

North Carolina Department of Justice

ANNUAL REPORT

FISCAL YEAR 2016-2017

North Carolina State Crime Laboratory



Director John A. Byrd

November 1, 2017

Senator Shirley B. Randleman
Representative James L. Boles, Jr.
Representative Ted Davis, Jr.
Co-Chairs, Joint Legislative Oversight Committee on Justice and Public Safety
North Carolina General Assembly
Raleigh, NC 27601-2808

RE: Report on work of the NC State Crime Laboratory during FY 2016-2017

Dear Members:

Pursuant to Session Law 2013-360, Section 17.2, the Department of Justice is pleased to submit the Fiscal Year 2016-2017 Annual Report for the NC State Crime Laboratory to the Joint Legislative Oversight Committee on Justice and Public Safety. In addition to the data on evidence submissions, case completions, and other workload measures, the report provides updates on significant achievements and internal improvements that focus on quality of analysis, efficiency of analysis, and transparency of analysis.

Thank you for the opportunity to provide this information. We would be happy to respond to any questions you may have regarding this report.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Seth Dearmin', followed by a large, stylized oval flourish.

Seth Dearmin
Chief of Staff

SD/jab

Cc: Kristine Leggett
Fiscal Research Division

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Executive Summary

The North Carolina State Crime Laboratory remains committed to providing quality forensic analysis in a timely manner for the State's criminal justice system and made significant progress toward this goal in Fiscal Year 2016-2017.

Working more cases more efficiently

The State Crime Lab worked 59,102 submissions in FY 2016-2017. In FY 2016-2017, the Lab accepted more than 31,233 cases including nearly 55,830 items of evidence, as well as 26,000 submissions of convicted offender and arrestee samples to the State's DNA Database of profiles.

The adoption of Lean Six Sigma methodology has helped the State Crime Lab continue to increase efficiency and work more cases faster without sacrificing quality. Pending cases have dropped by 42.9% and lead time has been reduced to a laboratory average of 115 days. Since January 2014 pending cases have dropped 82.3%. The increased production rates have led to two consecutive years of increased submissions (11.3% and 11.5%, respectively), as predicted by the WVU Foresight Project for Forensic Laboratories. The State Crime Lab continues to have a very effective rush program through which District Attorneys with law enforcement can request expedited analysis in cases through an automated web based system.

Continuing to meet high quality standards

The State Crime Laboratory continues to meet the highest quality standards possible, through its accreditation by ANAB under strict ISO/IEC 17025 requirements. Every eligible scientist at the State Crime Lab is independently certified or working toward this goal.

Partnering with the private sector

The toxicology outsourcing project ended in January 2017; however, a number of completed cases are still awaiting final court disposition. The remaining funds are being used to assist law enforcement agencies with their untested sexual assault evidence collection kits that are viable for testing.

Making more efficient use of scientists' time in court

The State Crime Lab continues to seek help from the criminal justice system to reduce the time forensic scientists spend waiting to testify. Less time spent waiting in court or traveling to and from court for our scientists means more time in the Crime Lab working cases. The recommendations contained in the 2014 *UNC School of Government's Report of the Crime Laboratory Working Group: Administrative Solutions to Alleviate Lab Backlog* led to a concerted effort among criminal justice stakeholders to minimize the time spent in court by Crime Laboratory forensic scientists. Nearly half of all Judicial Districts in North Carolina agreed to adopt the recommendations from the School of Government report. **The Lab acknowledges the positive attention given to this important matter and continues to request assistance from our criminal justice stakeholders to minimize time forensic scientists spend in court and away from the lab.**

Building and planning for the future

Construction on the new Western Regional Laboratory is complete and the move completed. Limited analysis of cases has begun in the disciplines of drugs, toxicology, latent evidence, and firearms. **Forensic Biology will begin validations later this calendar year with projected casework expected to begin in first quarter of calendar year 2018.** The new facility is approximately twice the size of the current regional lab and serves law enforcement agencies in Western North Carolina. A formal ribbon cutting ceremony will be conducted on Monday, December 4th, 2017.

An area in which significant improvement in efficiency and case production might occur is the much needed **renovation of the Drug Chemistry and Toxicology laboratories in Raleigh.** Designed in the 1980s, the lab space is not set up for collaborative and team approached case analysis as is currently being utilized.

The prevalence of untested **Sexual Assault Evidence Collection Kits (SAECK)** has attracted considerable concern and attention, placing a spotlight on crime laboratories, police departments and sheriff's offices nationwide. The North Carolina State Crime Laboratory (SCL) and the North Carolina Attorney General have been taking proactive steps since January 2017 to clear all testable SAECKs in North Carolina.

Session Law 2017-57, Section 17.7 included language directing each local law enforcement agency to conduct an inventory of untested Sexual Assault Evidence Collection Kits (SAECKs) in its custody or control. This one time inventory will address any SAECKs currently in existence; however, **there is no statewide SAECK inventory and tracking management system to prevent unknown inventories of SAECKs reappearing in the future.**

Current **(SAECK) inventory and tracking management systems**, available on the market, are **capable of tracking SAECKs from the moment it is collected at the medical facility to the time that the N.C. State Crime Lab results, other publically funded crime lab results or private vendor lab results are reported and made available to investigators, prosecutors and victims.** All stakeholders would have access to this all-encompassing inventory and tracking management system and it is imperative that North Carolina acquire such a system to ensure all SAECKs are tracked and managed appropriately in the future.

The Current Operations Appropriations Act of 2017 provided \$1,740,727(nr) for the purchase or lease of scientific equipment. **This is the first time in laboratory history that language was drafted to allow the leasing of scientific equipment allowing for a more efficient and expeditious manner to replace outdated equipment.** **The State Crime Laboratory wishes to acknowledge the members of the Joint Legislative Oversight Committee on Justice and Public Safety for their support.**

The 2015-2016 FORESIGHT Project Report revealed that the SCL is comparable to other like size, publically funded state forensic laboratories servicing like size state populations. Nine of the twelve forensic disciplines noted were less in cost per item compared to the FORESIGHT 75th National Percentile. This is proof that the SCL is wisely managing its fiscal resources.

To remain a state-of-the-art forensic laboratory, additional funding needs remain. The Lab continues to see a **decrease in federal grant funding** and there is **no contingency for periodic reductions in crime lab court fees** authorized pursuant to NCGS 7A-304 (a) (7). Scientific supply costs increased to over \$1.4 M last fiscal year yet general appropriations covered only 31% of that cost with grants covering the balance. Replacing and updating scientific equipment based on industry standards has been recently offset by tremendous support from the general appropriations over the last two years; however, that support was non-recurring. The North Carolina **Forensic Science Advisory Board strongly recommended** that the General Assembly establish **a special revenue reserve fund to finance non-recurring expenses** such as scientific equipment and to increase funding for scientific supplies to offset decreasing federal grants.

In short, caseloads and turnaround times at the State Crime Lab continue to improve but challenges remain in identifying adequate fiscal resources to meet the Lab's continuing needs as it provides quality forensic services to the criminal justice system in our growing state.

NORTH CAROLINA STATE CRIME LABORATORY REPORT

FISCAL YEAR 2016-2017¹

This Report is presented to the Chairs of the North Carolina General Assembly Joint Legislative Oversight Committee on Justice and Public Safety and to the North Carolina General Assembly Fiscal Research Division as directed by Section 17.2 of S.L. 2013-360, the Appropriations Act of 2013. Under the Section, DOJ must report annually each year on the work of the North Carolina State Crime Laboratory (State Crime Lab) during the previous fiscal year.

I. Preface

State Crime Lab Director John Byrd continued his work from the first year of his tenure to ensure that all aspects of laboratory operations focus on providing the criminal justice system with quality forensic analysis in a timely manner.

