prosecutors timely access to what they need:

- Sufficient space to house all evidence currently stored at 201 Poplar and the large undisclosed site, with room for growth as casework expands;
- Climate-controlled zones to protect sensitive evidence such as DNA, biological samples, and electronics;
- Secure intake and release bays to streamline the movement of evidence while preserving chain-of-custody;
- Segregated storage areas for firearms, narcotics, digital devices, and bulk/oversized items such as vehicles; and
- Modern security infrastructure, including access-controlled entry, video surveillance, and electronic inventory management.

In 2024, the Mesa Police Department in Arizona opened a 33,000 square-foot, purpose-built evidence facility to address many of the same issues Shelby County now faces. As a large jurisdiction, it is moving away from piecemeal storage and toward centralized, climate-controlled, secure evidence warehouses. This facility is one example of a facility that seeks to improve efficiency, reduce risk of lost or mishandled items, and support stronger accountability for evidence handling.

At a minimum, city and county stakeholders should tour current facilities, including 201 Poplar and the undisclosed location where much of evidence and some forensic investigative analysis is conducted. We recommend a committee be developed to assess current processes for storing and processing in/out forensic evidence, as well as the transportation of that evidence, whether it be to Jackson or to a courtroom.

If it is determined that renovations or a new location for storing evidence should be built, it can be done independent of or in association with a crime laboratory or a new jail/justice center, both of which are current topics being discussed in our community. The table at the end of the document provides estimates on space and costs for such a facility.

Current Options: Transportation

Secure transportation of evidence is an additional concern for Shelby County. One potential option would be to replace the current appointment-based drop-off model with a dedicated,

county-managed pickup and delivery system operated in coordination with TBI. Under this model, a designated team (2-4), either from TBI or appointed by Shelby County, perhaps in association with crime scene investigators, would manage a consistent pickup and drop-off schedule, occurring three times per week. This team would be responsible for visiting each participating jurisdiction in the county, collecting properly packaged and documented forensic evidence, and delivering it directly to TBI's Jackson laboratory or taking it in for local drop-off to TBI.

This system would eliminate the need for individual departments to arrange transportation or coordinate schedules with TBI. Moreover, a centralized handler trained in evidence transport protocols would ensure compliance with chain-of-custody procedures, further reducing liability risks. To operationalize this model, the County could invest in dedicated evidence transport vehicle(s), using a portion of the $1.5 million allocated for local forensic needs. A suitable vehicle such as a secure SUV or a modified cargo van should be outfitted with lockable storage compartments, climate control features for biological evidence, and GPS tracking. This setup ensures that evidence is protected from tampering, environmental degradation, and unauthorized access during transit.
Some example vehicle options include:

- **Ford Transit or Mercedes-Benz Sprinter vans:** Estimated base cost of $35,000–$50,000, with customization (lockers, refrigeration, alarms) bringing the total to $55,000–$90,000.
- **Police Interceptor SUVs or Chevrolet Tahoe models**: Estimated cost with custom secure storage is $50,000–$80,000.
- **Mobile Crime Scene Units:** Though effective, these may exceed $100,000 and are likely better suited for on-site processing than routine transport.

These vehicles can be shared among departments or managed centrally under a rotating schedule, depending on case volume and geography. GPS tracking and communication systems would allow real-time monitoring of the vehicle and provide dispatch support in the event of an emergency.

Benefits of Centralized Transportation of Forensic Evidence

A centralized transportation system would have the following benefits:

- **Efficiency:** Reduces travel obligations for local investigators and eliminates the need for scheduling individual drop-offs;
- **Security:** Enhances the integrity of evidence through standardized handling and transport protocols;
- **Accountability:** Designating trained personnel ensures better compliance with chain-of-custody documentation;
- **Consistency:** Promotes uniform standards across all participating jurisdictions; and
- **Resource Optimization**: Allows criminalists and investigators to focus on forensic analysis and casework rather than transport logistics.

If the current system of transporting forensic evidence to TBI labs remains in place, improvements in coordination and scheduling will be essential to reduce delays and improve efficiency. Establishing a more frequent pickup and drop-off schedule, managed either by TBI or a designated county representative, could streamline the process. Enhanced coordination would also help ensure that evidence is prioritized appropriately and reduce the risk of bottlenecks, particularly in time-sensitive cases.

Table 4: Evidence Transport Vehicle Cost

VEHICLE TYPE	BASE COST RANGE	CUSTOMIZATION COST RANGE	TOTAL COST RANGE
FORD TRANSIT OR MERCEDES-BENZ SPRINTER	$35,000-$50,000	$20,000-$40,000	$55,000-$90,000
FORD POLICE INTERCEPTOR UTILITY	$30,000-$50,000	$5,000-$15,000	$35,000-$65,000
CHEVROLET TAHOE OR	$40,000-$60,000	$10,000-$20,000	$50,000-$80,000

DODGE DURANGO			
MOBILE CRIME SCENE UNIT (BOX TRUCK)	$60,000-$100,000	$40,000-$100,000	$100,000-$200,000

McCutcheon (2024). *Memphis Crime Lab Feasibility Study: Financial Costs, Evidentiary, Timeframe, and Implementation of Forensic Laboratory Technology* (Report Number, 2024-02). Memphis, TN: Precision Criminal Justice Consulting.

