Arkansas State Crime Laboratory Annual Report - 2021

The Arkansas State Crime Laboratory, Department of Public Safety, is pleased to submit this Annual Report. Fiscal information is based on FY2020-2021. Data on evidence submission, case completions, and other workload measures are for calendar year 2021. This report also provides updates on significant achievements and internal improvements that focus on quality, efficiency and transparency of analysis.

Kermit B. Channell, II
Director

Cindy Moran
Assistant Director

Executive Summary

The Arkansas State Crime Laboratory was created in 1977 by Act 517. The laboratory was placed in the Department of Public Safety by Act 864 of 1979. This action was reversed by Act 45 of 1981, which made the laboratory an independent agency. In April 1981, the laboratory began moving into its current location at #3 Natural Resources Drive in Little Rock. At that time, the agency shared the building with the Arkansas State Police, occupying approximately 26,000 square feet on the third floor and the basement. In April 1997, State Police moved to their new facility, and the Crime Laboratory began remodeling the building at #3 Natural Resources Drive allowing itself to occupy 80,000 square feet. In 2019, the Arkansas State Crime Laboratory was placed under the Department of Public Safety by the Transformation and Efficiencies Act (Act 910 of 2019).

The Arkansas State Crime Laboratory is led by a Director who is appointed by the Governor of Arkansas and reports to the Secretary of the Department of Public Safety. The Governor appoints the Crime Laboratory Board which consists of the following individuals who serve for a term of (7) seven years.

- One member of the active judiciary;
- One practicing member of the legal profession;
- One active county sheriff;
- One active chief of police;
- One active prosecuting attorney;
- Two physicians engaged in the active practice of private or academic medicine; and
- One member at large from the state.

The laboratory does not charge any law enforcement agency for analysis of evidence submitted or for testimony in criminal court. The agency can charge specific fees for testimony of its analyst in civil courts. The Crime Laboratory only accepts evidence from those agencies having law enforcement responsibilities.

Little Rock Laboratory- Currently the only fully-functional forensic laboratory in the state. Services include Physical Evidence, DNA and DNA Databasing (CODIS), Firearms/Toolmarks, Forensic Chemistry, Latent Prints, Toxicology, and Forensic Pathology. Digital Evidence analysis is conducted at the Arkansas State Police Headquarters in Southwest Little Rock, Troop A. The laboratory accepts evidence from investigations originating anywhere in Arkansas, both state and federal.

Hope Regional Laboratory- Arkansas opened its first regional crime laboratory on April 12th, 2004 in Hope. The laboratory currently serves as an intake point for all evidence submitted from the southern region of the state allowing law enforcement officers to remain in their communities. The facility, located on the campus of the University of Arkansas Hope-Texarkana, consists of approximately 2,200 square feet of administrative, evidence storage, and laboratory areas.

Lowell Regional Laboratory- The Lowell Regional Laboratory is located at the Arkansas State Police Troop L Headquarters. This laboratory offers testing for cases involving suspected controlled substances. . This laboratory, consisting of approximately 10,000 square feet, was officially opened for case submissions October 1, 2019.

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Mission, Vision and Core Values

CORE VALUES

Quality	Excellence, getting it right the first time, consistent performance, continuous improvement, taking pride in one's work
Teamwork	Having a common vision, ensuring cohesiveness, assisting one another, supporting other sections, putting others interests first and making decisions based on what is best for the laboratory
Safety	Providing a safe work environment and educating employees on safety practices
Clear Communication:	Communicate often, promptly, professionally and in person when appropriate
Accountability:	Holding oneself and others responsible for productive and ethical behavior
Professional Development:	Growing and engaging employees through training, mentoring, and providing leadership opportunities

Quality (Accreditation and Certification)

To “accredit” means to recognize an agency or institution as conforming to a body of standards related to a specific discipline. Accreditation is a way for an institution to objectively demonstrate, by the evaluation of an external accrediting body, that it meets (or exceeds) these standards.

ANAB (ANSI National Accreditation Board) is a non-governmental organization that provides accreditation services to public and private sector organizations. ANAB provides accreditation for ISO/IEC 17025 testing, calibration, and forensics laboratories.

On December 13, 2004, the ASCL became an accredited laboratory through the American Society of Crime Laboratory Directors/Lab Accreditation Board (ASCLD/LAB) Legacy Program.

On July 10, 2014, the ASCL received accreditation through the ASCLD/LAB-International program. This program is based on the ISO/IEC 17025 standards for the competence of testing laboratories, with supplemental requirements based on the needs of the forensic science discipline.

In April 2016, ASCLD/LAB merged into ANAB, which is now the accrediting body for the ASCL.

In order to maintain its accreditation, the laboratory undergoes a full on-site assessment by a team of assessors every four years, with annual assessment activities to evaluate and confirm ongoing conformance. The most recent full on-site assessment occurred in April 2022.

Accreditation is just one component of the ASCL’s quality assurance program. Our program also includes proficiency testing, continuing education, and other programs to help the laboratory provide better service to the criminal justice system and demonstrate that our laboratory meets the highest standards of the forensic science discipline.

The Medical Examiner’s Section was first accredited by the National Association of Medical Examiners (NAME) in 1976; the most recent period of accreditation began August 15, 2015, and the ASCL continues to maintain this accreditation. NAME is the premier professional organization for medical examiners, forensic pathologists, and medicolegal affiliates and administrators.

Fiscal Resources

The ASCL is funded through general revenue, federal funding and other special revenue as specified in Table 1. Federal funding is received directly through the Department of Justice and in directly as a sub-grantee through Arkansas State Police and the Arkansas Department of Health (Table 3). Salaries and benefits account for 82% of the general revenue budget. The ASCL pays approximately $900,000 for rent of the current facility in Little Rock.

Table 1 Appropriation Summary FY2020-2021

Source	Authorized Appropriation	Funding
498 General Revenue	$12,700,175	$12,126,327
1ED Federal Funding	$2,114,400	$2,106,532
788 DNA Special	$1,252,270	$1,252,270
1VM Asset Forfeiture	$1,000,000	$1,000,000

Table 2 General Revenue Appropriation Itemization

Source	Authorized
Regular Salaries	$7,951,869
Personal Service Matching	$2,545,282
# Positions	153
Operating Expenses	$2,079,759
Conference & Travel	$56,750
Professional Fees	$ 66,515
Total	$12,700,175

Table 3 Federal Funding Itemization

Source	Program	Funding
Department of Justice	DNA Capacity Enhancement Backlog Reduction (CEBR)	$1,094,179
Department of Justice	Paul Coverdell Forensic Science Improvement Grants Program	$264,698
Arkansas State Police	Fatality Analysis Reporting System (FARS)	$268,000
Arkansas Department of Health	CDC Overdose Data to Action Program	$192,265

^Calendar year

^^Federal fiscal year (Oct 1 – Sept 30)

1 ED Federal Funding

This appropriation is funded by grants from the United States Department of Justice. These are utilized to purchase scientific equipment, supplies, training and allows for funding to contract out forensic casework if necessary. It is also noted that this federal funding supports the salary for 7 forensic scientists.

788 DNA Special

This appropriation provides for operating expenses to support the DNA database, as authorized by Act 1470 of 2003, the 'State Convicted Offender Database Act', which is codified at A.C.A. §12-12-1101 et seq. Funding for this appropriation is Special Revenue generated by a mandatory fine of no less than $250 for persons required to submit to a DNA sample under the provision of this legislation.

1VM Asset Forfeiture

This appropriation is funded by Special Revenue generated from forfeitures of funds and property derived through court proceedings in cases involving the illegal manufacture and/or distribution of narcotics. The ASCL receives 20% of all forfeitures over the first $20,000 of forfeitures per county, per year. This appropriation is utilized to purchase equipment and is used to supplement the rent of the ASCL facility.

Case Submissions

In calendar year 2021, the ASCL received 27,950 cases, which comprised 32,425 requests. This is consistent with cases and requests received in 2020 (Figure 1).