II. Quality (Accreditation and Certification)

Forensic services provided by the State Crime Laboratory continue to meet the highest quality standards possible. The State Crime Lab maintains accreditation under strict ISO/IEC 17025 requirements and is accredited by ANAB. ANAB is a signatory to the International Laboratory Accreditation Cooperation (ILAC) as required by NC General Statutes on accreditation for the State Crime Laboratory (S.L. 2011-19). During 2016 and 2017, surveillance visits were conducted by ANAB and the US Army Criminal Investigation Laboratory (USACIL) for our DNA Quality Assurance Standards (QAS) audit. In both visits, the State Crime Laboratory was found to be **in compliance with established standards**. It should also be noted that all **eligible scientists** at the State Crime Lab **are independently certified or working toward this goal**.²

III. Case Submissions and Completions

1. Case Submissions

In North Carolina, the nation's ninth most populous state, more than 20,000 law enforcement officers and over 600 law enforcement agencies routinely submit evidence in criminal cases to the Crime Lab. In FY 2016-2017, more than 31,233 cases including over 55,000 items of evidence were accepted at the Crime Lab's three locations. (See Figure 1) This is an **11.5% increase in case submissions** compared to the FY 15-16 and a **23.9% increase in the last two years**. Including DNA Database submissions, the State Crime Lab system received 57,233 submissions in FY 2016-2017.

Case submissions are broken down as follows:

- The **main State Crime Laboratory in Raleigh** received 16,754 casework submissions and 26,000 DNA Database submissions for a total of 42,754 submissions.
- The **Triad Regional Crime Laboratory** received 5,771 casework submissions.
- The **Western Regional Crime Laboratory** received 8,708 casework submissions.

¹This Report addresses the statutorily mandated "previous fiscal year" (July 1, 2016 - June 30, 2017), and thus only briefly mentions, when required by context, important Crime Lab developments occurring on or after July 1, 2017, including, for example, funding in the 2017/2018 Appropriations Act (ratified June 28, 2017, and generally effective July 1, 2017), providing funding for the previously passed 2011 Forensic Sciences Act. Funding included \$115,518(r) for an Ombudsman, \$161,000(r) for scientist training and certification, \$18,000(r) for the Forensic Science Advisory Board, and \$51,155(r) for laboratory accreditation. Eight forensic scientist positions, previously funded from inadequate laboratory receipts, were transferred to general appropriations at a sum of \$550,989(r). In addition, \$1,740,727(nr) was provided for the purchase or lease of scientific equipment. This is the first time in laboratory history that language was drafted to allow the leasing of scientific equipment allowing for a more efficient and expeditious manner to replace outdated equipment. Finally, Session Law 2017-57, Section 17.7 included language directing each local law enforcement agency to conduct an inventory of Sexual Assault Evidence Collection Kits (SAECKs) in its custody or control and report its finding to the DOJ, SCL no later than January 1, 2018 and the SCL to compile the information and report its finding no later than March 1, 2018.

² Eligible forensic scientists are waiting for the appropriate independent certifying body to schedule certification testing.

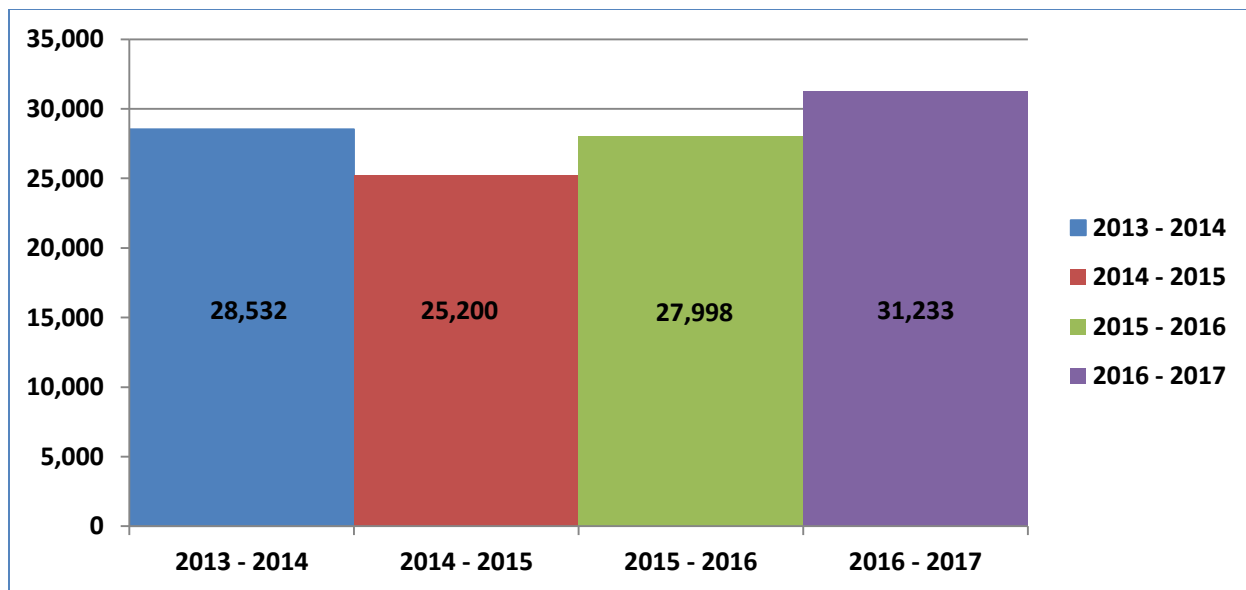


Figure 1 Annual Case Submissions

a. Case Submissions by Forensic Discipline and Lab Location

In FY 2016-2017, the State Crime Lab received the following cases, broken down by forensic discipline and laboratory location:

	<u>Raleigh</u>	<u>Triad</u>	<u>Western</u>	<u>TOTALS</u>
Drug Chemistry	8,420	2,877	6,070	17,367
Toxicology	3,653	1,979	2,028 ³	7,660
Forensic Biology	2,074	339* ⁴	263*	2,676
DNA Database	26,000	0	0	26,000
Latent	781	359	134	1,274
Digital	53	3*	8*	64
Trace Evidence	530	139*	97*	766
Firearm & Tool Mark	1,243	75*	108	1,426

In FY2016-2017 approximately 5,200 of the 26,000 DNA database samples received were duplicates. Duplicate submission and improper use of kits during collection continues to impact the DNA Database Section. The Laboratory pays approximately \$5.00 per kit for the collection kits, which are provided to law enforcement agencies at no cost. The

³ The Western Regional Laboratory provides drug chemistry analysis as well as latent evidence and firearm & tool mark examinations. The Western Lab currently does not conduct trace evidence, digital evidence and forensic biology analyses, convicted offender or DNA upon arrest samples. Forensic biology analyses is projected to be added to the Western Regional Laboratory in the first quarter of calendar year 2018.

The Triad Regional Laboratory provides drug chemistry and toxicology analyses as well as latent evidence examinations. The Triad Lab does not perform examinations of firearm and tool mark, digital or trace evidence, forensic biology analyses, or convicted offender or DNA upon arrest samples.

⁴ Case submissions to a Regional Laboratory for a forensic discipline not offered at that Lab (identified by the * symbol) are transferred to the appropriate Lab location for analysis. The chart reflects all cases received at each Lab location, regardless of whether the requested analysis was offered at that Lab.

duplicates submitted in FY 2016-2017 cost \$26,000. To maximize taxpayer resources, the Lab encourages ongoing training in efficient collection procedures for submitting law enforcement agencies. All personnel involved in the collection of offender and arrestee DNA samples are encouraged to complete training available on the North Carolina Justice Academy website to reduce duplicate sample submissions.

New instrumentation, increased production efficiencies and the opening of the new Western Regional Laboratory will allow increased case production from most of our disciplines. **The two exceptions are latent evidence and drug chemistry** for two very different reasons. **Latent evidence submissions have increased due to many local laboratories terminating their own latent evidence analysis as employees retire or leave.** An aggravating factor for local labs continuing their own analysis is the additional cost of hiring, training and certifying their analysts. Drug Chemistry has seen an **increase** in more complex drug analysis specifically **new opioids such as fentanyl and fentanyl based analogs.** These **new drugs require additional testing procedures lengthening the processing time.** Based on the last two years of submission data, **the addition of two new drug chemistry analysts and two new latent evidence analyst is projected to mitigate this increase.** The State Crime Lab can absorb these submission increases by making internal transfers of current positions and therefore; **no additional human resources are anticipated for FY 2017-2018.** See Figures 2 and 3.