The cost of the vehicle is important, but so is the security. Dedicated evidence transport vehicles minimize the risk of contamination or tampering. They should have lockable compartments, climate control for temperature-sensitive evidence, and tracking systems for real-time monitoring (McCutcheon et al., 2024). Whether law enforcement agencies are using a van, SUV, or mobile unit, trained personnel and strict chain-of-custody procedures are essential to keep evidence secure and admissible for court. Some other things that also need to be planned for are ongoing costs like maintenance and insurance to keep the vehicle and its equipment working as it should (McCutcheon et al., 2024).

Chain-of-custody integrity begins at the point of seizure. All evidence should be packaged in tamper-evident containers with unique seal numbers, labeled consistently, and accompanied by documentation recording the date, time, handler, location, and purpose of every transfer. A single countywide evidence label format and custody form should be adopted and integrated into a shared laboratory information management system so that barcodes and metadata follow the item from seizure to analysis.

Together, these standards replace the current ad-hoc approach, whether driving to TBI or waiting for analyst pickup, with a countywide, auditable system. They reduce investigator downtime, eliminate inconsistent packaging and custody practices, and improve security through documentation, recording, and accountability. This creates a single, defensible chain-of-custody that begins at seizure and ends at analysis, ensuring that Shelby County can meet the demands of growing forensic evidence with uniform, professional practice.

DIGITAL FORENSICS

Context and Needs

Digital forensic evidence, including cellphones and computers, plays a role in nearly all modern cases, similar to how DNA became a routine evidentiary source in the 1990s. Digital evidence is now a routine feature of modern investigations. Peer-reviewed work estimates that digital evidence factors into roughly 90 percent of criminal cases, and surveys from the Pew Research Center show that 91 percent of U.S. adults own smartphones, which means most crimes now leave a digital trace of some kind (Pew Research Center, 2019; Roussev & Quates, 2019).

Because access, acquisition, and analysis are technically complex and often slowed by encryption, mobile forensics can be time-consuming without sufficient staff, space, and specialized tools. The National Institute of Standards and Technology's (NIST) published guidance emphasizes that modern smartphone security introduces significant challenges for forensic examiners, demonstrating the need for enhancement and expansion in this area of investigation (NIST, 2014). A recent practitioner survey found that backlogs continue to grow year after year, and agencies are struggling to keep up with the influx of devices needing analysis (Forensic Magazine, 2024a). Additional research shows that as technology becomes more embedded in daily life, each case increasingly involves multiple devices such as smartphones, tablets, and cloud services, all of which require more time and specialized expertise to process (Forensic Magazine, 2024b).

Internationally, demand for digital forensics is growing faster than capacity. Reviews by independent inspectors in the United Kingdom have documented case queues for mobile devices exceeding a year in some forces, and U.S. policing associations have similarly showed concern about escalating volumes, uneven practices, and the need to modernize evidence handling across personnel, processes, and technology (HMICFRS, 2022; Major Cities Chiefs Association, 2021). While contexts differ, the trend shows growth in evidence is outpacing current systems and practices in place. The case for immediate and sustained funding is strong. At a minimum, resources should be increased to (1) expand personnel, (2) physical space, (3) dedicated workstations, (4) licenses for specialized extraction and analysis software, and (5) recurring training to keep pace with emerging technologies (Major Cities Chiefs Association, 2021).

An audit was conducted by the TBI for the period of June 1, 2020, through April 30, 2024, to evaluate the agency's efficiency, specifically in terms of forensic processing, digital evidence, and internet crimes against children (under the age of 13). According to the audit, the Forensic Services Division, which is an important key to addressing evidence backlogs, saw its budget increase from $20.8 million to $29.5 million, which signifies growing demand (Tennessee Comptroller of the Treasury, 2024).

Digital forensics has become a cornerstone of modern investigative work. With the rise of AI-driven communication, cloud storage, and the information we all have on our phones (e.g. photos, medical information, banking information, location, etc.), the amount and type of digital evidence has expanded. Phones often contain everything from texts and GPS history to app activity and photos, all of which are materials that can be central to building a case. At the same time, this type of evidence raises serious concerns, especially when it involves juveniles when it comes to photos on their phones and other information they share with their peers. Handling it requires secure protocols and careful attention to privacy and legal standards.

Preparing for exponential expansion of this forensic area will take hiring and training and is essential to prevent future backlogs. New staff cannot complete cases and reduce existing workloads or improve the evidence of processing and turnaround times until trained. To try to aid with evidence backlogs and turnaround times, TBI added 50 new forensics scientists and 5 new digital forensics positions from 2021 to 2024. However, delays still arise with the new staff because the training for them is extensive and can take anywhere from several months to two years, and a lack of sufficient laboratory and office space makes it hard to accommodate new staff.

TBI management faces challenges when it comes to training new staff, not only because of the time it takes but also because it involves existing staff helping to train as well, ultimately slowing down the process for existing staff to do its job. Despite the challenges of this, the Forensic Services Division reduced its inventory of backlogged requests from 19,587 on September 1, 2023, to 10,173 on September 1, 2024, a reduction of 48 percent. TBI benefited from this reduction because it hired and trained staff. Similarly, in April 2024, the Forensic Services Division reported a total of 13,537 evidence testing requests to be completed, compared to 18,906 outstanding requests in April 2023.