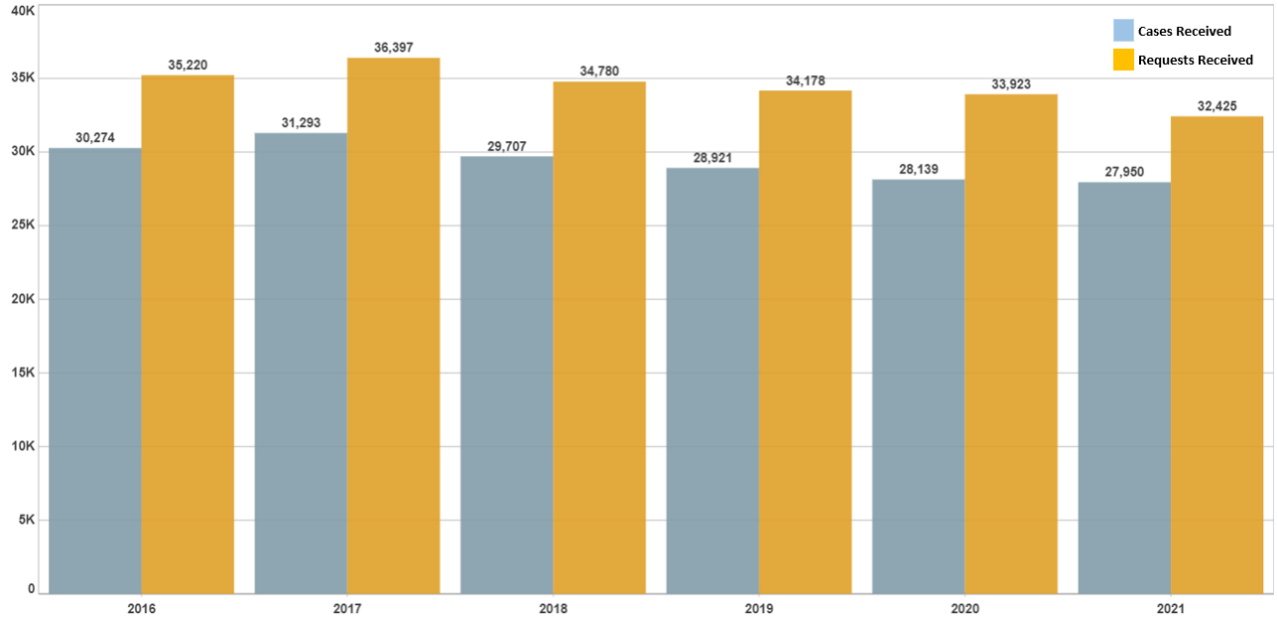


Figure 1 Cases/Requests received for analysis, 2016-2021

Note: A case can have several requests (e.g. homicide case can have a Firearms, DNA, Physical Evidence, Latent Print, requests).

Evidence Receiving Secure Storage

Submissions by Forensic Disciplines and Lab Location

In 2021 the ASCL received the following requests which are broken down by forensic discipline and laboratory location. As shown in Figure 2, 62% of requests received system wide is for seized drug analysis.

Table 4 Cases Received by Discipline, 2020

Disciplines	Little Rock	Lowell	Totals
Forensic Chemistry	15,432	6,172	21,604
Toxicology	5,360		
Physical Evidence	1,772		
DNA	1,783		
Firearms/Toolmarks	1,133		
Latent Prints	1,278		
Digital Evidence	147		
Database Samples			
CODIS	12,606		
Firearms - NIBIN	1,519		

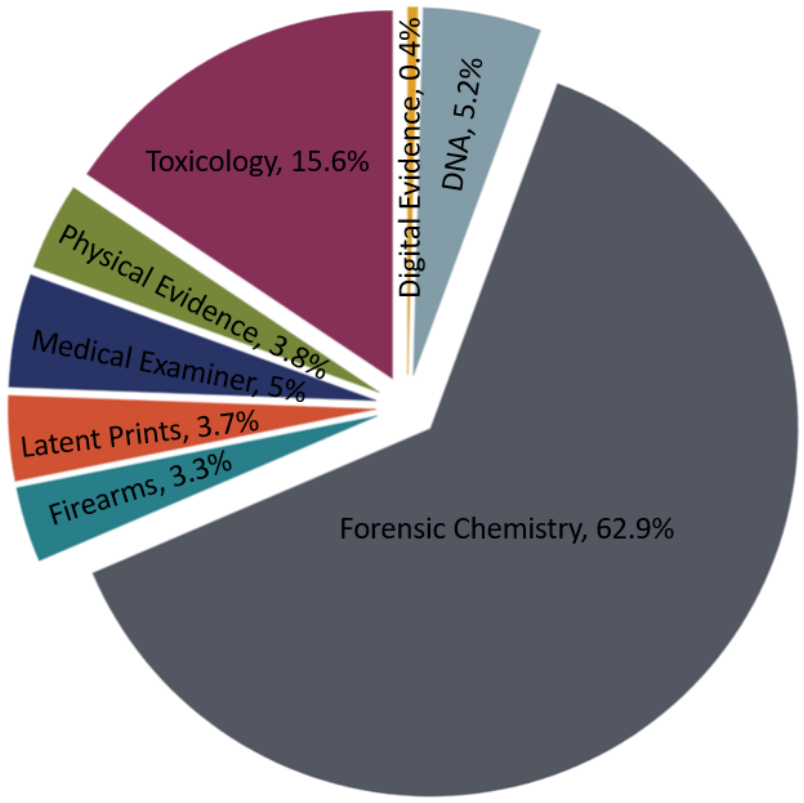


Figure 2 Requests for Analysis by Discipline, 2021

Medical Examiner Caseload

The ASCL Medical Examiner's Office conducts forensic examinations for all 75 counties, as deemed necessary, and may be requested by the county Coroner, elected Prosecuting Attorney and law enforcement (AR 12-12-318). The number of forensic examinations drastically increased (19%) in 2021, with drug overdose deaths on the rise (Table 5). It should be noted that case submissions to the ASCL for autopsy are at the discretion of the county Coroner. Statewide drug overdose statistics from 2019-2020 indicate that the ASCL receives approximately 77% of all drug overdose death cases.

Table 5 Medical Examiner Examinations, 2021

Year	Cause: Drug Overdose	Manner: Homicide	Total
2016	207	270	1,445
2017	285	300	1,562
2018	322	285	1,504
2019	263	288	1,448
2020	329	387	1,429
2021*	**494**	347	1,702

*22 Autopsy reports pending

Table 6 summarizes the cause and manner of death for the forensic examinations conducted in 2021. NAME accreditation standards require that 90% of autopsy reports are completed within 90 days. Because of staffing issues in both the Medical Examiner and Toxicology sections, the ASCL completed 52% of autopsy reports within 90 days and 47% within 60 days.

Table 6 Medical Examiner Examination Summary, by Cause and Manner, 2021

	Total By Cause	Accident	Homicide	Natural	Suicide	Undetermined
Total by Manner	1702*	682	347	310	153	193
Alcohol	12	10	0	2	0	0
Asphyxia	18	14	2	1	0	1
Blunt Force	116	81	26	0	3	6
Bones	1	0	0	0	0	1
Burns	3	0	0	0	1	2
Carbon Monoxide	59	44	0	0	1	14
Disease	337	25	1	304	0	7
Drowning	54	42	0	0	8	4
Drug Overdose	494	453	0	0	26	15
Electrocution	3	3	0	0	0	0

Environmental Hypothermia	1	1	0	0	0	0
Exposure (Hyperthermia)	3	2	0	0	0	1
Gunshot Wound(s)	365	3	276	0	80	6
Hanging	26	0	0	0	26	0
Other	13	4	3	2	2	1
Poisoning	2	0	0	0	1	1
Shotgun Wound(s)	12	0	11	0	1	0
SIDs	76	0	0	0	0	76
Stabbing	29	0	25	0	4	0
Stillborn	1	0	0	0	0	0
Strangulation	3	0	3	0	0	0
Undetermined	58	0	0	0	0	58

*22 Autopsy reports pending

Case Submissions by County

Figure 3 represents areas in which cases submitted to the laboratory are most prevalent. Central and northwest regions of the state submit a higher caseload. Benton and Washington counties are in the High Intensity Drug Trafficking Area (HIDTA) and reflect the necessity for the new Lowell Regional Laboratory.