An area in which significant improvement in efficiency and case production might occur is the much **needed renovation of the Drug Chemistry and Toxicology laboratories in Raleigh.** Designed in the 1980s, the lab space is not set up for collaborative and team approached case analysis as is currently being used in the rest of the Lab.⁵ **As a result of completing a Lean Six Sigma efficiency study, the forensic biology section underwent a \$1.6 M renovation in 2015 to create open lab space. Six months after the renovation was completed, the forensic biology section reported a 600% increase in case completions.**

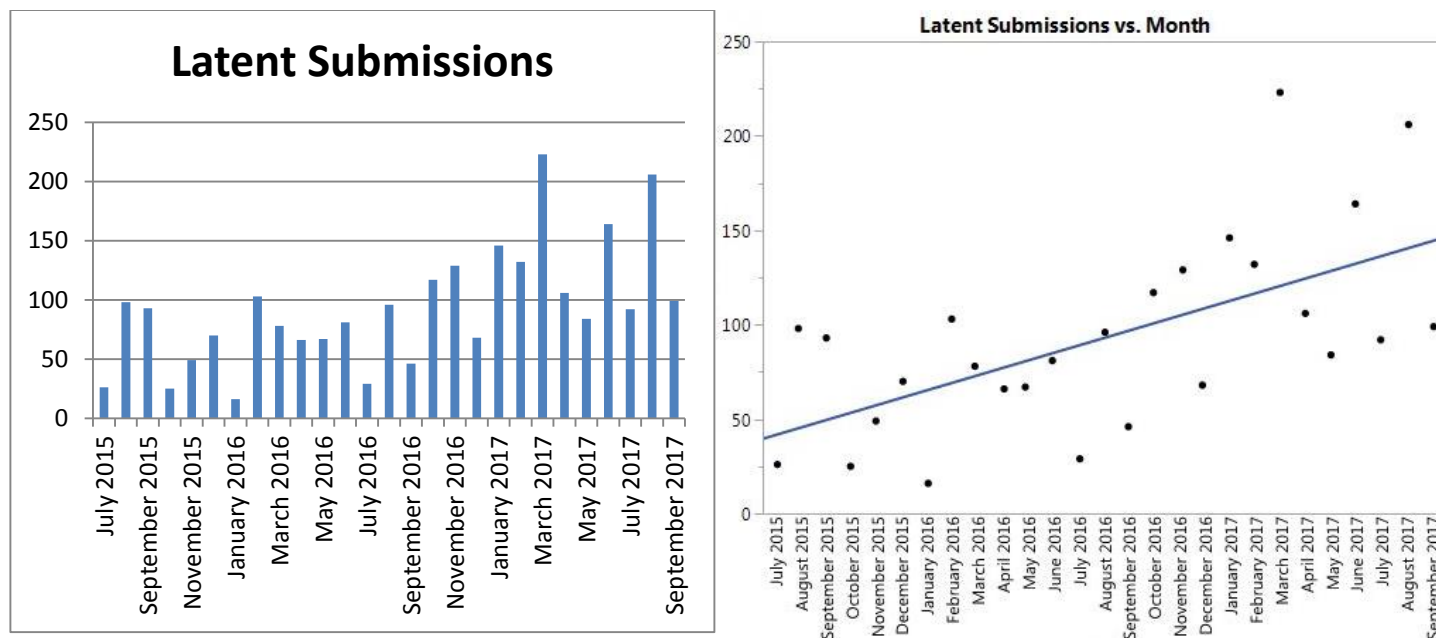


Figure 2 - Latent Evidence Submissions by Month and Trend Line Graph

⁵ Preliminary analysis of this capital renovation by a State Construction Office approved architect is **approximately \$4 M.** This renovation would include upgrading HVAC and addressing ongoing humidity issues in the building.

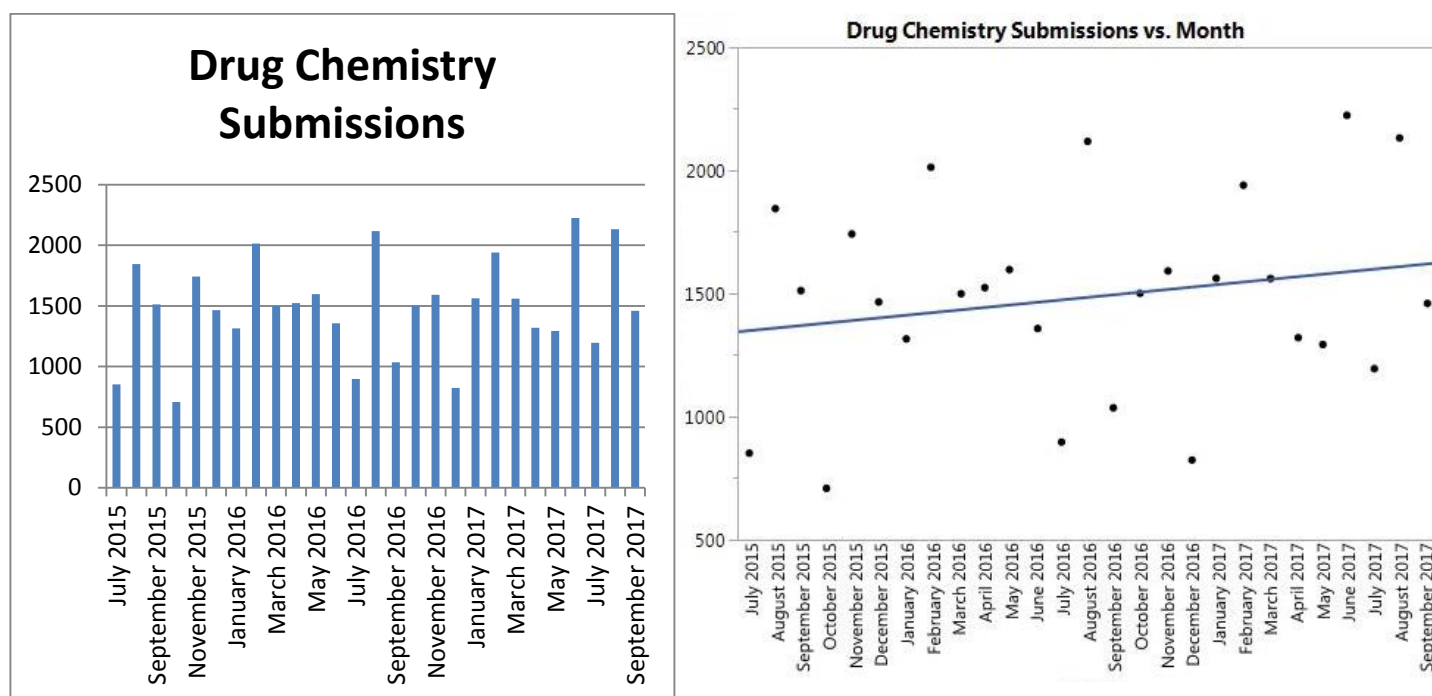


Figure 3 - Drug Chemistry Submissions by Month and Trend Line Graph

b. Case Submissions by County⁶

Case work and evidence item submissions over the past four fiscal years per North Carolina County may be found in Appendix A.

2. Case Completions

For FY 2016-2017, scientists in the State Crime Lab system worked 59,102 submissions, broken down as follows:

- The **main State Crime Lab in Raleigh** worked 23,352 case submissions and 19,377 profiles processed for the DNA Database (including 10,165 DNA samples from convicted offenders and 9,212 DNA samples taken upon arrest).
- The **Triad Regional Crime Lab** worked 5,626 case submissions.
- The **Western Regional Crime Lab** worked 10,747 case submissions.

Improvements in efficiency and methodology have led to decreased turnaround times. This, in turn, has led to a **reduction in stop works** (cases that the DA's office has determined no longer require analysis). In **FY 2015-2016, the State Crime Lab processed 13,046 stop works**; however, in **FY 2016-2017, the number of stop works was reduced to 4,933**. This is good news for the criminal justice community because that means that cases are being worked quickly enough that cases do not need to be dismissed due to the length of time required for lab analysis. With the reduction in stop works, the State Crime Lab appears to have worked fewer cases than in previous years; however, the **39,725 cases worked exceeded the 31,233 cases submitted in the same fiscal year**. See Figure 4.

⁶This information is provided in compliance with S.L. 2013-360 (3) which requires that the Annual Crime Lab Report contain "A breakdown by county of the number of submissions received by the Laboratory in the previous fiscal year." The numbers in these tables do not include Convicted Offender or DNA upon Arrest submissions.