Memphis and Shelby County investigate a majority of their digital forensics locally without relying on TBI. In 2024, SCSO conducted 144 phone examinations, a workload handled by a team consisting of one sergeant and three patrol officers. These phones were processed off-

site at a location tied to the Narcotics Unit, with extracted data transferred to secure servers maintained by the Electronic Surveillance Unit (ESU). The data were stored using Penlink, which operates on an independent server not connected to the broader SCSO system. While this separation enhances data protection, it also introduces storage challenges. According to McCutcheon and colleagues (2024), MPD manages approximately 130 terabytes of stored data, and this will continue to grow. With no current limits on retention, the accumulation of data raises long-term questions about server capacity, maintenance costs, and how long data should be preserved.

Interviews with suburban agencies revealed inconsistent practices in how digital evidence is stored, processed, and secured prior to analysis. Some departments relied on off-site facilities or narcotics units for phone examinations, others used individual investigators without dedicated server infrastructure, and several acknowledged that their procedures differed from those of neighboring jurisdictions. While each agency followed its own internal protocols, the lack of uniform standards creates vulnerabilities. These variations increase the likelihood of courtroom challenges, even in cases where the evidence itself is sound.

Other local agencies face similar strain. Germantown, for example, has two investigators handling all electronic evidence. Bartlett reported a growing backlog. Several departments rely on the Memphis Police Department's Internet Crimes Against Children (ICAC) task force or external partners—sometimes outside the county—for support. These arrangements help fill gaps but are often stopgaps rather than solutions. Adding further pressure, defense attorneys are increasingly asking for additional digital evidence. Prosecutors must often act on these requests to maintain the integrity of their cases and comply with legal standards. This has led to additional demands on digital forensics units, especially in serious cases where digital evidence plays a central role.

Current Options: A Memphis/Shelby County Digital Forensics Center

During our interviews, some suburban police departments in Shelby County expressed interest in centralizing their digital forensic efforts into a shared, multi-agency unit. Most agencies expressed a need for more digital forensic capacity, whether through additional staffing, better technology, or streamlined procedures. Multiple departments suggested that a centralized digital forensics facility could improve coordination. If each agency could

contribute personnel who remain up to date on tools, training, and legal standards, a shared space could offer faster turnaround, consistent protocols, and better communication across jurisdictions.

Under this proposed model, participating agencies would contribute existing digital investigators who would work collaboratively in a centrally located facility. These investigators would remain on their respective department payrolls, reducing duplication while increasing capacity. The shared facility could be designated as a county-wide multi-agency digital forensics unit.

A county-run digital forensics center, which could be administered by the Sheriff's Department but open to the MPD, suburban departments, and other county agencies, would directly address inconsistencies identified in storage, security, and processing. A single facility would allow (1) standardized intake, (2) evidence preservation, (3) legal review, (4) analytical methods, and (5) reporting. It would also concentrate cybersecurity safeguards and quality assurance, while shared training, pooled equipment, and scheduled access would better align practice across the county (Major Cities Chiefs Association, 2021).

Proposed Centralization Route

- **Cost Efficiency:** Centralization allows for shared infrastructure, software licenses, and space, reducing the financial burden on individual departments;
- **Scalability:** A centralized unit can adapt more efficiently to case surges or major incidents involving digital evidence;
- **Specialization:** Centralizing staff promotes specialization and continuous training, which are critical given the pace of technological advancement;
- **Evidence Integrity:** Central oversight allows for stronger chain-of-custody protocols and consistent policies around handling sensitive material, including evidence involving juveniles; and
- **MPD Digital Forensics:** Depending on MPD involvement, at a minimum a centralized unit could help free up MPD analysts to focus on city cases, improving efficiency across jurisdictions.

One model includes the Arizona Counter Terrorism Information Center (ACTIC, n.d.), which houses a dedicated digital forensics laboratory that supports multiple agencies across the

state. Agencies could assign their own examiners to the facility, allowing them to work cases with shared infrastructure while maintaining case ownership. The center would provide advanced forensic workstations, secure evidence storage, and centralized training resources, making it both an operational and educational hub. There is an emphasis on regional collaboration that can standardize practices, reduce duplication of resources, and ensure sensitive digital evidence is handled in a secure, consistent environment. Similarly, Knox County, Tennessee has consolidated aspects of its forensic services to improve efficiency across suburban and county agencies. Both examples highlight the advantages of centralization: greater consistency, shared resources, and stronger defensibility of digital evidence in court.

Additionally, Jefferson County Sheriff's Office launched the East Tennessee Regional Forensic Facility and Training Program in 2024. It provides a strong template for Shelby County. It is a resource for local law enforcement agencies to quickly conduct digital forensic analysis to reduce TBI's volume and workload. The location provides a shared workspace, training, and technical assistance. This effort is scalable and could be replicated locally.