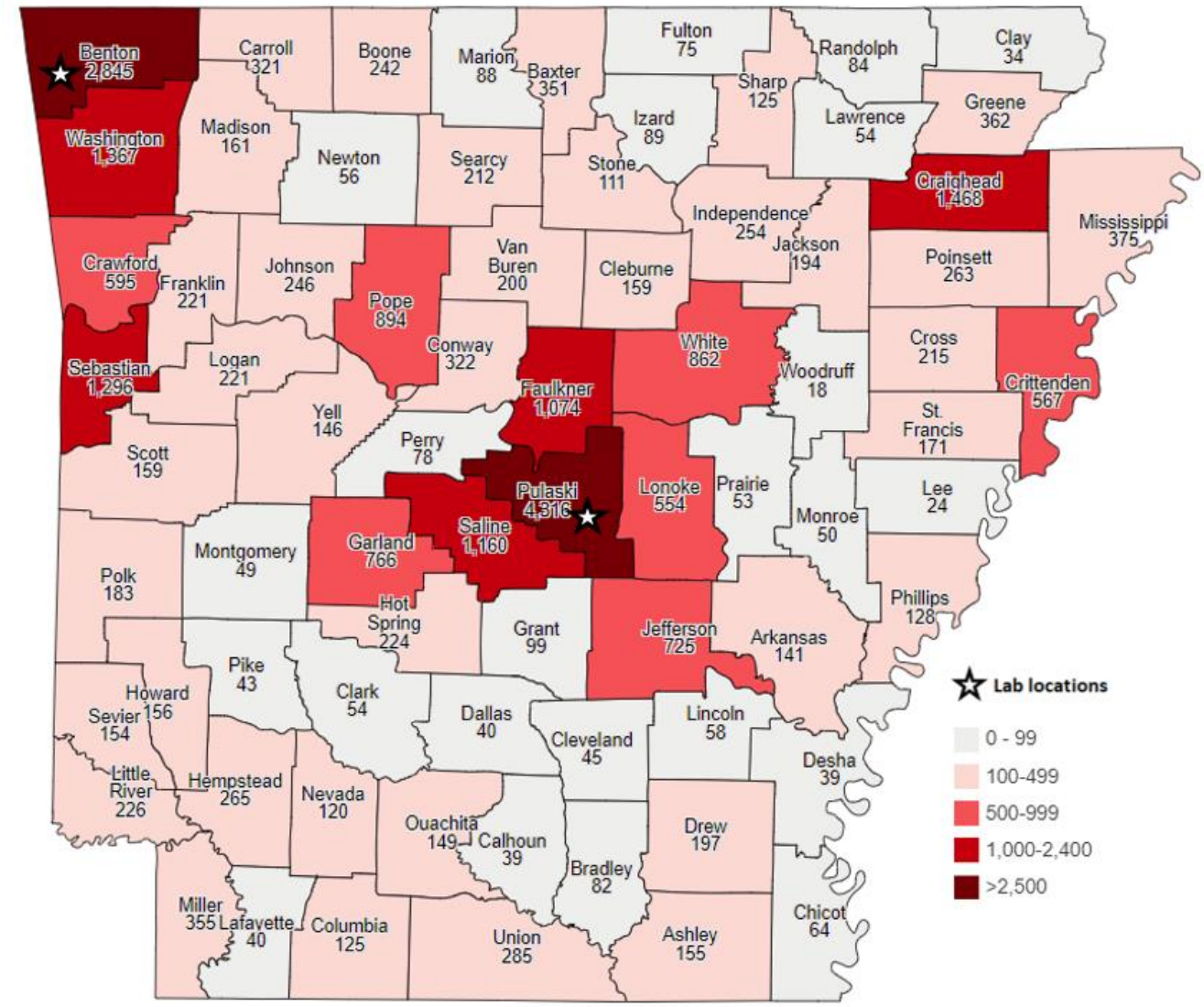


Figure 3 Requests for analysis by county, 2021

Case Completions and Turn-Around Times

Table 7 Case Completions by Discipline and Location, 2021

Disciplines	Little Rock	Lowell	Totals
Forensic Chemistry	14,658	3,844	18,386
Toxicology	5,110		
Physical Evidence	1,394		
DNA	1,093		
Firearms/Toolmarks	452		
Latent Prints	1,525		
Digital Evidence	65		

Table 8 Turn-Around Times by Discipline and Location, 2021

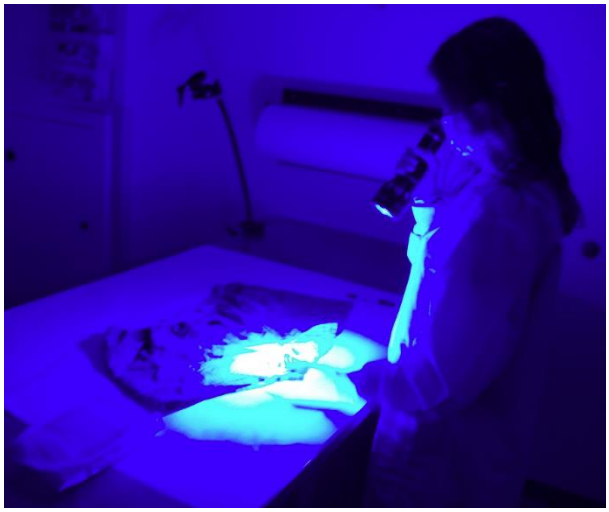
Disciplines	December 2020	December 2021
Forensic Chemistry – Little Rock	60 days	4 months
Forensic Chemistry - Lowell	4 months	5 months
Toxicology – Law Enforcement (DUI/DWI)	60 days	3 months
Toxicology – Coroner	43 days	60 days
Toxicology – Medical Examiner	60 days	60 days
Physical Evidence – Sexual Assault	49 days	3 months
Physical Evidence – Homicide	37 days	<30 days
Physical Evidence – Property/other	20 months	12 months
DNA – Sexual Assault	5 months	7 months
DNA - Homicide	5 months	8 months
DNA – Property/Other	45 months	2 years
Firearms/Toolmarks - Homicide	11 months	10 months
Firearms/Toolmarks – Other	45 months	2 years
Latent Prints - Homicides	57 days	<30 days
Latent Prints - Other	60 days	60 days
Digital Evidence – Mobile Devices	7 months	14 months
Digital Evidence – Computers	8 months	18 months

Outsourcing of Property Crimes

According to a study funded by the National Institute of Justice[1], when DNA is collected and analyzed for property crime investigations, the following observations were made:

- More than twice as many suspects were identified
- Twice as many suspects were arrested
- More than twice as many cases were accepted for prosecution

This study also found that suspects were five times more likely to be identified through DNA evidence than through fingerprints.



Understanding the importance of utilizing DNA analysis in property crimes investigations while still keeping focus on homicide and sexual assault cases, the ASCL has utilized federal funding through the DNA Capacity Enhancement for Backlog Reduction (CEBR) Program to contract property casework to private vendor laboratories.

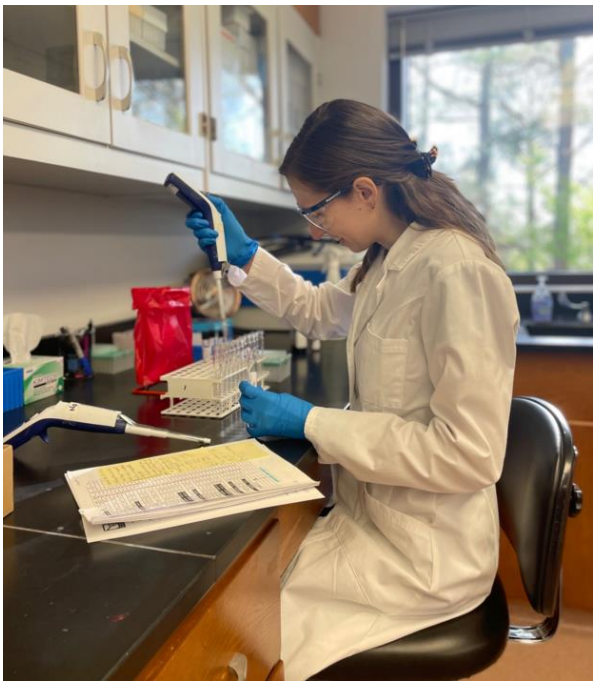
1,018 property crime cases were outsourced (2019: 333; 2020: 524; 2021:161). From the results of this testing, 586 developed a usable DNA profile (58%) for entry into the CODIS DNA database. From those entries, there were 391 CODIS hits (38%).