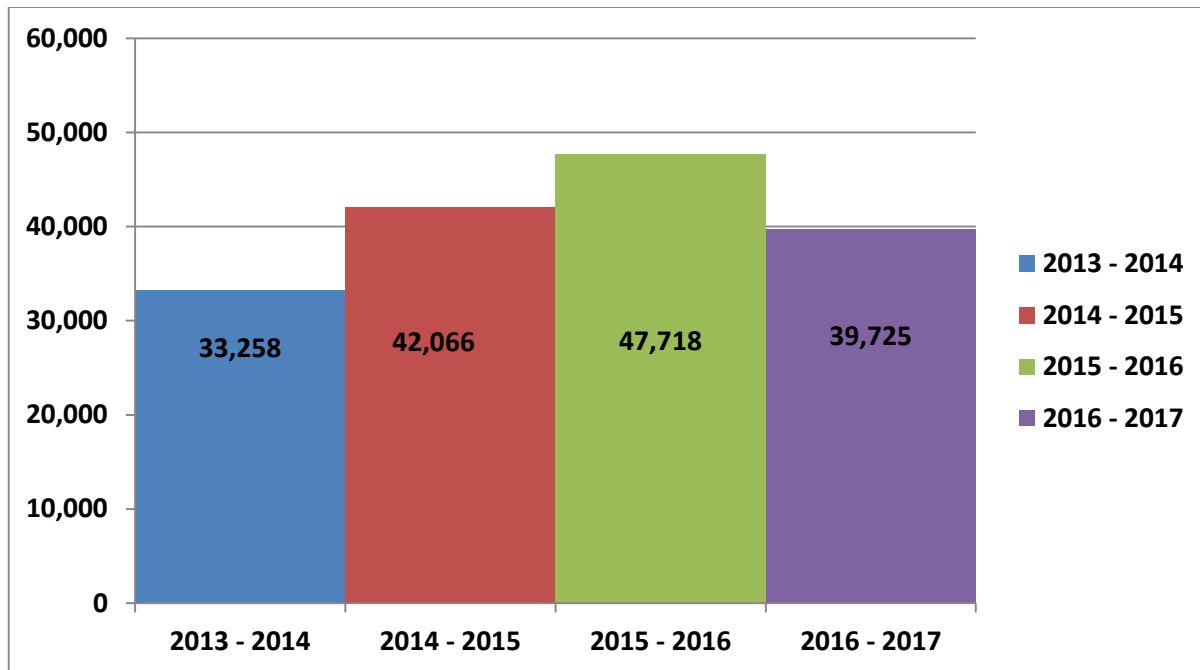


Figure 4 Annual Case Record Completions

a. Case Completions by Forensic Discipline and Lab Location

In FY 2016-2017, the State Crime Lab completed the following cases, broken down by discipline and lab location:

	<u>Raleigh</u>	<u>Triad</u>	<u>Western</u>	<u>TOTALS</u>
Drug Chemistry	11,533	2,475	8,102	22,110
Toxicology	6,588	2,425	2,144	11,157
Forensic Biology	2,572	299	207	3,078
DNA Database	19,377	0	0	19,377
Latent	590	264	131	985
Digital	71	3	7	81
Trace Evidence	603	108	77	788
Firearm & Tool Mark	1,395	52	79	1,526

Notable successes of the DNA Database Section include a **record 478 hits to the DNA database**, which now contains more than 320,000 DNA profiles. New technology now allows faster input of DNA samples into the database where it can be used to identify suspects in unsolved cases.⁷ The Lab received submissions resulting from changes to G.S. 15A-266.3A that authorized the collection of DNA profiles from those arrested for 35 additional offenses, to include all violent felonies.

Total Cases Pending

Case completions have steadily increased over the last two and a half years. At the end of FY 2016-2017, the lab system had a **total inventory of 9,060 cases**. **This is a decrease of over 82% over the last two years**. For FY 2016-2017, the caseload is down by 42.9%. See Figure 5.

⁷ At the writing of this report, the average time to receive convicted offender (CO) or arrestee (AR) samples and input into the database is approximately 14 days.

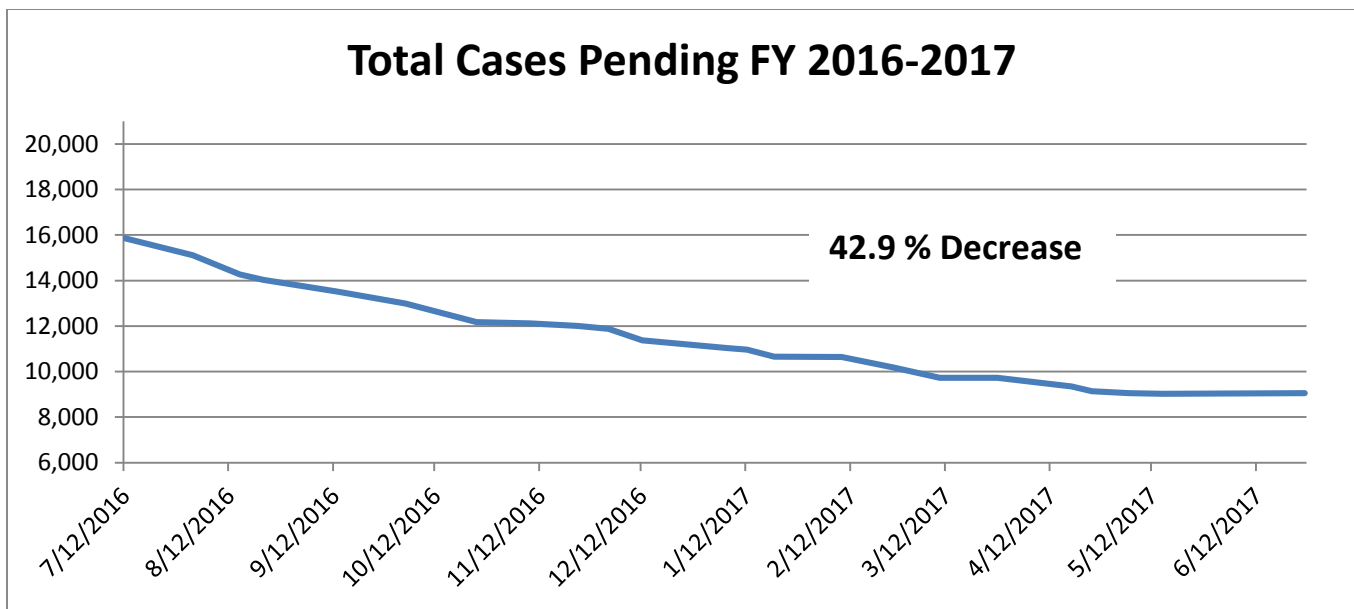


Figure 5 Total Cases Pending as of June 30, 2017

b. Lead Times⁸

Lead times at the State Crime Lab continue to improve as additional scientists complete their required training and begin to work on active cases. **Average lead time for the laboratory was 115 days as of October 1, 2017.** Lead times for individual cases vary depending on the amount of evidence submitted and the type or types of analysis requested, and certain **cases can be worked in as little as days with a rush request from a District Attorney.** For example, a DWI case submission may include a single vial of blood to be tested for alcohol while homicide case submissions may include 75 to 150 pieces of evidence. Even a single piece of evidence can require multiple types of analysis; for example, a firearm may be submitted for ballistics, fingerprint and DNA analyses.

The State Crime Lab continues to battle inaccurate public perceptions of turnaround times, often due to evidence not being submitted to the Lab until weeks or months after the crime was committed. Unfortunately, public perception of turnaround time is directly tied to the date of the crime rather than the date when it was submitted to the Lab.

c. Rush Case Program

The State Crime Lab continues to operate a successful rush case program to give District Attorneys the option to expedite cases when appropriate. Upon the request of a District Attorney, **the Lab can rush or expedite a case for public safety or court purposes.** Depending on the evidence submitted and the type(s) of analysis requested, rush cases can be worked in a matter of days. Lab management welcomes inquiries from District Attorneys about cases where a rush request may be needed.