Based on this model, the option of centralization would operate on a voluntary basis. Participation would not require agencies to dismantle their current digital forensic capabilities or abandon established internal procedures. The shared unit would serve as an additional resource, available to those departments seeking specialized assistance, overflow support, or collaborative casework. Given that both crime and offenders frequently cross jurisdictional lines, a connected, cooperative forensic model helps break down operational silos and reflects the mobility of today's criminal activity.

However, if implemented, there are potential concerns. First, high-volume contributors could overwhelm the system. This can be mitigated through reserved workstations by agency, triage-based scheduling, and service-level agreements (SLAs) prioritizing violent-crime and court-driven cases. Second, investigators would lose the convenience of handing evidence to an in-house analyst. This can be offset with daily courier runs, secure off-hours lockers, and remote intake portals for cloud artifacts, thereby preserving efficiency without sacrificing consistency.

A newly constructed or a retooled facility would need to be approximately 1,500-2,000 square feet based on current volume and personnel demand. This space would accommodate 6-8 digital forensic analysts, dedicated server infrastructure, secure evidence storage, administrative areas, and room for shared operations. The estimated cost for the building and

basic fit-out—excluding personnel—is approximately $1-2 million.

Beyond the structure itself, specialized digital forensics infrastructure is required:

- Server systems and data storage capable of handling hundreds of annual phone dumps with scalability for exponential growth would cost approximately $50,000. These servers must offer secure, high-throughput capacity with backup power and environmental controls to preserve sensitive digital evidence.
- Workstations and forensic computing equipment represent another critical investment. Each analyst requires a high-performance workstation capable of processing encrypted and complex digital data. Outfitting the lab with approximately 10 standard units and two high-end systems would total around $85,000.
- Additional infrastructure, including secure evidence lockers, network infrastructure, backup power, and general furnishings, is estimated at $250,000. This ensures the Shelby County Digital Forensic Center is fully functional from day one, with the physical and technical support to expand operations over time.

Timeline for centralizing a digital forensics location

Centralization of a digital forensics' center would take approximately 18-24 months to complete:

- Likely a year or more: Choose or build a secure facility that is Criminal Justice Information Services (CJIS) compliant, including server rooms, workstations, and evidence intake areas.

- This includes the following tasks:
  Assess needs, engage stakeholders, and explore feasibility for centralized unit;
  Months 2-5: Apply for large grants and finalize budget;
  Months 7-10: Consolidate or purchase forensics software, secure evidence lockers, and high-capacity servers;
  Months 8-12: Team creates standard operating procedures (SOPS), triage protocols, and MOUs among participating agencies; and
  Months 12-13: The centralized unit launches and starts taking in cases across jurisdictions.

Table 5: Build and Salary Estimates Per Analyst

NUMBER OF ANALYSTS	SQ FT PER ANALYST	TOTAL SQ FT	BUILD COST $800/ SQFT	BUILD COST $1,000/SQFT	TOTAL SALARY & BENEFITS
1	250	250	$200,000	$250,000	$83,564
2	250	500	$400,000	$500,000	$167,128
3	250	750	$600,000	$750,000	$250,692
4	250	1,000	$800,000	$1,000,000	$334,256
5	250	1,250	$1,000,000	$1,250,000	$417,820
6	250	1,500	$1,200,000	$1,500,000	$501,384
7	250	1,750	$1,400,000	$1750000	$584,948
8	250	2,000	$1,600,000	$2,000,000	$668,512
9	250	2,250	$1,800,000	$2,250,000	$752,076
10	250	2,500	$2,000,000	$2,500,000	$835,640
11	250	2,750	$2,200,000	$2,750,000	$919,204
12	250	3,000	$2,400,000	$3,000,000	$1,002,768

- *McCutcheon, James, Amanda Johnson., Kiarra Fortney, Karli Province, Larisa McKinnerney. (2024). *Memphis Crime Lab Feasibility Study: Financial Costs, Evidentiary, Timeframe, and Implementation of Forensic Laboratory Technology* (Report Number, 2024-02). Memphis, TN: Precision Criminal Justice Consulting.
- *The “Sq Ft per Analyst” reflects the assumption that each digital forensic analyst requires a minimum of 250 square feet of space.
- *The “Total Sq Ft” multiplies that 250 sq ft per analyst by the total number of analysts. Each additional analyst adds an equal amount of required space.
- Table 5 gives estimates for both the facility build estimates and personnel costs cost for digital forensics analysts. Research states there is no national rule on how much space each analyst should get, but the National Institute of Standards and Technology (NIST) and National Institute of Justice (NIJ) states that the space should be built according to the functions and workflow of the job (U.S. Department of Justice et al., 1998).
- The American National Standards Institute (ANSI) suggests 750-1,000 sq ft be used for digital forensic laboratories. Since digital forensic analysts would be working with computers as opposed to lab equipment, 250 square feet would be more than enough per analyst. For each analyst, 250 sq ft is sufficient to accommodate adequate power, cooling, a workstation, an intake/imaging room, secure evidence storage, server space, and common areas (Scientific Working Group on Digital Evidence, 2018).

