ANNUAL REPORT 2018

Wisconsin State Crime Laboratories Mission
To promote excellence in analysis, training and service to the community and our organization with integrity and uncompromising quality.

Wisconsin State Crime Laboratories Vision
To search for the truth through science and to lead and shape the advancement of forensic science.

TABLE OF CONTENTS

Message from the Director

The future is bright for the Wisconsin State Crime Laboratories (WSCL)! Before looking to 2019, we must look back at 2018 and reflect on the accomplishments made.

We saw quite a multitude of case submissions and the trend of sexual assaults case submissions has continued to increase.

The WSCL welcomed many new faces to our analytical staff and we also saw more staff complete their training. In addition, we also welcomed new faces to our supervisory staff to include Claudia Moreno, Katie Hoffmeyer and Kerrie Spitzer. This new group of laboratory leadership gives us the opportunity to offer new perspectives to workflow, case submissions, and new technologies.

In terms of accreditation, manuals and quality, WSCL entered 2018 with a mission of quickly adopting the new ISO standard document. This largescale effort resulted in reorganizing and restructuring our current manuals, a monumental task which was guided and lead by the Quality Assurance Coordinator Casey Collins. This effort allowed us to show objective evidence of conformity in preparation for the 2019 ANSI National Accreditation Board (ANAB) Surveillance visit.

All of the units within the crime laboratories worked on continuous process improvement in 2018. Toxicology continued their work toward validating new instrumentation and adopting new workflows. Controlled Substances continued to make great strides in case output, educating management and staff, as well as maintaining turnaround times. Firearms worked to tackle the vast number of cases, as well as educate everyone on the National Integrated Ballistic Information Network (NIBIN) and the new standards issued by the ATF. DNA pushed forward with new instrumentation and probabilistic software, while also working on the Wisconsin Sexual Assault Kit Initiative (WiSAKI) project. DNA Databank successfully processed all samples in house, while fine tuning their process mapping and also working on the WiSAKI project. Latent Prints worked on refining their workflow and acquired a new footwear database. In addition, upon completion of their large reanalysis project, they were able to get more folks trained while also tackling their large case log. Forensic Imaging continued to improve the training of our customer base while keeping up with the trends of the field by exploring new software. The Automated Fingerprint Identification System (AFIS) Unit continued to meet the ever growing demand for their services while also refining their manuals, training new staff and getting ready for the large AFIS software upgrade. Crime Scene Response responded to a high number of requests in the field while also preparing for a new vehicle and planning for the revamped Crime Scene Processing Schools in 2019. The evidence specialists managed many sexual assault kits, sending kits to the vendor labs while also evaluating their training process and keeping up with the many active cases being received. Truly all disciplines have been actively pushing to maintain our mission: to promote excellence in analysis, training and service to the community and our organization with integrity and uncompromising quality.

We see many opportunities for success in 2019. We aim to be one of the best crime laboratories in the nation, and with that comes the dedication to upholding forensic science as an unbiased entity within the Department of Justice. It is our priority in 2019 to advocate for state-of-the-art forensic science laboratories in Milwaukee and Wausau that match the cutting-edge scientific work being performed daily.

We aim to continue to be a strong voice in our community. We have a great opportunity to build external partnerships by hosting the 2019 Midwest Lab Directors meeting in Madison in June 2019. We are also excited to build the relationships with the institutions of higher education. Our hope is to support and build the future of forensics in this state by assisting institutions via lecture, advisement and sound curriculum.

As always, we strive to support and honor everyone who works at the WSCL. Together, we'll continue to support the criminal justice system in our state.