2021 Success of Outsourcing Property Crime Cases

- 73% of cases outsourced produced a useable profile to enter into CODIS (118 profiles).
- Of these profiles, 64% resulted in a CODIS hit (64 hits).
- 40% of these property cases (majority of these are when no suspect was identified by law enforcement) resulted in a CODIS hit identifying a suspect.

[1] DNA Solves Property Crimes (But Are We Ready for That?) | National Institute of Justice (ojp.gov)

Human Capital



Human capital is an intangible asset that the ASCL strives to protect. Our employees are the laboratory's greatest asset and what makes the laboratory successful. In 2013, the ASCL became a Lean Six Sigma laboratory that strives for continuous improvement. Part of this culture is to 'manage' from the bottom. ASCL employees who perform the work are the experts that Administration engages to make significant improvements to the laboratory's processes. The ASCL currently has appropriation for 153 positions, 7 of which are paid from federal grant funds.

One of the goals of the laboratory is to have an 'employee centered' culture where employees are passionate and engaged in their career. To help gage the success or make improvements to the laboratory's culture, it is important to review and understand why scientists leave. Maintaining a low turn-over rate is essential to the success of a forensic laboratory because the training period for a new analyst can be up to 1.5 years. Table 9 demonstrates the number of analyst vacancies over the last 4 years, as well as the reason. In the situations in which an analyst left for other employment, 88% were receiving a higher salary at their new employment.

Table 9 Employee Retention/Attrition, 2020

Reason for Leaving	2018	2019	2020	2021	TOTAL	%
Other non-forensic employment	0	1	3	2	6	**20%**
Other forensic employment - Public	3	1	3	3	10	**33%**
In-Voluntary Dismissal	2	1	1	0	4	**13%**
Higher Education	3	0	1	1	5	**17%**
Personal- Family	1	0	0	1	2	**7%**
Other forensic employment - Private	0	0	2	0	2	**7%**
Unknown	0	0	0	1	1	**3%**
TOTAL VACANCIES	**9**	**3**	**10**	**8**	**30**	
Retention Rate (80 FTE's)	**89%**	**96%**	**86%**	**90%**		

Laboratory Facility

Facility & Needs Assessment – Feasibility Study

The *Justice for All Reauthorization Act* of 2016 (JFARA) mandated a needs assessment of forensic laboratories, which included an examination of workload, backlog, personnel, and equipment needs for both public crime laboratories and Medical Examiner and Coroner (ME/C) offices.

As indicated in the *Report to Congress - Needs Assessment of Forensic Laboratories and Medical Examiner/Coroner Offices*[2], one of the challenges for laboratories is the physical capacity and infrastructure of their existing facilities. These facilities are maximized and most are outdated.

In order to sufficiently address the increase in demand for and complexity of forensic services and the lack of physical space at the ASCL, a Facility Assessment and Needs Analysis (Feasibility Study) was conducted by the SmithGroup in collaboration with Polk Stanley Wilcox, and Bernhard Engineering. The following information is directly from the Feasibility Study published report.

ANALYSIS

- Existing Facility Analysis
- Architecture & Planning
- Mechanical & Plumbing
- Electrical System
- Site Criteria
- Site Infrastructure Criteria
- Staffing & Investigative Projections

A main focus was placed on reviewing the current infrastructure. The study stated, *"While the facility has served ASCL's operations well over the years, it has increasingly become an obstacle to operations, negatively impacting opportunities for a more optimized and appropriate approach to services. There are a number of areas in the facility that serve as ongoing constraints both to operations, and to expansion."*

Existing Facility - Autopsy

[2] https://www.justice.gov/olp/page/file/1228306/download

Images: Proximity issues of electrical gear and panels from mechanical, plumbing, and fire protection distribution in central plant.

Images: Commonly observed original air-handling unit with compromised supply duct insulation.

Images: Original basement air-handling unit with blocks supporting isolators and large wall penetration gaps around abandoned pipes.

Images: Supplemental cooling unit for instrumentation lab with portable cooler. Walk-in cooler condensation resulting from adjacency to tempered loading area.

MECHANICAL SYSTEMS SUMMARY

"The mechanical systems have served this facility for over 40 years in support of its ongoing mission. While still operational, the demands on these systems have exceeded their original design conditions and during periods of peak demand are falling short."

"Given the age of the systems, the current risks to building operations, limited cooling and air-handling unit capacities, the increased need for program area and mechanical systems to support, and the critical nature of this program, we recommend that a new facility is pursued with purpose-built infrastructure and systems to support this program both now and into the future"

PLUMBING SYSTEM

Images: Gas-fired domestic hot water heater next to the heating water boilers with uninsulated domestic hot water piping.

Images: Portions of broken acid waste piping and piping repairs in shaft utilizing cast iron instead of glass.

PLUMBING SYSTEM SUMMARY

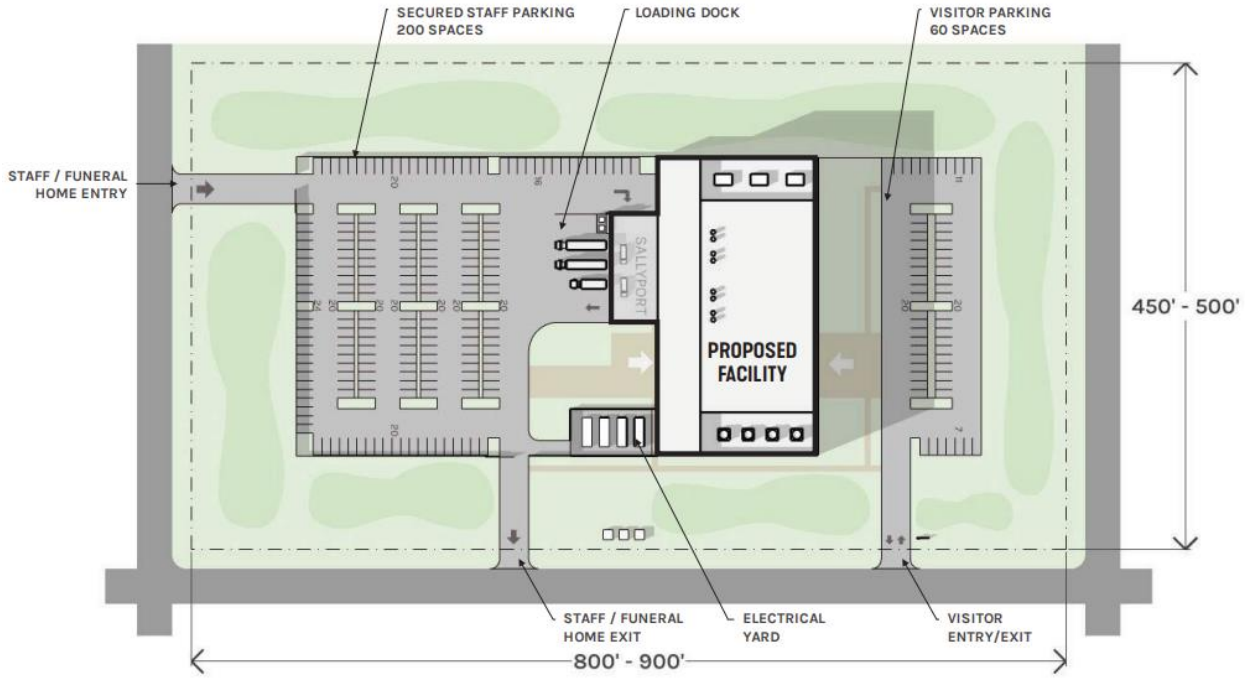
"Recommendations include evaluating the current water heater installation for stability, providing hot water pipe insulation where missing, adding vacuum breakers where missing at lab sinks, and providing independent secondary roof drains (or scuppers) as required by the current code but not currently installed. Note that the addition of secondary roof drainage will be very disruptive, and likely will require revisions to other systems to accommodate minimum slope. Confirm that an oxygen monitoring and alarm system is provided at the nitrogen generator and helium cylinder manifold."