- In McCutcheon et al. (2024) study, they found that Metro Nashville Crime Lab square foot cost $857 per square foot and Arkansas State Crime Laboratory was $1,063 per square foot. The table also shows two costs to build the unit: on the low end it would cost $800 per square foot, and the high end would cost $1,000 per square foot, depending on potential variations in constructions costs for forensic facilities (McCutcheon et al., 2024).
- Personnel costs are calculated with a base salary of $64,280 per analysts (entry level: $46,429, average: $64,280, senior role: $79,061) plus 30% benefits (aligned with recent Bureau of Labor Statistics estimates of average employer-provided benefits) adding up to be $84,564 per analyst (EERI SalaryExpert, 2025; U.S. Bureau of Labor Statistics, 2025).
- It is important to mention that these analysts will already be on the payroll of the police departments. Therefore, the suburbs will supplement the amount of money for these salaries, so in essence the only jobs that would need to be paid for would be custodians, front-desk receptionist, and security, this depends on the option that is being picked.
- Yearly upgrades to equipment and repairs are not included in this budget and can range based on network infrastructure (Major Cities Chiefs Association, 2021).

Current Options: Maintain and Expand Independently with Continued Coordination

Another option is to continue enhancing digital forensic capacity within each individual department, including MPD and SCSO. This approach would allow agencies to build on their existing infrastructure without the initial cost of constructing or repurposing a centralized facility. It also maintains momentum and flexibility, allowing departments to tailor upgrades to their specific needs. However, over a 5- to 10-year period, this path would likely result in higher overall costs compared to developing a shared, centralized hub. If no joint facility is established, each agency will need to maintain and regularly update its own forensic software, upgrade workstations, expand secure data storage, and remain compliant with CJIS and related standards.

Continued investment in staff training, cybersecurity protocols, and evidence handling procedures will be essential to keep up with growing demands. As digital evidence becomes increasingly central to investigations— particularly with the widespread use of smartphones— each department will need to scale its operations accordingly to avoid backlogs and delays.

RAPID DNA

Context and Needs

Currently, DNA evidence or biologics are seeing a significant technological advancement. Genealogy is at the core of this movement. As participation in genealogy databases grows, the likelihood of finding investigative leads will increase, making these methods viable in cases no one thought possible a few years ago. Future workflows may also integrate genealogy with Rapid DNA, familial STR searching, and other forensic tools, creating a more complete investigative picture. In-house capabilities could also give agencies better control over sensitive single nucleotide polymorphism (SNP) data, reducing privacy risks associated with shipping and third-party handling.

At the same time, the expansion of forensic genealogy faces potential hurdles. Legal and policy changes could limit access to genealogy databases or create stricter consent requirements. The field is also moving toward higher expectations for validation and accreditation under recognized standards, which will require time and resources. Public perception will continue to play a role; any misuse or perceived misuse of genealogy data could reduce voluntary participation in these databases. Even with training and initial funding, sustaining an in-house program means budgeting for equipment maintenance, consumables, and ongoing analyst training. Finally, private labs may be reluctant to work with agencies that generate their own SNP data, limiting the flexibility of hybrid models.

Rapid DNA is an emerging technology that is part of this advancement. While turnaround times at TBI for Forensic Biology are near average or above other government funded forensic crime labs, being able to utilize DNA for investigation in real time can be of much benefit, especially in time sensitive cases. Federally, Rapid DNA is authorized for booking-station use under the Rapid DNA Act of 2017 and must comply with the Federal Bureau of Investigation (FBI) standards. Profiles from qualifying arrestees can be searched against the Combined DNA Index System (CODIS) within about 24 hours and against the FBI's DNA Index of Special Concern for priority unsolved cases for accredited laboratories.

With the FBI's July 2025 update to its Quality Assurance Standards (QAS) (specifically Standards 18 and 19), profiles generated from validated Rapid DNA systems can now be uploaded into CODIS, provided strict compliance measures are met. This marks a turning point, allowing on-site or booking station DNA analysis to feed directly into the national

database, streamlining investigations and expanding the reach of DNA-driven leads. Importantly, this cannot be done locally and must be done by TBI's lab.

Rapid DNA is most effective for high-quality, single-source samples like buccal swabs or bodily fluids and is not recommended for complex or low-level mixtures such as those found in sexual assault kits or degraded evidence. Agencies utilizing Rapid DNA must partner with accredited public labs to ensure validation and compliance with FBI standards. Chain-of-custody protocols, documentation practices, and contamination controls remain critical, especially if results are to be used in court.

Success stories from pilot jurisdictions include rapid investigative leads within hours of booking, but state-level reviews also warn that improper implementation could jeopardize cases. Inviting outside experts to brief local officials can increase confidence and ensure practices remain within accreditation and legal boundaries (CBS News, 2021).

In Tennessee, the TBI is still validating Rapid DNA for casework in its Nashville lab and developing implementation policies. Local agencies should therefore expand training and prepare personnel, while formal deployment should remain consistent with TBI policy and FBI QAS. It is important to note local use is still subject to state-level validation and FBI QAS (Congress, 2017; FBI, 2021; Tennessee State Government, 2024).

It is also important to note that Tennessee's DNA database is operated by the TBI, and both Combined DNA Index System (CODIS) and National DNA Index System (NDIS) entries require an accredited, QAS-audited laboratory. While local or regional collaborations with Arkansas and Mississippi may supplement investigative efforts, any non-CODIS local databases raise legal and privacy concerns and require careful review, policies, and transparency (ANSI National Accreditation Board, 2022; FBI, 2021; Wired, 2019).