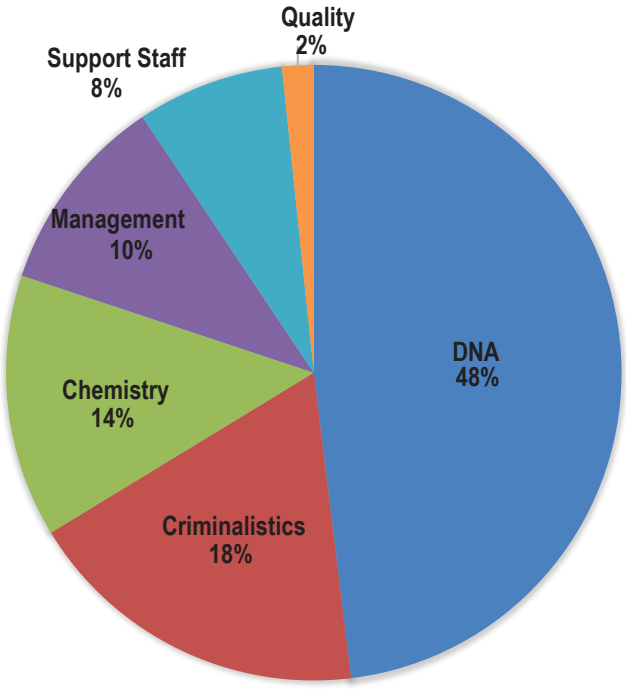
Laboratory Quality Section

In 2018, WSCL continued its accreditation to international criteria for testing laboratories (ISO/IEC 17025:2005) and criteria for forensic laboratories (ASCLD/LAB supplemental requirements). This accreditation is reaffirmed through annual surveillance activities and punctuated with full onsite reassessments every four years. Accreditation compares the WSCL's procedures and activities to over 400 criteria set for staff education, equipment, reagents, test control, proficiency testing, audits, management, reporting, and courtroom testimony.

Recently, the assessment community was impacted by two significant changes. In the middle of 2017, the WSCL assessment organization (ASCLD/LAB) merged with a larger accrediting body (ANAB), taking the former's name. This changed the supplemental requirements for forensic laboratories. Secondly, in late 2017 the core ISO/IEC 17025 criterion for testing laboratories were updated. These new core criteria were similar but not identical to the previous version with changes made to increase emphasis on impartiality, risk evaluation and process improvements while deemphasizing prescriptive criteria. Both these changes necessitated the establishment of a timeline for the WSCL transition to the new criteria by February of 2019 or February 2020.

To meet this challenge the WSCL opted to demonstrate conformance in February 2019 and revise its entire Bureau procedure manual to align with and address the new criteria. In addition, each discipline procedure manual (e.g. DNA, firearms, controlled substances, latent prints, trace evidence, and toxicology) had to make necessary changes to meet the new criteria. This review and revision of over 1,000 documents was completed on October 1, 2018. Our compliance with these new standards was confirmed in February 2019 during our onsite assessment. This compliance ensures that the WSCL continues to provide high quality forensic services to the state of Wisconsin.

Wisconsin State Crime Laboratory Staff Overview



The quality staff supports over 180 staff at the WSCL spread across five different sections (DNA, Criminalistics, Chemistry, Management and support staff) and three different laboratories (Madison, Milwaukee, Wausau). In total, 133 (73%) of the forensic staff are proficiency tested annually to ensure the validity of the results produced by the WSCL. The quality team tracks these results as part of its mission to promote excellence by ensuring conformance with the required international standards.

Wisconsin State Crime Laboratory Discipline Overview

The Wisconsin State Crime Laboratory has approximately 180 management, forensic scientists, and technicians at three separate service areas: Madison, Milwaukee, and Wausau. Both the Milwaukee and Madison laboratories provide DNA Analysis. In total, there are ten disciplines practiced at varying levels throughout the state (below). Questioned documents, tire track, gun shot residue, traditional hair, and blood pattern analyses are not provided in Wisconsin.

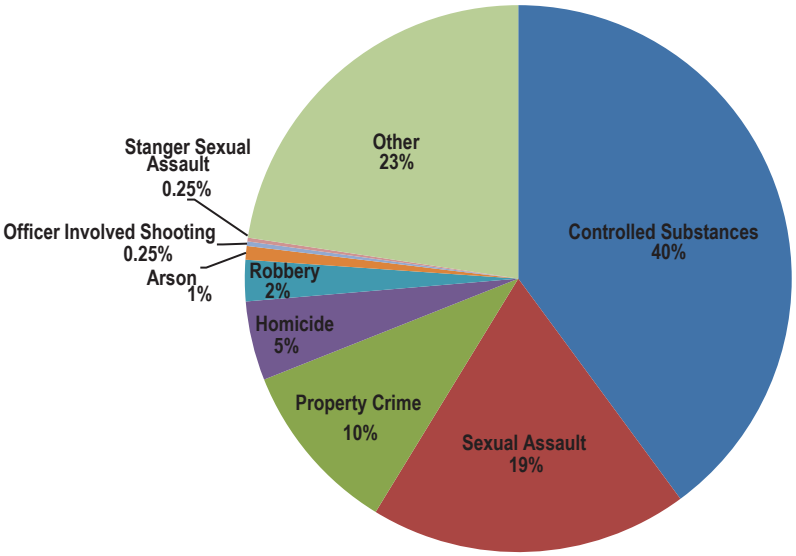
Services	Madison	Milwaukee	Wausau
AFIS Specialists	✓		
Controlled Substances	✓	✓	✓
Crime Scene Response	✓	✓	✓
Databank	✓		
DNA Analysis	✓	✓	
Firearms and Toolmarks		✓	
Forensic Imaging	✓	✓	✓
Identification	✓	✓	✓
Toxicology	✓	✓	✓ (BAC only)
Trace		✓	

Evidence and Administrative Support Case Receipt

To support the analytical staff and the customer, the evidence and administrative support staff function as the WSCL liaison with law enforcement and fully communicate the specific details and limitations regarding the integrity of evidence outlined in the Submission Guidelines.