"Given the critical nature of this facility and its program and knowing that this program will only increase in the future, we recommend that a new facility is pursued with purpose-built infrastructure and systems to support this program both now and into the future."

SITE CRITERIA

Maintaining a central location is important for the customers that we serve as well as ease of transitioning equipment and services between existing and new facilities.

IDEAL SITE



The size of the site is driven by the programmatic needs of the Crime Lab and Medical Examiner operations of the ASCL. In addition to the building footprint the site includes the following:

- (60) Parking spaces for visitors
- Public entry plaza
- (200) Secure parking spaces for staff, law enforcement and Investigations vehicles.
- Pull-through Sally port for screened receipt and release of decedents
- Evidence receiving and vehicle inspection bays
- Emergency electrical yard
- Setbacks for security, storm water retention and landscaped open space
- Loading Dock for deliveries, mass fatality body coolers and trash collection
- Secure staff entry plaza

The recommendation of this study is a site with a minimum size of 8-10 acres with a minimum width, based on typical block depths around the campus, of 450’ – 500’; a subsequent length of 800’ – 900’ would provide enough space to fit the site program.

A building massing has been derived based on program discussions. The building includes 4-levels of dedicated laboratory space and a 5th floor to accommodate a roof top mechanical penthouse and screened roof area. The total square footage recommendation is 187,000.

SECTION PLANNING

- Office & Administration
- Evidence Receiving
- Latent Prints
- DNA
- CODIS
- Toxicology
- Chemistry
- Firearms & Toolmarks
- Physical Evidence
- Medical Examiner

Each section within the ASCL was reviewed for needs through 2025. This included instrumentation, laboratory best practices, caseload predictions (based on population and crime statistics) and staffing needs. This allowed for an understanding of the quantity of space dedicated to the section.

						Facility Metrics Based on Population		
		FORESIGHT Data			Year	2051		
Section	Current Staff	Cases/100K	Cases/FTE	Peer NASF/FTE	Population	3,546,843 Cases	Staff	NASF
SECTION TOTALS								
Crime Lab Sections	109						154	78,877
Medical Examiner Section	30						46	17,526
Section Subtotal	139						200	96,403
ADDITIONAL BUILDING COMPONENTS								
Colaboration NASF				10 %				11,210
Support NASF				4 %				4,484
Additional Component Subtotal								15,694
Facility Totals								
Total NASF								112,097
Grossing Factor				60%				
Gross Building Area								**186,828**

EMERGENCY SUPPORT FUNCTION

Mass fatalities may occur as the result of a variety of events, including natural disasters, disease outbreaks and pandemics (i.e., COVID-19), or large accidental incidents. Since a mass fatality event is likely to result from a major incident, law enforcement, Coroners, and the State Crime Laboratory will have a major role in the response. The Arkansas State Crime Laboratory serves as an Emergency Support Function agency, designated as (ESF #8) under the Arkansas Department of Health. The mission of the laboratory in this function is to assist in the mass fatality management operation.

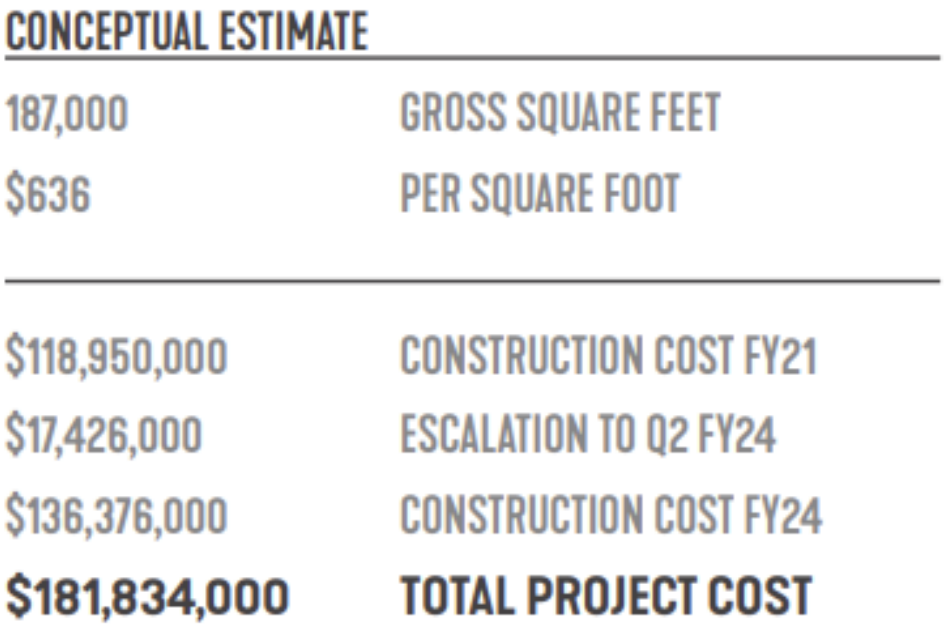
This function is critical to conduct rapid return of decedents to their legal next of kin and support the resolution of the mass fatality event. Currently, the Arkansas State Crime Lab would be challenged to support this essential role. In the event of a mass fatality, a lack of physical space (both exterior and interior) and redundancy in infrastructure or special systems would prevent operational continuity for daily caseload while supporting a tragic event.

IMPLEMENTATION

- Project Conceptual Estimate
- Potential Implementation Schedule

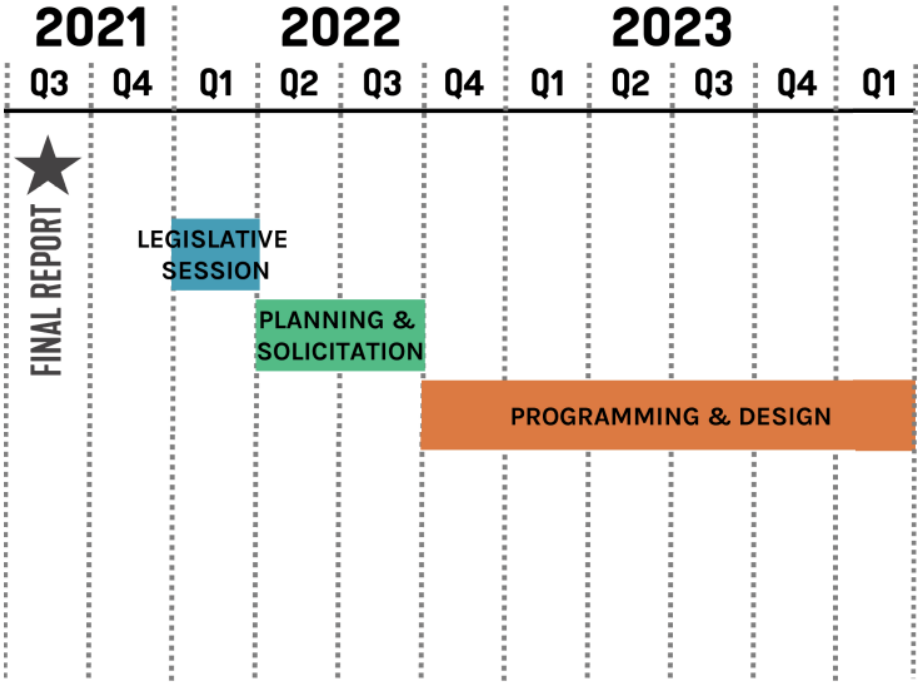
The cost estimate on the following pages represents an expected cost for the work in current dollars and is then escalated to allow for cost increases until the midpoint of construction. This midpoint is expected to occur in the 2nd quarter of 2024. Escalation of 6% for the first year and 4% for the next 2 years was incorporated into the expected construction cost. The reasoning for different percentages across the three-year period is that impacts due to the pandemic are expected to be alleviated while projections in escalation for material and labor costs will start to normalize.