The Tennessee Advisory Commission on Intergovernmental Relations (TACIR) has recently recommended amendments to permit Rapid DNA testing at law enforcement booking stations. These changes would allow real-time DNA analysis during arrest processing, significantly improving investigative turnaround times. The FBI's July 2025 update to its QAS is an important milestone, permitting crime scene–derived Rapid DNA profiles to be uploaded into CODIS if strict compliance measures are followed. TACIR has gone a step further, recommending resource-sharing across jurisdictions to reduce backlogs and supporting pilot projects that place Rapid DNA instruments at booking stations. These recommendations reflect a recognition that local deployment, if aligned with state and

federal standards, could reduce turnaround time and provide investigative leads more quickly.

At the same time, public trust considerations remain significant. While a local or regional non-CODIS database might offer investigative value, such systems raise legal, privacy, and transparency questions. Civil liberties groups have cautioned against building shadow databases without clear statutory authority, auditing, and oversight. Other jurisdictions that have attempted local databases have faced concerns that samples could be retained indefinitely or used outside of their intended scope. Incorporating strong safeguards, transparency measures, and legal review is therefore essential if Shelby County or its partners consider any form of supplemental database.

Current Options

Investing in Rapid DNA presents both compelling opportunities and important considerations for Shelby County. On the positive side, Rapid DNA can dramatically accelerate the investigative process. By generating DNA profiles in under two hours, law enforcement can identify suspects or rule out individuals much earlier in an investigation. This speed enhances case clearance rates, aids in identifying repeat offenders, and can improve public trust by demonstrating responsiveness and technological modernization. For cases involving violent crimes or time-sensitive evidence, this rapid turnaround can be particularly valuable.

One potential option for Shelby County is the purchase of a Rapid DNA machine to support preliminary, on-site forensic analysis, and swab those currently in jail. The primary benefit of operation would be the ability to conduct initial testing locally, without the need to transport evidence to regional facilities such as the TBI lab in Jackson. This could reduce turnaround time for generating investigative leads in cases where time sensitivity is a factor. Prioritization would be recommended, as the cost of swabbing all violent crime suspects for Rapid DNA would increase per swab, by $170-200.

Under this model, Rapid DNA results would be used to inform the early stages of an investigation, while confirmatory testing for prosecution would still be routed through TBI to meet accreditation and evidentiary standards. This approach may offer logistical efficiencies and faster access to potential leads, much like NIBIN, though it would also require adherence to state and federal guidelines regarding validation and oversight.

Rapid DNA requires specific consumables, regular calibration, and trained personnel to operate effectively within the bounds of federal standards. The 2025 FBI QAS now permit the upload of crime scene-derived Rapid DNA profiles into CODIS, but only if strict accreditation, validation, and oversight procedures are followed. This means the technology must be integrated within an accredited lab framework or used in close coordination with one for entry into CODIS.

Table 6: Rapid DNA Estimated Cost

CATEGORY	BASE COST RANGE	ANNUAL MAINTENANCE RANGE	FIRST-YEAR TOTAL RANGE
RAPIDDNA INSTRUMENT (THERMO FISHER RAPIDHIT ID)	$144,685-$213,100	$15,000-$20,000	$159,685-$233,100
RAPIDDNA INSTRUMENT (ANDE 6C)	$200,000-$377,000	$20,000-$50,000	$220,000-$427,000
RAPIDINTEL CARTRIDGE KIT (50 RUNS)	$7,200-$8,560		$7,200-$8,560
PRIMARY GEL CARTRIDGE (150 RUNS)	$9,500-$11,460		$9,500-$11,460
PROPRIETARY BUCCAL SWABS	$1.50-$7.00		$1.50-$7.00
THIRD-PARTY DNA REPOSITORY SUBSCRIPTION	$120-$189/year		$120-$189/year
LABORATORY ACCREDITATION	$3,000-$10,000		$3,000-$10,000

https://osp.admin.mn.gov/sites/osp/files/2023-09/d-191_priceschedule_09.26.23.pdf

We recommend stakeholders invest in additional training and discussions on the capabilities of Rapid DNA before making a decision on whether or not to invest in the technology. If the option is not to invest in this technology, we encourage continued training and education as this new forensic capability improves. While Rapid DNA offers significant benefits in terms of speed and investigative utility, it is not appropriate for all types of evidence and must be applied within the bounds of legal and scientific standards. Further training is essential to ensure that stakeholders can correctly interpret results, maintain chain-of-custody, and determine when Rapid DNA is the appropriate tool. As legal frameworks and forensic

technologies continue to evolve, coordinated education and capacity-building efforts will be critical to avoid misapplication and ensure the system's integrity.

FIREARM AND DNA ANALYSIS

Context and Needs

Another local forensic concern is the turnaround time for ballistic evidence verification. As noted above, turnaround time for firearm analysis is higher than industry average. It is important to disentangle the process as it comes to the NIBIN and firearm toolmark analysis. NIBIN analysis is done locally to investigate potential leads and history of the firearm in question. For prosecution, toolmark analysis and any investigative conclusion must be verified. A firearm toolmark analyst is responsible for verifying ballistic evidence.