⁸ **Backlog** is defined by the National Institute of Justice (NIJ) as older than thirty days from the date of offense but is an arbitrary measure based on when the evidence is submitted to the Lab. **Lead Time** is defined as the time from when the analyst receives the evidence until the time they publish a report at the completion of their analysis. **Turnaround time** is defined as the time from when the evidence is submitted to the State Crime Lab to when the report is published. This includes time the evidence sits in the Lab evidence vault waiting to be assigned to an analyst.

d. Court Testimony and Judicial Efficiencies

During FY 2016-2017, the State Crime Lab continued to feel the effects of the 2009 U.S. Supreme Court ruling in *Melendez-Diaz v. Massachusetts* that requires forensic scientists to provide live, in-court testimony rather than testifying by sworn affidavit. More time spent by scientists in court or traveling to court means less time in the lab working on cases.

In FY 2016-2017, Crime Lab scientists spent a total of **3,500** hours traveling to court, waiting to testify or testifying. This is an **increase of 220 hours or 6%** from FY 2015-2016 and a 19% increase from FY 2014-2015. Of those hours, Crime Lab scientists spent 1,906.29 hours traveling to court, **1,187.54 hours waiting to testify** (an increase of over 126 hours from the previous year), and 407.05 hours testifying. See Figure 6. **Assistance is still needed from our criminal justice stakeholders to minimize time forensic scientists spend in court and away from the lab.** The seventeen recommendations from the *UNC School of Government's Report of the Crime Laboratory Working Group: Administrative Solutions to Alleviate Lab Backlog* specifically outlines recommendations to minimize wait time for our analysts.

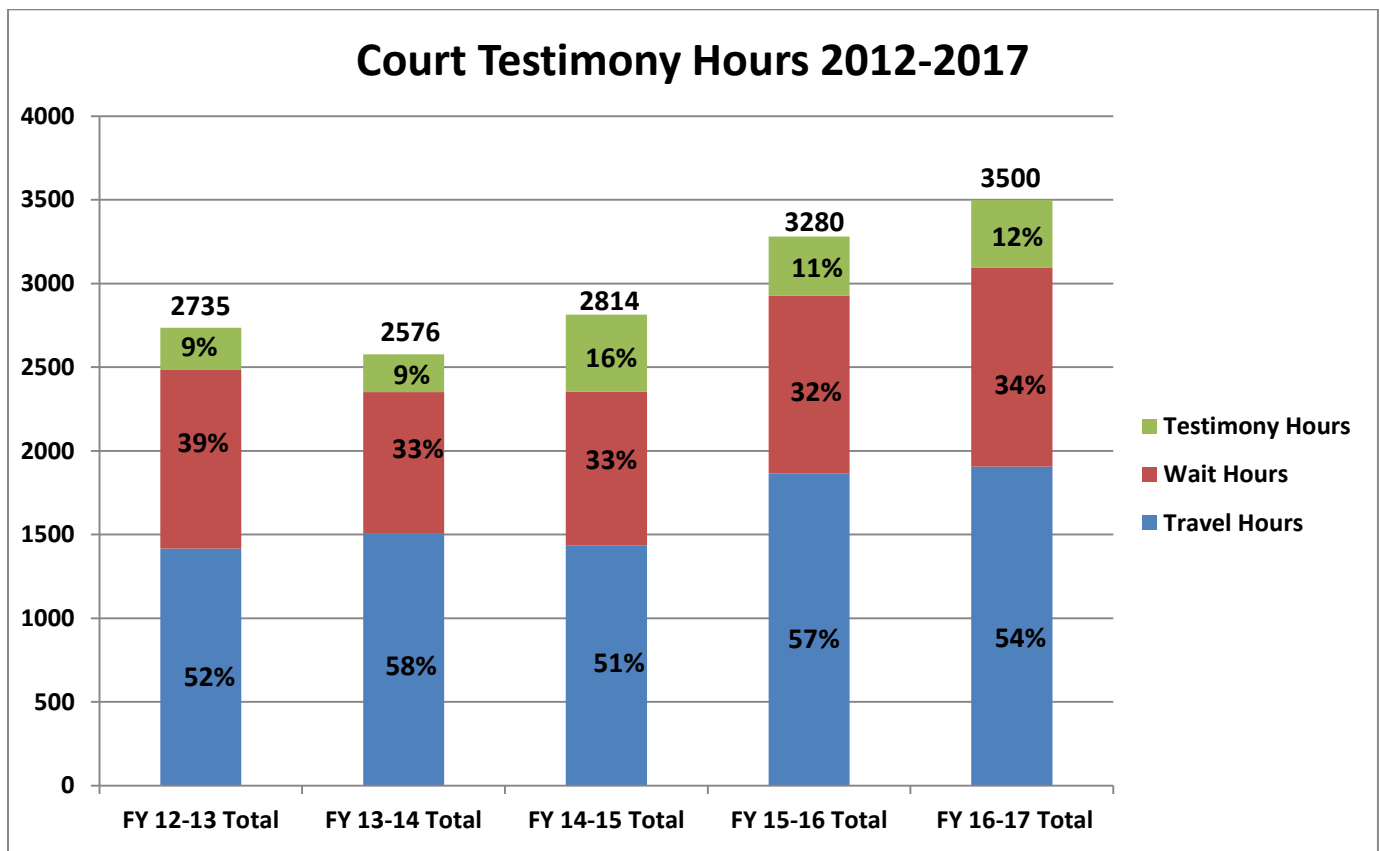


Figure 6: Court Testimony Hours 2012-2017

Nearly half of all Judicial Districts in North Carolina agreed to adopt the recommendations from the School of Government report. **The State Crime Lab acknowledges the positive attention given to this important matter and continues to request assistance from our criminal justice stakeholders to minimize time forensic scientists spend in court and away from the lab.**

e. Outsourcing

Time-limited outsourcing of certain toxicology cases to the State's vendor for toxicology analysis ended in January 2017; however, a number of completed cases are still awaiting final court disposition. The remaining funds are being used to assist law enforcement agencies with their untested sexual assault evidence collection kits that are viable for testing.

At the end of the toxicology project, the State Crime Laboratory **outsourced 5,019 toxicology cases**. The total amount of money spent from FY 2014 through FY 2017 was in excess of \$1.8M for testing and in excess of \$116K for testimony. The testimony amount will grow slightly as some cases are still awaiting final court disposition. Total anticipated amount is approximately \$2.1M. **The State Crime Lab acknowledges the N.C. Conference of District Attorneys for their strong partnership and willingness to participate on this project.**

f. Sexual Assault Evidence Collection Kits (SAECK)

The prevalence of untested **Sexual Assault Evidence Collection Kits (SAECK)** has attracted considerable concern and attention, placing a spotlight on crime laboratories, police departments and sheriff's offices nationwide. The North Carolina State Crime Laboratory (SCL) and the North Carolina Attorney General have been taking proactive steps since January 2017 to clear all testable SAECKs in North Carolina. The SCL has been working with the NC Conference of District Attorneys in order to begin assessing how many untested SAECKs are in local law enforcement agencies throughout NC. In addition, unused outsourcing money appropriated for the purpose of testing toxicology cases (completed in January 2017) was available for DNA testing. As a result of having available funding, the SCL secured two private vendor laboratories to assist in testing viable, untested SAECKs. Both vendor laboratories are accredited to ISO/IEC 17025 standards and FBI Quality Assurance Standards for DNA Testing Laboratories. This proactive approach has begun to identify viable, untested SAECKs that are being tested, at no cost to the local agency, while allowing the SCL to continue working current cases.