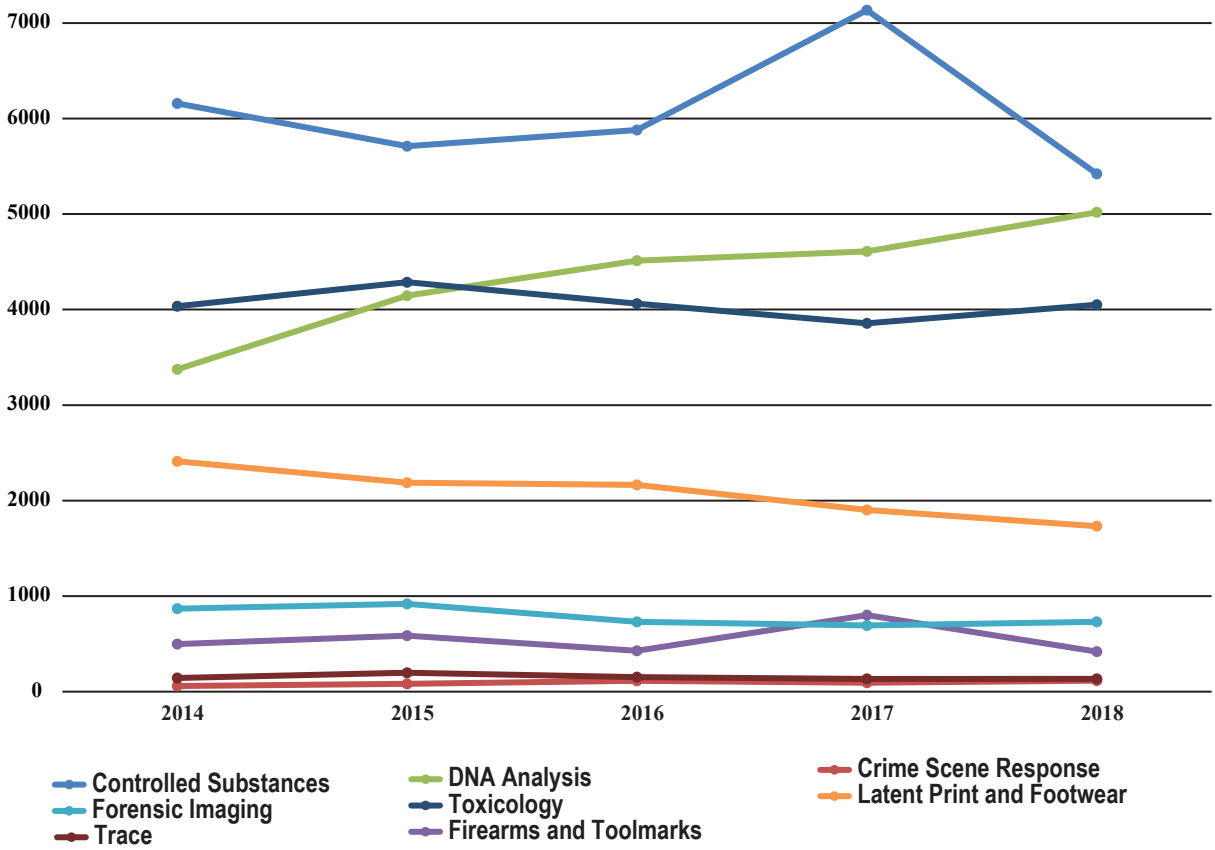
In 2018, the WSCL receipted almost 13,000 cases, a decrease from 2017. The types of offenses submitted vary across the three laboratories, for example, most of the cases submitted to the Wausau laboratory are for possession of a controlled substance.

Receipted Cases	2014	2015	2016	2017	2018
Madison	3532	4297	4124	5978	4601
Milwaukee	4228	4589	5143	6498	5548
Wausau	3542	3678	3762	3319	2531
Total	**11302**	**12564**	**13029**	**15795**	**12680**



As demonstrated on the pie chart on the left, the 12,680 WSCL receipted cases can largely be defined by five main case types: possession of a controlled substance, sexual assault, property crime, homicide, and robbery. Each submitted case has the potential to be worked by multiple units and certain units are more heavily impacted by specific case types. For instance, sexual assault cases may have both a DNA and a Toxicology assignment but very rarely will have a Latent Print assignment. These case type breakdowns will be included in each unit summary.