The MGU functions as the regional ballistics testing site under the Crime Gun Intelligence Center (CGIC) model, supporting more than 50 outside law enforcement agencies. This role has expanded the scope of local forensic investigation by linking cases through test fires and submitting evidence for NIBIN correlation. Firearm evidence is handled through a mix of local, state, and federal collaboration. While some cases are submitted to TBI for firearm toolmark verification, many firearms cases are resolved by plea agreements and do not proceed to full forensic analysis. The Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) provides essential resources such as eTrace and NIBIN access, along with training in techniques like serial number restoration and ballistic analysis. The FBI contributes specialized forensic support when cases involve organized crime, terrorism, or broader trafficking investigations.

Initial test firing and NIBIN entries are typically completed within 72 hours. More complex verification steps and eTrace batch entries take longer, as these are scheduled rather than immediate. In practice, verification is performed as needed, while most ballistic evidence is entered into NIBIN following initial testing. Firearms analysis underscores the same logic of centralization.

Current Options

The City of Memphis recently allocated funding to hire a firearm analyst and a DNA forensic analyst at TBI to focus specifically on Memphis cases. At this time, it is unclear whether these analysts will also serve the SCSO and suburban departments. We recommend that this occur, possibly by adding Shelby County funding. If it does not occur, there will still be added benefit by adding these personnel at TBI. The added personnel focusing only on City of Memphis cases will help free up other firearm and DNA analysts to assist with non-Memphis cases. Importantly, a DNA forensic analyst would be highly valuable in supporting the firearm analyst by processing DNA evidence related to firearms.

National professional organizations and federal agencies such ATF have documented a significant and growing shortage of firearm and toolmark examiners in public laboratories, which contributes to prolonged training timelines and unfilled positions (Consortium of Forensic Science Organizations, 2024). Training to qualify as a certified firearms examiner often spans 18 to 24 months, meaning even once funding is available, agencies cannot quickly close the personnel gap. This systemic backlog affects multiple states; Tennessee's generalized reliance on TBI, Arkansas's 515-day turnaround in 2023, and MPD's dependence on both local NIBIN entries and TBI verification illustrate how widespread the issue is.

To remain competitive with surrounding states, Memphis (possibly with the help of Shelby County) would need to offer to the TBI salary ranges of approximately $60,000 to $80,000 for a firearm examiner and $70,000 to $90,000 for a DNA forensic analyst. The 2024 Memphis City Crime Lab Feasibility study (McCutcheon, et al., 2024) found a $92,000 annual salary for a DNA analyst based on Charlotte, NC rates; offering salaries in this range would be necessary to attract and retain qualified personnel. It may take 1–2 years to hire and fully train a firearms expert, so Memphis and other agencies in western Tennessee will not have immediate improvements in turnaround time. With the newly funded DNA analyst focusing on forensic DNA from firearms in the Memphis or Shelby County area, existing delays in case processing may begin to decrease more quickly.

PLANNING AND IMPLEMENTATION OF FORENSIC NEEDS

City and County Volume and Implementation

While the county's municipal law enforcement agencies each maintain their own investigative priorities and operational autonomy, the feasibility of developing a sustainable, full service forensic crime laboratory depends on cooperative planning between the City of Memphis and Shelby County. If the long-term strategy is only to expand current unit level capacities such as digital forensics, firearms examination, or latent print processing, then some degree of separation is manageable as these functions can operate independently without the significant infrastructure required of a full-service laboratory.

Based on volume of evidence processed, the City of Memphis could likely move forward on a laboratory initiative on its own, and the SCSO and the suburban municipalities could continue to operate independently utilizing TBI services. The Shelby County District Attorney's Office would almost certainly be able to utilize a local laboratory as it works with all cases from the county. If the city and county processed evidence differently, one through TBI and the other through a local forensic crime lab, it may draw comparisons and highlight inconsistencies between the different modes of forensic evidence analysis.

By contrast, a county led initiative that does not include the City of Memphis would be unworkable. The total case volume generated by the county and suburban jurisdictions alone would not justify the high fixed costs of construction, maintenance, accreditation, and technology upgrades. In 2024, for example, the SCSO submitted 24 SAKs for testing, while all of Shelby County (which includes Memphis) sent 255 SAKs for testing.

This low volume means that a county only laboratory would operate far below capacity for many disciplines. In contrast, a cooperative model between the city and county could consolidate resources, share specialized personnel, and create a stronger case for sustained funding. Shared governance could also reduce duplication of effort and improve interagency case support, ultimately enhancing efficiency, consistency in quality assurance, and public safety outcomes.

Strategic Implementation

Government and organizational theory suggest that a gradual, staged approach to building any government or bureaucratic unit, including a forensic laboratory, offers advantages over an all-at-once model. In public policy, Lindblom's theory of incrementalism recognizes that complex decisions often progress through a series of smaller, practical adjustments rather than through one large comprehensive plan. This is particularly relevant when the operating environment involves multiple stakeholders, uncertain funding timelines, or changing operational needs.