In April 2017, the SCL and the NC Department of Justice (DOJ) worked closely with members of the General Assembly to draft language for conducting a state-wide inventory. To that end, Session Law 2017-57, Section 17.7 included language directing each local law enforcement agency to conduct an inventory of Sexual Assault Evidence Collection Kits (SAECKs) in its custody or control and report its finding to the DOJ, SCL no later than January 1, 2018 and the SCL to compile the information and report its finding no later than March 1, 2018. This one time legislatively mandated inventory will address any SAECKs currently in existence; however, **there is no statewide SAECK inventory and tracking management system to prevent unknown inventories of SAECKs reappearing in the future.**

Current **Sexual Assault Evidence Collection Kit (SAECK) inventory and tracking management systems**, available on the market, are **capable of tracking SAECKs from the moment it is collected at the medical facility to the time that the N.C. State Crime Lab results, other publically funded crime lab results or private vendor lab results are reported and made available to investigators, prosecutors and victims.** Initial estimates of a statewide, commercial off the shelf (COTS) system is approximately **\$2M spread over five years**. The State Crime Lab sought federal grant funding for this system but was denied. **All stakeholders would have access** to this all-encompassing inventory and tracking management system and it is imperative that North Carolina acquire such a system to ensure all SAECKs are tracked and managed appropriately in the future.

g. Drug Chemistry - Opioid and Fentanyl Update

During FY 2016-2017, the **Drug Chemistry Section saw a significant increase in the number of fentanyl or fentanyl analog related items from 116 items in the first half of the fiscal year to 300 items in the second half.** Ten fentanyl analogs were added to the N.C.G.S. during the 2017 Legislative Session and will become effective Dec. 1, 2017.

There are immediate safety concerns for handling fentanyl and fentanyl analogs. Laboratory procedures have been recently modified to incorporate additional personal protective measures for scientists when any case that may involve heroin or an unknown powder is to be analyzed. In addition to personal protective equipment, scientists must notify another scientist that they are working a possible fentanyl case. Finally, each scientist has been trained to use and has available Narcan in their workstations. Narcan is the antidote for exposure to fentanyl or fentanyl analogs.

With the nationwide attention that the opioid crisis has received and the increase in overdose deaths and fentanyl exposures, the State Crime Lab added *suspicious overdose cases* to its list of services provided to its customers. To further assist local agencies, the State Crime Lab is rushing the analyses of these type cases and returning information back within a week or two.

Finally, an increase in a new synthetic opioid called *U-47700*, or “*pink*” as it is called on the streets, has been identified in several cases in the laboratory. This substance has been attributed to several deaths in our state. Analysis in the first half of the fiscal year confirmed 3 items and the number jumped to thirty confirmations in the second half of the fiscal year.

h. Toxicology- Update

During FY 2016-2017, the Drug Chemistry and Toxicology Units were separated into individual sections due to their large size and to create efficiencies. The Toxicology Section currently has 25 scientist positions located between the three laboratories. Eight analysts completed the in-house Toxicology training program and five are currently in training. Two robotic liquid handling systems were purchased to increase efficiency. Additional automation is being planned for the next fiscal year using grant funding.

Approximately 98% of the 11,157 completed cases involved Driving While Impaired investigations (DWI). Other types of cases submitted include Drug Facilitated Sexual Assaults (DFSA), homicide investigations, and custodial neglect cases (e.g. – parental drug use contributing to the death of their child). FY 2016-2017 State Crime Lab Toxicology statistics are included in Figure 7, below.

FY 2016-2017 State Crime Lab Toxicology Statistics
Blood Alcohol Concentration (BAC)
o Average Blood Alcohol Concentration = 0.1561.
o Highest Blood Alcohol Concentration observed = 0.4513
o Four cases had a Blood Alcohol Concentration of 0.40 or greater, which is considered capable of causing coma or death.
Blood Drug
o The average blood sample contained 2-3 unrelated drugs
o 55% contain Benzodiazepines (e.g. Valium, Xanax, Klonopin)
o 44% contain Marijuana related drugs
o 33% contain Opiate drugs (e.g. Fentanyl, Oxycodone, Hydrocodone, Morphine/Heroin)
o 13% contain Cocaine and related drugs

Figure 7 FY 2016-2017 State Crime Lab Toxicology Statistics

IV. Process Improvements

The State Crime Lab continues its concerted effort to identify cases that have been disposed of in court (“stop-work cases”) and no longer need forensic analysis. The **State Crime Lab routinely provides prosecutors with lists of cases** which

appear to have cleared the court system but for which the Lab has not received a disposition notice, requesting confirmation that the case is completed and that no further Lab work is required. The NC Conference of District Attorneys has facilitated prosecutorial review of these notices and **forty-three of the forty-four District Attorneys are either fully or partially participating**. As a result, the Lab is able to focus on the cases where forensic analysis is still needed.

The State Crime Lab has partnered with the NC Department of Justice (DOJ) Information Technology Division (ITD), NC Government Data Analytics Center (GDAC), NC Conference of District Attorneys, NC Administrative Office of the Courts (AOC), and the Statistical Analysis System (SAS) Institute, Inc. to develop a software solution to **automate the stop work process within the laboratory information management system**. The group is in testing phase now with an anticipated solution sometime in FY 2017-2018. **District Attorneys will be able to access and update case dispositions through the State Crime Lab's web-based laboratory information management system without the Lab providing lists.**

V. Human Capital

The State Crime Lab continues to see some turnover with employees. In FY 2016-2017, there were twelve resignations and six retirements. **Of the resignations, none were attributed to salary issues.** The State Crime Lab had an 8.5% attrition rate and an 11% vacancy rate at the end of the fiscal year. Additional demographics indicate the State Crime Lab work force is composed of 53% Millennials and 77% female. To assist the State Crime Lab in retention, a concerted effort has been made to create promotional opportunities through career advancement. **Twenty-four promotions were conducted during FY 2016-2017 and nine promotional opportunities are pending.**

The State Crime Lab has conducted significant analysis to determine the future needs within each of the disciplines. As previously noted, the State Crime Lab is able to internally transfer positions to address projected shortfalls in production. **Currently, there are no projected needs for additional manpower in FY 2017-2018.** The one potential exception may occur within the DNA Database section should legislation be brought forward to add the remainder of felony charges to the DNA collection list.

Diversity within the State Crime Lab work force remains an area of needed emphasis. At the end of the fiscal year, the racial/ethnic breakdown is 87% Caucasian, 8% African-American, 2% Hispanic, 1% Indian, 1% Asian, and 1% Other. In FY 2016-2017, the lab has conducted two recruiting events at Historically Black Colleges and Universities (HBCUs) in a concerted effort to improve diverse representation within the lab system. Three recruiting events are planned for the second quarter of FY 2017-2018.

VI. Expansion

Construction on the new Western Regional Laboratory is complete and the move completed.⁹ Limited analysis of cases has begun in the disciplines of drugs, toxicology, latent evidence, and firearms. **Forensic Biology will begin validations later this calendar year with projected casework expected to begin in first quarter of calendar year 2018.** The new facility is approximately twice the size of the current regional lab and serves law enforcement agencies in Western North Carolina. A formal ribbon cutting ceremony will be conducted during the last quarter of calendar year 2017.

VII. Fiscal Resources¹⁰

⁹ The NC State Construction Office issued a Certificate of Beneficial Occupancy on September 21, 2017.

¹⁰S.L. 2013-360 (4) also provides that the Annual Crime Lab Report contain "[a]n average estimate of the dollar and time cost to perform each type of procedure and analysis performed by the Laboratory." The Crime Lab has not had the capability in the past to calculate this data. However, late in the 2013/2014 fiscal year, the Lab initiated participation in "Project Foresight," operating out of West Virginia University, which compiles such information for forensic laboratories. The data collection deadline for the Project Foresight Annual Report published the next May is Dec.1. Because the Crime Lab's data for the May, 2015, report will not represent a full year

The State Crime Lab has faced fiscal resource challenges in the recent past due to unfunded requirements¹¹ which placed a strain on the Lab's budget. In addition, a significant decline in dedicated receipts generated from court fees¹² resulted in unstable funding challenges. **The Current Operations Appropriations Act of 2017** (ratified June 28, 2017, and generally effective July 1, 2017), **provided funding for the previously unfunded mandates of The Forensic Sciences Act of 2011**. Funding included \$115,518(r) for an Ombudsman, \$161,000(r) for scientist training and certification, \$18,000(r) for the Forensic Science Advisory Board, and \$51,155(r) for laboratory accreditation. In addition, **eight forensic scientist positions, previously funded from inadequate laboratory receipts, were transferred to general appropriations** at a sum of \$550,989(r). Finally, \$1,740,727(nr) was provided for the purchase or lease of scientific equipment. **This is the first time in laboratory history that language was drafted to allow the leasing of scientific equipment allowing for a more efficient and expeditious manner to replace outdated equipment.** **The State Crime Laboratory wishes to acknowledge the members of the Joint Legislative Oversight Committee on Justice and Public Safety for their support.**

At the beginning of calendar year 2014, the State Crime Lab began participating in **Project Foresight** through the West Virginia University, College of Business & Economics. The purpose of the collaboration was to begin building a detailed picture of the fiscal resources required to operate a forensic laboratory to include determining the cost of each test. **This annual report is the first opportunity to provide this data.**

During FY 2016-2017, the State Crime Lab had 218 full time equivalent positions, or FTEs, including 148 forensic scientist positions and 70 support staff positions to include administrative and technician positions. As newly hired scientists completed their training and began work on active criminal cases, the State Crime Lab's **supply costs have increased**. During FY 2016-2017, the State Crime Lab expended over \$1.4 M on scientific supplies of which 75% was forensic biology and DNA Database. See Figure 8. Of that amount, **31% or \$455,943.72 was from General Appropriations** and the remaining **69% or \$1,029,158.30 was from DNA Grant funding**. See Figure 9.

and will thus be incomplete, the first full year data reflecting a comparative breakdown of analysis costs will be issued May, 2016. Therefore, category 2013-360 (4) is being addressed, for the first time, in the FY 2016-2017 State Crime Laboratory Annual Report.