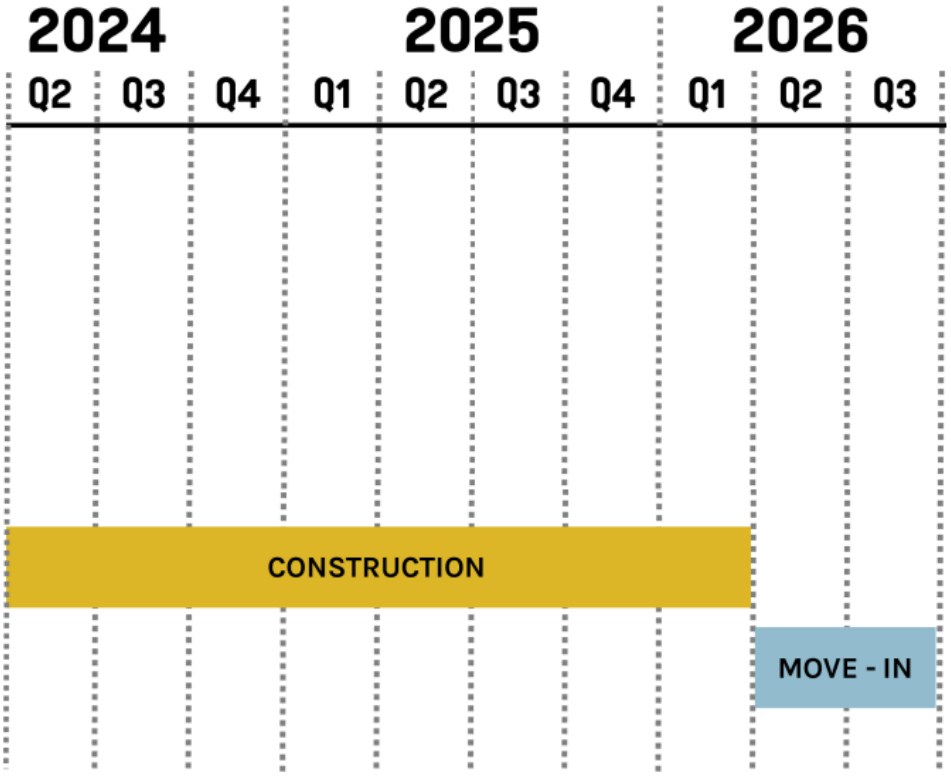
Total project cost includes all costs and expenses associated with the construction of a new facility. Construction cost is a portion of that total project cost, but will vary based on multiple factors. For this analysis, the total project cost includes construction costs and "soft costs" associated with design, permitting, furniture, and state management. The total project costs assume that site acquisition will not be needed, so if a property needs to be purchased, the costs associated with that transaction should be added to total project cost.



POTENTIAL IMPLEMENTATION SCHEDULE

The time required to complete a project is related to the overall project cost and abilities of the ASCL to continue to meet the needs of their customers. The adjacent implementation schedule assumes that following the 2022 legislative session, funding will have been secured to move forward with project planning and development of the formal solicitation for design services. After approximately six months, formal programming and design for the new facility can begin. Although the construction delivery method is unknown at this time, construction for the project will likely require two years before facility commissioning an occur. Finally, a staged move will be required as the Crime Lab and Medical Examiner will need to maintain ongoing operations.





KEY FINDINGS

- The ASCL employs a dedicated staff of scientists, pathologists, investigators, technicians and supporting staff that are performing at some of the highest output levels in the country. It is noted that the ASCL, in the last consecutive three years, has been recognized as one of the top performing forensic laboratories in the world operating at 90% or better of peak efficiency.
- The existing ASCL facility is at capacity with no practical options for on-site renovation or expansion.
- A new facility and location are required to provide reasonable space and adequate systems to meet the needs of the State of Arkansas both today and to year 2051.

Project FORESIGHT

The ASCL participates in a program called Foresight, which is a business quantitative process tailored to forensic laboratories. The program, hosted at West Virginia University, allows the ASCL to evaluate its performance against other forensic laboratories (186 participants) across the globe. For the past three years (2018 - 2020), the ASCL was recognized as one of fourteen forensic laboratories in the world as a top performing laboratory based on the Foresight business metric. This Foresight Maximus award was presented to the ASCL for operating at 90% or better of peak efficiency. The tables below demonstrate how the ASCL performs relevant to other laboratories across the globe.

Demand for Services

Table 10 demonstrates that the ASCL receives more cases per capita when compared to the median in the areas of DNA Database (CODIS), Drugs, Fire Analysis (Arson), Firearms and Ballistics, Toxicology ante-mortem and post-mortem and Trace (GSR, hair suitability), 123%, 165%, 89% and 53%, 31%, 143% respectively. In fact, both DNA Database, Drugs and Fire analysis receive more cases than the highest 25% receiving laboratories.

Table 10 Cases Received per 100,000 population

Cases per 100,000 population	Arkansas	25th Percentile	Median	75th Percentile
Digital Evidence	6.20	5.85	7.35	13.31
DNA Casework	88.10	46.32	81.69	133.09
DNA Database	456.51	48.04	204.84	271.00
Drugs	657.5	162.5	248.3	393.0
Fingerprints	39.07	28.17	37.10	71.33
Fire analysis	6.10	2.48	3.23	5.64
Firearms and Ballistics	31.55	12.88	20.66	38.14
Serology/Biology	62.42	25.31	39.51	66.86
Toxicology ante mortem	82.73	44.31	63.02	126.34
Toxicology post mortem	73.10	46.64	61.80	104.92
Trace Evidence	3.79	0.77	1.56	3.45

Laboratory Productivity

Table 11 represents the requests completed and laboratory reports generated per capita. In the areas of Drugs, Fire Analysis, Serology, Toxicology (ante and post-mortem) and Trace Evidence, the ASCL completes more reports than the median.

Table 11 ASCL Laboratory Reports Issued per 100,000 population

Reports Issued per 100,000 population	Arkansas	25th Percentile	Median	75th Percentile
Digital Evidence	4.81	4.65	6.39	20.17
DNA Casework	93.18	43.07	90.20	134.59
Drugs	822.11	183.64	252.57	390.43
Fingerprints	37.79	27.41	38.58	51.22
Fire analysis	6.20	2.45	2.95	5.45
Firearms and Ballistics	19.19	15.92	21.88	34.31
Serology / Biology	59.05	25.99	33.71	49.55
Toxicology ante mortem	81.34	40.19	63.28	70.05
Toxicology post mortem	74.65	46.13	60.96	76.91
Trace Evidence	3.86	0.78	1.49	2.85

Laboratory Efficiency

Table 12 represents the time it takes to complete a report from the submission of evidence (turn-around time). In the areas of Digital Evidence, Fingerprints, Serology, Toxicology (ante and post-mortem) and Trace Evidence, the ASCL is analyzing and completing reports more timely than the median.

Table 12 Turn-around Time per Investigative Area

Area of Investigation	Arkansas	25th Percentile	Median	75th Percentile
Digital Evidence	58	78	133	158
DNA Casework	71	101	127	143
Drugs	131	56	69	82
Fingerprints	25	55	67	78
Firearms and Ballistics	150	55	68	78
Serology/Biology	37	53	63	74
Forensic Pathology	54	46	51	55
Toxicology ante mortem	27	51	64	74
Toxicology post mortem	27	65	78	87
Trace Evidence	53	163	194	236

Table 13 represents the number of cases completed for each full-time equivalent (FTE) employee (the work input of a full-time employee working for one full year) retained by the laboratory. This information indicates the level of productivity within the average laboratory by investigative area. It demonstrates that the ASCL completes more cases per FTE when compared to the median in all sections with the exception of DNA Casework and Database. In the areas of Digital Evidence, Fire analysis, Toxicology (ante and post-mortem) and Trace Evidence more cases are completed per FTE than the highest 25% laboratories. In summary, this demonstrates that the ASCL is extremely efficient in case processing.