In the context of forensic services, beginning with targeted expansions of individual units, by strengthening current infrastructure, such as evidence storage and transportation, digital forensics, ballistics, or Rapid DNA processing, it would allow the city and county to address immediate gaps while building internal capacity over time. If these units are developed with long-term integration in mind, they can serve as the foundation for a future full-service laboratory should the demand and resources align. This approach would also allow for continued collaboration with the TBI, ensuring that new capabilities fill existing gaps rather than duplicating services unnecessarily.

Challenges to Implementation

Recent reports from Nashville highlight the operational challenges that can arise even when a jurisdiction has its own full-service crime laboratory. Metro Nashville's lab became fully operational all at once, although it took 10 years to bring the facility to fruition. Recently, it has been reported that Metro Nashville's Forensic Crime Lab has faced difficulties meeting turnaround time expectations for certain types of evidence, including sexual assault kits. Factors contributing to these delays include staffing shortages, which have led to the need to rely on private laboratories to help reduce existing backlogs, increasing costs. In some instances, turnaround times for sexual assault kits have exceeded two years, while the Tennessee Bureau of Investigation has maintained an average turnaround time of under one year.

The TBI has provided assistance to Metro Nashville in some cases, underscoring the importance of maintaining cooperative relationships between local laboratories and state forensic resources. While Nashville has shown success, this specific situation illustrates the need for sustained staffing and capacity building. It also shows the potential value of

developing capabilities in stages, ensuring that each component is fully resourced and integrated before moving toward a larger, stand-alone laboratory model.

From a planning perspective, any laboratory designed only for current case volume risks being outdated before it becomes operational. Emerging capabilities such as familial DNA searching, genealogy-based investigations, and the potential integration of artificial intelligence are likely to expand expectations for forensic capacity.

In short, any new facility designed for present needs would require additional space, advanced equipment, a larger and more specialized workforce, and built-in flexibility for future growth. If a strategy to expand forensic capacity is pursued, it should be planned and funded with long-term scalability in mind. If the immediate goal is to fill critical service gaps, budgets, staffing, and infrastructure should be increased to meet both current and anticipated demands. In short, any new facility designed for present needs would require additional space, advanced equipment, a larger and more specialized workforce, and built-in flexibility for future growth. If a strategy to expand forensic capacity is pursued, it should be planned and funded with long-term scalability in mind. If the immediate goal is to fill critical service gaps, budgets, staffing, and infrastructure should be increased to meet both current and anticipated demands.

Lastly, with the State of Tennessee currently exploring expanded capacity through satellite forensic crime lab offices, the prioritization of locations should be guided by both geographic coverage and demonstrated need. Memphis, with consistently higher crime rates and case volumes comparable to other major Mississippi River cities such as St. Louis and New Orleans, represents a strong candidate. While distance from existing labs is an important consideration, evidence volume must weigh equally in determining placement. The further an agency is from its designated forensic laboratory, the greater the barriers to timely submission, the higher the risk of deterioration during transport, and the fewer the opportunities for comprehensive testing. Whether through the establishment of a local crime lab or a TBI-administered satellite office, Tennessee's investment in Memphis would strengthen solvability, expand capacity, and ensure that forensic resources are positioned where they are most urgently required.

Priority	Initiative	Estimated Space (Sq Ft)	Estimated Build/Startup Cost	Staffing & Salaries	Notes
1	**Shared Property & Evidence Storage Facility**	$75,000-100,000 sq ft (current storage at 201 Poplar + Undisclosed location)	Build cost TBD (based on sq. ft $600 per square foot), $50-$60M Renovation of current facilities, estimated less and in the millions	Estimate: 5-10 staff to manage intake, cataloging, long-term storage; $50-65k avg. salary each	Centralized property building for all evidence (except suburbs opting out). Relocation from 201 Poplar and Undisclosed Storage Warehouse.
2	**Evidence Transportation System**	N/A (operational system)	Vehicle fleet: 2–3 secure transport vehicles ($75k each $150k–$225k)	3–4 trained transport officers, $70k each ($210k–$280k/yr)	Couriers on fixed schedule; staff also assist property room as needed.
3	**Digital Forensics Center** (6 analysts model)	1,500 sq. ft.	$1.2M–$1.5M build cost	6 analysts $83,564 each	Sheriff-run centralized lab for MPD + suburban agencies. Addresses backlog, inconsistent practices, and secures sensitive data. Cost savings if analysts are currently employed analysts within current agency.
4	**Rapid DNA Capacity**	Space minimal (placement dependent on machine use)	$250k–$300k per instrument + training costs; 2–3 units = $600k–$900k	Staff training integrated into existing roles; TBI validation must still be conducted	State database to be used. Local investment builds readiness, but implementation follows TBI & FBI standards.
5	**Ballistics / Firearm Toolmark Analysis**	Space embedded by MOU agreement with TBI Additional space needed if firearms analysts employed locally, may be able to use current space at NIBIN unit	Cost: Additional salaries + partial funding for TBI examiners; equipment upgrades ~$250k	2 examiners fully trained = $100k–$115k each annually ($260k–$300k/yr)	Current NIBIN unit develops leads but not confirmatory analysis. Toolmark verification required; training pipeline 540–720 days. Shared funding between Memphis & Shelby advised through MOU with TBI for the current proposal.

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