¹¹ S.L. 2011-19 also known as "The Forensic Sciences Act of 2011" required the Crime Laboratory to absorb recurring costs associated with individual forensic scientist certification, facility accreditation by ISO 17025 standards, a fulltime ombudsman (Attorney III) and travel support for the Forensic Science Advisory Board which is required to meet multiple times each year. **This unfunded mandate equated to over \$345,000 annually.**

¹² The current statute authorizes the courts to assess fees for the following laboratory analyses: forensic DNA analysis; bodily fluid tests for the presence of alcohol or controlled substances; and the analysis of controlled substances. The 2017/2018 Appropriations Act amended the statute to add fees for digital evidence analysis. Fees are not currently permitted for the following laboratory analyses: firearms & tool marks; latent; and trace evidence.

FY2016-2017 Scientific Supplies DNA vs Non-DNA Disciplines Total = \$1,485,102.00

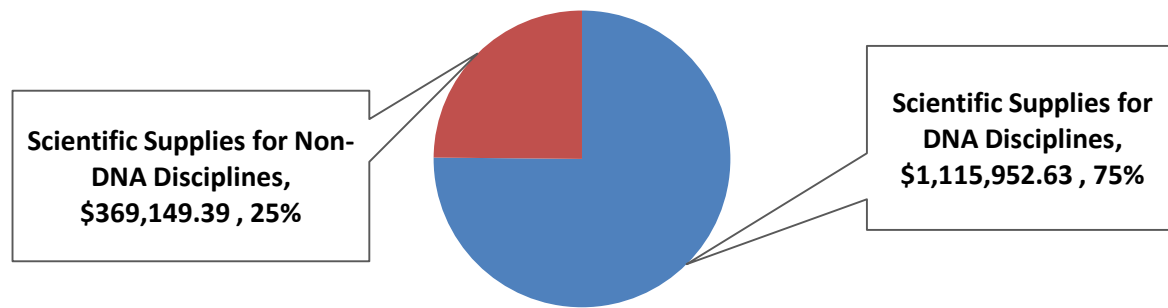


Figure 8 - FY 2016-2017 Scientific Supply Costs

Appropriation -vs- Grants Total = \$1,485,102.00

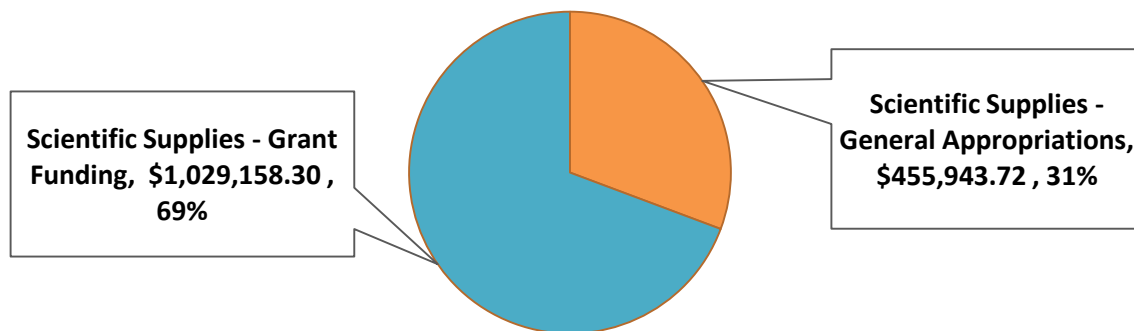


Figure 9 Scientific Supply Funds from General Appropriations vs DNA Grants

The FORESIGHT Project Report indicates that the NC State Crime Lab is comparable to other like size, publically funded state forensic laboratories servicing like size state populations. **Nine of the twelve investigative areas noted were less in cost per item compared to the FORESIGHT 75th National Percentile.** The areas that were higher were areas in which small numbers of cases are generated and/or new instrumentation was recently purchased. In both situations, the cost per item will be higher. As newer instrumentation is acquired, it is anticipated that the initial cost per item will also increase. See Figures 10 and 11.

Investigation area	FORESIGHT 75th National Percentile 2015-2016	NCSCL Cost per Item 2016-2017
Toxicology ante mortem (excluding BAC)	\$644	\$902
Blood Alcohol (BAC)	\$229	\$195
Digital evidence - Audio & Video	\$3,946	\$5,267
DNA Casework	\$730	\$379
Drugs - Controlled Substances	\$232	\$184
Fingerprints	\$471	\$675
Fire analysis	\$1,043	\$268
Firearms and Ballistics	\$1,042	\$353
Gun Shot Residue (GSR)	\$1,516	\$353
Marks and Impressions	\$3,213	\$339
Serology/Biology	\$692	\$166
Trace Evidence	\$3,058	\$856

Figure 10 Comparison of FY 2015-2016 FORESIGHT Cost per Item to NCSCL Cost per Item

Project FORESIGHT Annual Report, 2015-2016 Cost per Item by Investigative Area			
Area of Investigation	25th percentile	Median	75th percentile
Toxicology ante mortem (excluding BAC)	\$366	\$446	\$644
Blood Alcohol	\$86	\$115	\$229
Digital evidence -Audio & Video	\$348	\$1,268	\$3,946
DNA Casework	\$316	\$434	\$730
Drugs -Controlled Substances	\$124	\$181	\$232
Fingerprints	\$227	\$303	\$471
Fire analysis	\$401	\$596	\$1,043
Firearms and Ballistics	\$391	\$634	\$1,042
Gun Shot Residue (GSR)	\$858	\$1,065	\$1,516
Marks and Impressions	\$972	\$2,268	\$3,213
Serology/Biology	\$205	\$420	\$692
Trace Evidence	\$966	\$1,589	\$3,058

Figure 11 Project FORESIGHT Annual Report, 2015-2016 Cost per Item

During FY 2016/2017, the State Crime Lab utilized available grants to refresh scientific equipment, purchase supplies and pay for training to meet unfunded and mandated certification and accreditation requirements. During the last twelve months, the Lab used six grants for FY 2016-2017 through various federal programs. The grant awards include: \$250,000 for scientific instrumentation and equipment for Triad Lab and Trace Evidence; the 2014 and 2015 DNA grants totaling over \$3.2 M for DNA supplies and scientific instruments for Forensic Biology & DNA Database; \$250,372 for

software, scientific instrumentation, equipment and supplies for Drug Chemistry, Toxicology and Latent Evidence; \$160,000 for a Toxicology scientific instrument; and \$250,000 for software, training and equipment for Digital Evidence. The 2016 DNA Grant funds were recently awarded in the latter half of FY 2017 and are now being utilized.

The North Carolina Forensic Science Advisory Board, composed of 15 renowned national forensic experts, reported in a letter to the North Carolina General Assembly the *"tremendous progress by the State Crime Laboratory over the past 36 months..."* as well as *"...an urgent need for more Laboratory resources."* The **Board unanimously supported and strongly recommended** that the General Assembly establish **a special revenue reserve fund to finance non-recurring expenses** such as scientific equipment and to **increase funding for scientific supplies to offset decreasing federal grants**. To remain a state-of-the-art forensic laboratory, scientific instrumentation and equipment must be replaced and updated based on current industry standards. Realistically, \$1.5 M recurring would allow a ten year replacement schedule and combined with the nearly \$3.5 M received over the last two years, the State Crime Lab would be very close to industry standards. A special revenue reserve fund would provide contingency funding to offset periodic reductions in crime lab court fees authorized pursuant to NCGS 7A-304 (a) (7).