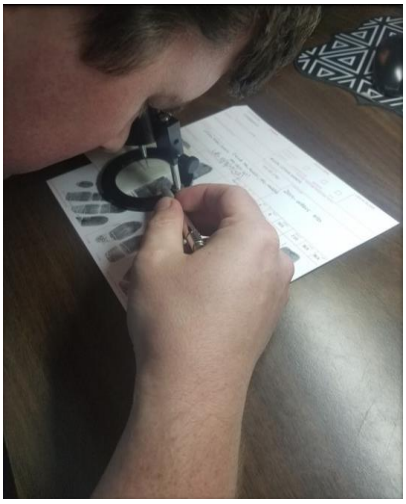


Table 13 Cases Completed per Full Time Examiner (FTE)

Area of Investigation	Arkansas	25th Percentile	Median	75th Percentile
Digital Evidence	66	22	50	47
DNA Casework	94	77	102	138
DNA Database	1,946	1,634	2,618	3,702
Drugs	467	307	374	477
Fingerprints	167	98	142	177
Fire analysis	173	38	58	81
Firearms and Ballistics	96	47	69	107
Serology/Biology	140	58	120	151
Toxicology ante mortem	350	135	174	258
Toxicology post mortem	350	113	138	175
Trace Evidence	108	32	35	40

Financial

Table 14 represents the average compensation by investigative area. The ASCL compensation is significantly lower in all areas of investigation when compared to the median and lowest 25% compensated laboratories.

Table 14 Average Compensation by Investigative Area

Average Compensation by Investigative Area	Arkansas	25th Percentile	Median	75th Percentile
Digital Evidence	$84,017	$89,738	$109,930	$119,795
DNA Casework	$52,150	$102,698	$121,050	$135,816
DNA Database	$51,866	$88,907	$102,387	$115,187
Drugs	$61,951	$95,831	$106,962	$119,312
Fingerprints	$60,528	$92,304	$101,878	$109,718
Firearms and Ballistics	$69,679	$99,964	$108,818	$116,884
Serology/Biology	$71,936	$89,350	$99,032	$110,252
Toxicology	$54,397	$92,534	$102,103	$111,681
Trace Evidence	$82,931	$98,062	$118,417	$166,759

Note: Compensation includes personnel expenditures- wages, salary, benefits, operating staff, support staff, and administrative staff. Centrally assigned compensation is apportioned to each investigative area according to the percentage of full-time equivalent employees assigned to a particular investigative area.

Table 15 summarizes the cost to process a case per investigative area. The ASCL cost to process a case is significantly lower in all areas when compared to the median, as well as the 25% lowest cost laboratories. Based on the ASCL budget (Table 2), salaries and match represent 83% of the ASCL general revenue budget. The more efficient that these areas are in completing cases per FTE (Table 13), the lower the overall cost to operate. This is also due in part to the lower compensation of individuals as represented in Table 14.

Table 15 Cost per Case by Investigative Area

Cost Per Case by Investigative Area	Arkansas	25th Percentile	Median	75th Percentile
Digital Evidence	$1,974	$2,522	$3,765	$7,002
DNA Casework	$1,050	$1,102	$1,411	$2,185
DNA Database	$51	$42	$63	$124
Drugs	$232	$266	$365	$451
Fingerprints	$642	$640	$939	$1,368
Fire analysis	$746	$1,539	$2,356	$3,161
Firearms and Ballistics	$1,208	$1,300	$1,911	$3,259
Serology/Biology	$845	$776	$1,035	$2,077
Toxicology ante mortem	$288	$594	$817	$1,062
Toxicology post mortem	$288	$772	$959	$1,258
Trace Evidence	$1,200	$3,056	$4,594	$6,501

Note: The cost includes allocations for capital, wages & salary, benefits, overtime & temporary hires, chemicals, reagents, consumables, gases, travel, quality assurance and accreditation, subcontracting, service of instruments, advertisements, non-instrument repairs and maintenance, equipment leasing, utilities, telecommunications, overhead, and other expenses.

Court Testimony and Judicial Efficiencies

All employees are subject to testify in criminal cases in local, state and federal court throughout Arkansas. Table 16 compares the court activity in 2019-2021. The COVID-19 pandemic resulted in many courts closing, decreasing overall court time and miles driven in 2020. Court time increased back to levels in 2019. Use of video testimony as an alternate method is still under-utilized.

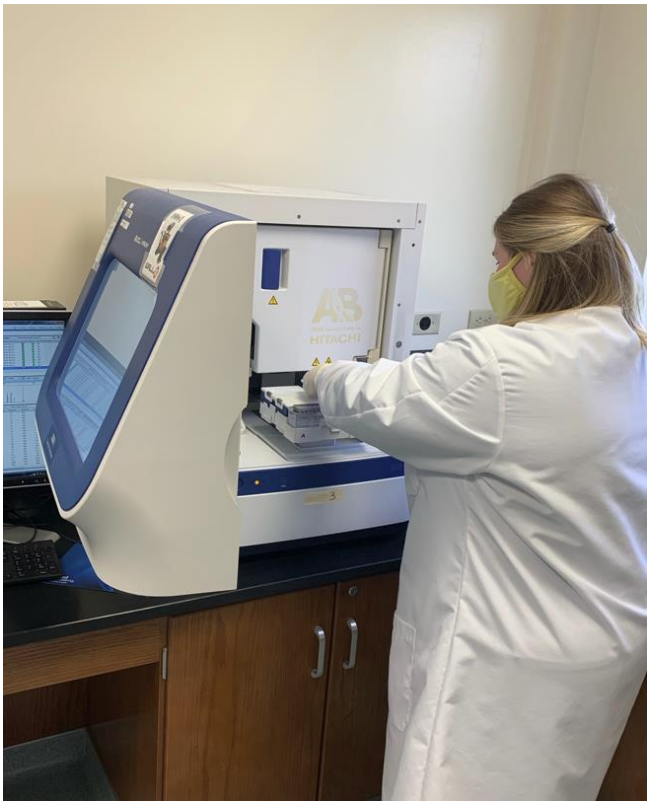
Table 16 Court Time, 2019-2021

Year	Confirmed Subpoenas*	Testified	Video Testimony	Testimony Time (hours)	Waiting Time (hours)	Travel Time (hours)	Total Time (hours)	Total Miles
2019	316	188	6	77	738	1134	1,949	24,425
2020	218	144	17	57	300	304	661	12,705
2021	379	188	11	90	612	954	1,656	32,841

*The individual was confirmed and spent time for court purposes (e.g. driving, waiting, and testifying).

Significant Challenges

Sexual Assault Kit Backlog



Act 839 of 2019 requires that all sexual assault kits (SAK) be collected, tracked and tested by the laboratory within **60 days** of receipt. The ability of the laboratory to complete testing within 60 days depends of the following factors:

a. The number of sexual assault kits that the laboratory receives;
b. The technology and improved testing methods available;
c. The establishment of a fully trained and dedicated staff to meet the caseload; and
d. The number of lab requests related to other crime categories.

Despite being one of the most efficient laboratories in the country as well as implementing more efficient and streamlined policy and procedures for the processing of SAKs, the ASCL is not meeting this 60 day turnaround time requirement. This is due in large part to losing six (6) DNA Analysts since July 2019 – 2021. Due to the 12 month training period required for a new DNA Analyst, the backlog of sexual assault kits significantly increased.

Opioid Epidemic

The opioid epidemic has had a significant impact on the ASCL, specifically in the Forensic Chemistry, Toxicology and Medical Examiner's section. The Medical Examiner's section conducted a record number of autopsies in 2021, due in large part to the large increase in drug overdose deaths: 147 from 2020 to 2021 (Figure 4).

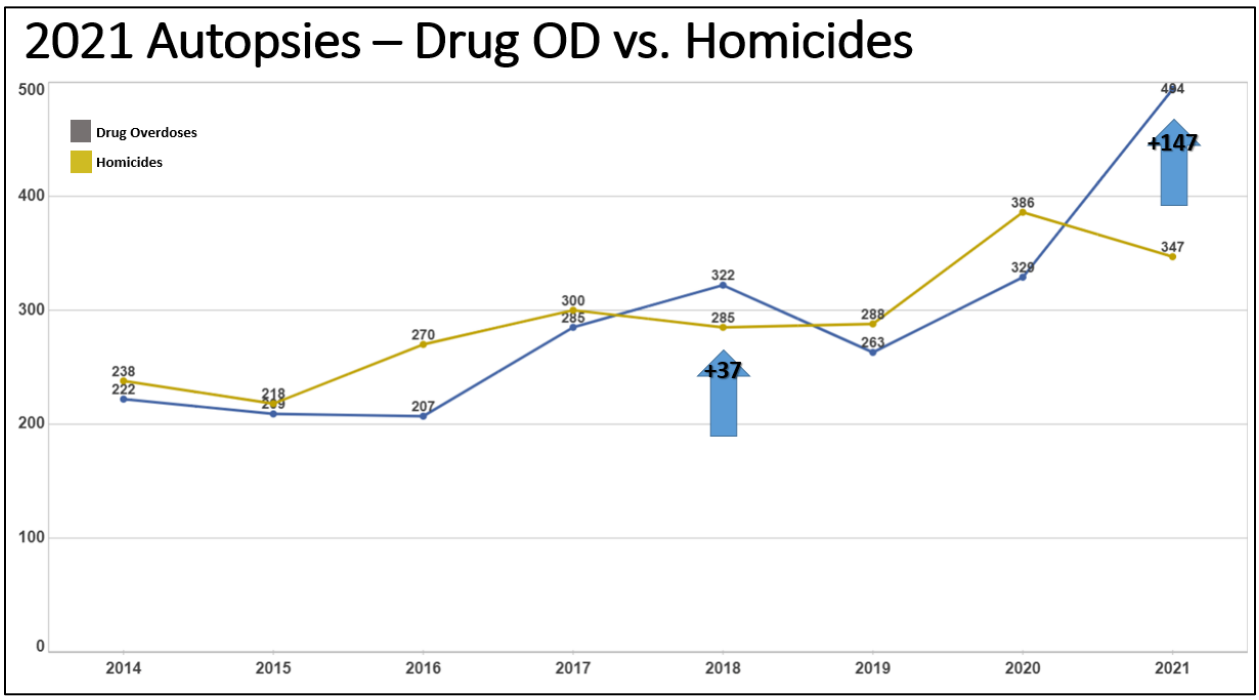


Figure 4 Drug Overdoses versus Homicides from autopsies conducted at ASCL, 2021

Fentanyl was present in 57% of drug overdose cases which is a staggering statistic. Figure 5 indicates the drugs present in overdose deaths. Methamphetamine is also a major contributor to overdose deaths. It is not uncommon to see multiple drugs present in an individual and there seems to be an increased trend in methamphetamine and fentanyl combinations.

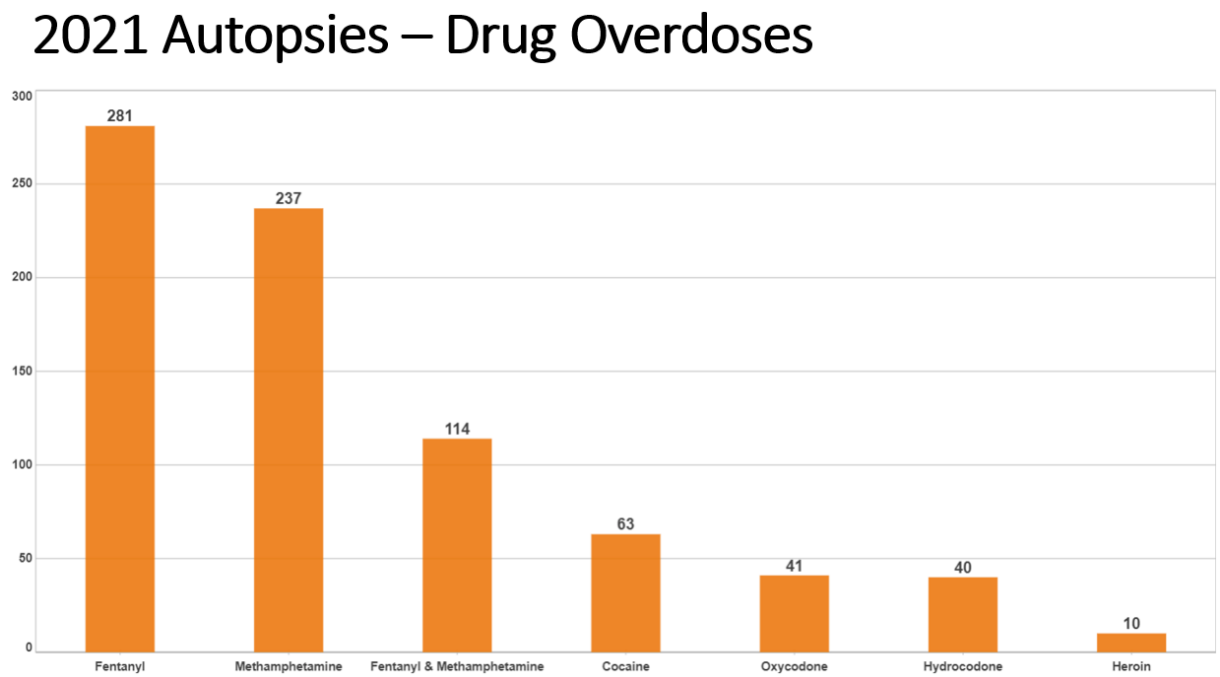


Figure 5 Drug types in drug overdoses from autopsies conducted at ASCL, 2021

Legislative Changes

Arkansas, like most of the nation, has experienced difficulty in recruiting Forensic Pathologists. Few medical school graduates choose pathology residencies, and even few opt to work in Forensic Pathology, where the pay lower than in other practice areas.

In the 2021 Legislative Session, significant progress was made to help retain and recruit well qualified Forensic Pathologists. *Special language* was added to exceed the maximum salary level up to 50% for the Chief Medical Examiner and Associate Medical Examiners. This has allowed the ASCL to become competitive with other states in recruiting and retaining Medical Examiners. In fact, the ASCL was successfully recruited Dr. Theodore Brown in September as well as an exceptionally well qualified Associate Medical Examiner that will start in September 2022.

- Act 360 *Student Loan Forgiveness Program* allows ASCL Forensic Pathologists to receive $25,000 for each 24 month term that they are employed with the ASCL, not to exceed $100,000. This is also a tool to help recruit and retain Medical Examiners since most have student loan debt near $300,000.
- Act 151 revised the language in §12-12-312 so that the ASCL is not required to provide case file photographs to a defendant in the custody of the Department of Corrections that depicts a crime scene, the victim of a crime or was taken in conjunction with an autopsy

Conclusion

The ASCL has worked diligently since 2013 to ensure that we continue to utilize the tools of Lean Six Sigma to promote an employee centered culture that focuses on continuous improvement, efficiency, quality and teamwork. The Foresight data detailed in this report demonstrates the success that Lean Six Sigma has created in making these improvements.

Arkansas, like many states, is facing continual challenges such as the opioid crisis, the demand for timely services, advancements in forensic science and technology and the necessary infrastructure needed to support them.

Challenges that continue to face all forensic laboratories, as assessed by the National Institute of Justice:

- Collaboration and communication impairment – Better coordination is needed to enhance evidence collection and preservation; facilitate requests for testing; and ensure adequate communications on subpoenas to testify in cases later dismissed or resolved via plea bargains
- Increased workloads – Current data reflect a need to address backlogs in digital and multimedia evidence, drugs and controlled substances, and toxicology and increasing workloads for medico-legal death investigations and forensic autopsies
- Physical and technology infrastructure deficiencies – Resources are needed to bring facilities up to date
- Recruitment, hiring and training needs – These challenges are often in competition with law enforcement personnel needs, and are exacerbated by background investigations and security clearance requirements
- Shortfall of training funding – Training funds typically account for only 0.5% of total laboratory budgets
- Medical examiner and Coroner systems- workload issues compound the difficulty of conducting death investigations across jurisdictions
- Federal funding- is not available for forensic disciplines practiced at forensic laboratories and medical examiner and coroner offices – DNA analysis funding is an exception
- Forensic science research, development, and evaluations- there is a lack of dedicated funding
- Stressful work environments- takes a toll on the forensic workforce, yet few support tools are developed specifically for forensic scientists, in contrast to law enforcement and other public service sectors.

Our laboratory and professional staff will continue to improve all areas of concern listed above and focus on an environment of continuous improvement.

Respectfully submitted,

Kermit B. Channell, II
Director