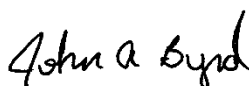
VIII. Conclusion

The State Crime Lab continues to provide high-quality forensic science while improving efficiencies and turnaround times. The Crime Lab will continue to seek increased efficiencies through the use of Lean Six Sigma methodology, streamlined evidence management processes, advanced instrumentation, strategic redistribution of casework, and improved coordination with the courts and our partners in the criminal justice system.

The opening of a larger Western Regional Laboratory will speed analysis of cases by providing more types of forensic analysis in the region, and it will help the entire state by relieving the main State Crime Lab in Raleigh of some of its workload.

However, the Crime Lab continues to face challenges, particularly a recurring funding source for the purchase or lease of scientific equipment, complimentary recurring increases in scientific supply funds, funding and acquisition of a state-wide Sexual Assault Evidence Collection Kit Inventory and Tracking Management System, renovation of the Raleigh Drug Chemistry and Toxicology laboratories, and the requirement that lab scientists provide in-person court testimony.

Respectfully submitted November, 2017,



John A. Byrd
Director, North Carolina State Crime Laboratory

Appendix A - Submissions by County

	7/1/2013 to 6/30/2014		7/1/2014 to 6/30/2015		7/1/2015 to 6/30/2016		7/1/2016 to 6/30/2017	
County	<u>Submissions</u>	<u>Items Submitted</u>	<u>Submissions</u>	<u>Items Submitted</u>	<u>Submissions</u>	<u>Items Submitted</u>	<u>Submissions</u>	<u>Items Submitted</u>
Alamance	420	689	267	445	278	446	359	689
Alexander	66	108	46	93	72	142	89	259
Alleghany	21	22	34	42	30	55	13	19
Anson	89	326	63	153	65	129	55	235
Ashe	61	115	29	69	42	70	27	61
Avery	83	136	76	113	53	78	56	99
Beaufort	432	616	371	507	372	508	446	710
Bertie	61	86	33	51	24	70	56	137
Bladen	67	118	110	149	84	185	98	157
Brunswick	521	660	437	614	550	785	428	683
Buncombe	985	1745	897	1416	1046	1839	1051	1890
Burke	327	547	258	459	335	519	455	861
Cabarrus	615	1113	571	789	609	841	600	1009
Caldwell	376	638	325	529	325	650	324	542
Camden	26	53	21	29	17	25	13	13
Carteret	397	544	320	464	447	623	412	600
Caswell	127	146	47	62	68	151	78	139
Catawba	573	1066	652	1133	988	1430	885	1612
Chatham	135	235	133	233	126	212	118	219
Cherokee	66	106	55	113	81	133	102	175
Chowan	27	49	53	81	32	56	57	80
Clay	25	50	40	72	50	75	34	56
Cleveland	322	607	330	477	468	744	543	772
Columbus	247	388	203	336	204	391	142	292
Craven	316	511	268	590	347	675	351	599
Cumberland	916	1532	497	1023	247	1155	274	1186
Currituck	80	133	50	99	80	102	69	109
Dare	220	339	240	385	223	309	256	415
Davidson	650	972	326	441	330	486	435	709
Davie	58	77	99	135	85	117	88	162
Duplin	262	408	180	338	222	399	410	677
Durham	1706	3822	1299	3806	1376	4624	1066	3969
Edgecombe	358	492	328	442	253	377	206	331
Forsyth	471	852	501	980	925	604	282	799
Franklin	141	313	144	364	203	569	285	751
Gaston	859	1170	751	1151	857	1287	1120	1675
Gates	7	9	14	15	10	16	9	21

	7/1/2013 to 6/30/2014		7/1/2014 to 6/30/2015		7/1/2015 to 6/30/2016		7/1/2016 to 6/30/2017	
<u>County</u>	<u>Submissions</u>	<u>Items Submitted</u>	<u>Submissions</u>	<u>Items Submitted</u>	<u>Submissions</u>	<u>Items Submitted</u>	<u>Submissions</u>	<u>Items Submitted</u>
Graham	95	236	36	107	41	71	32	60
Granville	322	449	267	408	257	334	246	490
Greene	75	162	73	139	76	122	44	87
Guilford	1494	2197	1301	1993	1294	1965	1375	2635
Halifax	220	590	222	405	181	313	242	454
Harnett	349	500	339	514	204	402	226	480
Haywood	203	299	292	404	250	384	357	515
Henderson	353	536	275	443	350	526	397	612
Hertford	71	124	73	97	54	98	52	114
Hoke	212	574	195	652	234	635	203	553
Hyde	22	54	5	9	10	20	20	28
Iredell	382	503	302	507	341	560	262	571
Jackson	164	333	145	332	152	381	188	302
Johnston	672	1048	647	1110	706	1098	590	952
Jones	62	95	56	73	52	66	70	109
Lee	265	409	218	462	217	405	211	417
Lenoir	392	613	394	661	413	783	480	1027
Lincoln	76	137	221	367	566	745	501	651
Macon	124	168	127	196	128	205	172	288
Madison	71	141	48	80	38	67	116	222
Martin	67	88	172	294	188	276	213	454
McDowell	141	200	124	213	137	182	177	314
Mecklenburg	406	573	354	499	444	754	375	715
Mitchell	46	84	31	53	86	132	41	90
Montgomery	89	150	38	76	38	98	95	205
Moore	466	672	228	340	264	421	233	469
Nash	367	561	420	616	455	669	392	653
New Hanover	437	827	537	1247	666	1689	829	2153
Northampton	45	106	38	101	121	235	41	118
Onslow	603	958	449	698	513	835	576	959
Orange	520	811	384	755	322	593	462	986
Pamlico	25	49	79	108	126	183	117	184
Pasquotank	175	249	113	192	122	216	210	359
Pender	110	149	70	105	76	115	144	270
Perquimans	38	78	43	74	15	20	27	46
Person	173	229	162	218	130	166	173	246
Pitt	346	525	237	394	211	456	479	883
Polk	48	60	79	125	87	163	117	179

	7/1/2013 to 6/30/2014		7/1/2014 to 6/30/2015		7/1/2015 to 6/30/2016		7/1/2016 to 6/30/2017	
<u>County</u>	<u>Submissions</u>	<u>Items Submitted</u>	<u>Submissions</u>	<u>Items Submitted</u>	<u>Submissions</u>	<u>Items Submitted</u>	<u>Submissions</u>	<u>Items Submitted</u>
Randolph	567	798	338	546	442	691	609	935
Richmond	384	648	214	354	241	447	378	701
Robeson	371	908	281	588	311	592	327	672
Rockingham	340	691	254	392	247	369	247	609
Rowan	220	396	385	616	578	823	587	1067
Rutherford	120	173	121	204	169	290	209	373
Sampson	359	567	272	424	302	463	175	326
Scotland	167	382	119	270	179	444	156	377
Stanly	135	253	192	319	187	322	261	492
Stokes	142	248	108	166	139	228	170	328
Surry	327	504	312	462	289	486	287	590
Swain	83	142	60	110	105	156	99	186
Transylvania	69	110	76	144	128	248	114	280
Tyrrell	44	45	31	34	15	18	4	4
Union	436	684	349	498	455	702	464	835
Vance	163	291	147	279	189	340	244	518
Wake	228	802	263	921	485	1954	589	1631
Warren	32	73	37	98	22	34	31	57
Washington	32	57	21	55	30	40	15	26
Watauga	200	290	148	243	133	207	160	263
Wayne	404	837	377	675	488	908	601	1132
Wilkes	282	508	257	381	320	525	305	532
Wilson	488	835	413	807	435	702	516	820
Yadkin	152	237	88	138	207	307	202	378
Yancey	58	111	60	101	99	148	79	136
TOTAL	27,642	46,920	23,785	42,090	27,284	48,704	28,606	55,830