The graph below shows the assignments completed by each discipline over the last five years. A more detailed graph will be included at the start of each laboratory section.



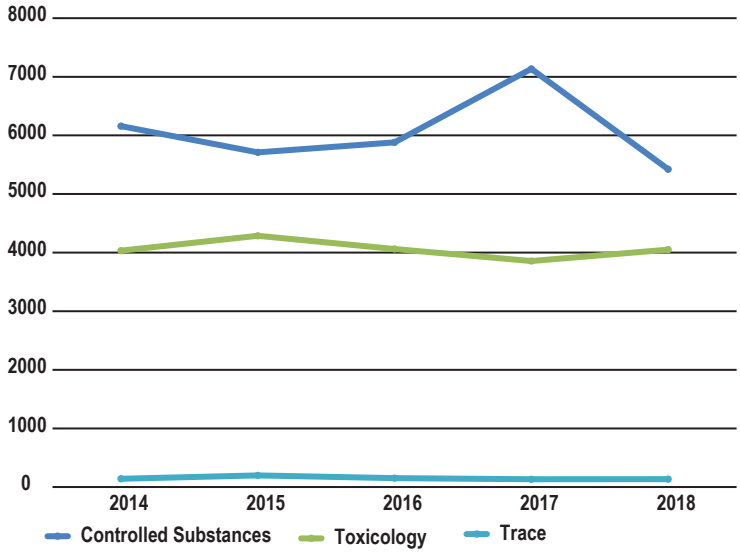
Note: The data provided in this report is obtained from the Laboratories Information Management System (BEAST). For the remainder of this report, the term case will refer to an assignment created to perform the work. This is the easiest metric to use to effectively evaluate the output in each unit. Additionally, the average turnaround time refers to the time it takes to complete a confidential report of laboratory findings.

Chemistry Section

The primary function of the Chemistry Section is to analyze items of evidence in order to determine the presence or absence of a controlled substance. At the Wisconsin State Crime Laboratory, the Chemistry Section consists of three units: Toxicology, Controlled Substance, and Trace Evidence.

Controlled Substance	Analyze evidence for the presence (or absence) of controlled substances as defined in the Unit Controlled Substance Act, Chapter 961.
Forensic Toxicology	Analyze bodily fluids or tissue for alcohol and controlled substances.
Trace Evidence	Analyze broad spectrum of physical evidence and/or substances for identification or comparison purposes.

Chemistry Output



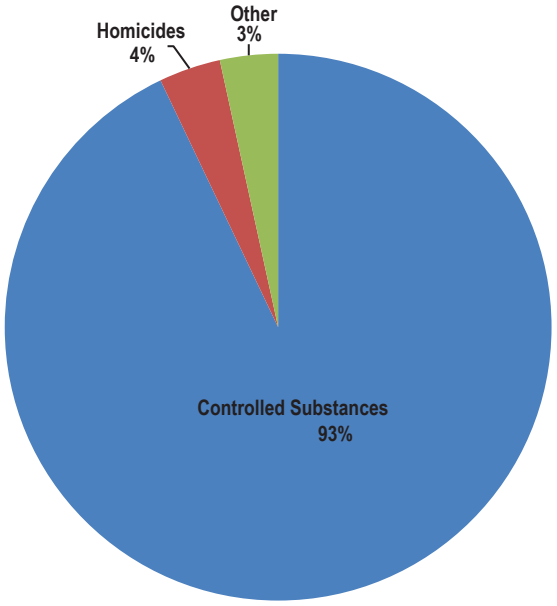
The Chemistry Section had several challenges which had a direct impact on output. All three have been negatively impacted by personnel turnover which resulted in staff reassignment from working cases to train new hires. In addition, the landscape of the evidence itself has presented challenges. As will be discussed, the opioid epidemic and the frequent receipt of substances that contain mixtures has impacted both the Toxicology and Controlled Substances Units. Toxicology also observed a law change that made 4th offense OWI a Class H felony, which allowed these cases to be submitted to WSCL. The staff have responded by adopting new workflows and evaluating new emerging technologies. Despite these significant challenges, the Chemistry Section maintained a high level of output.

Controlled Substance Caseload

	2016	2017	2018
Case Intake	6473	6447	5283
Case Output	5887	7135	5422
Avg.Turnaround	62 days	80 days	43 days

In 2018, the Controlled Substance Unit worked diligently to reduce the backlog from over 1000 cases to less than 400. As demonstrated in the graph, a majority of cases worked are related to possession of a controlled substance which may include plant materials, powders, tablets, etc.

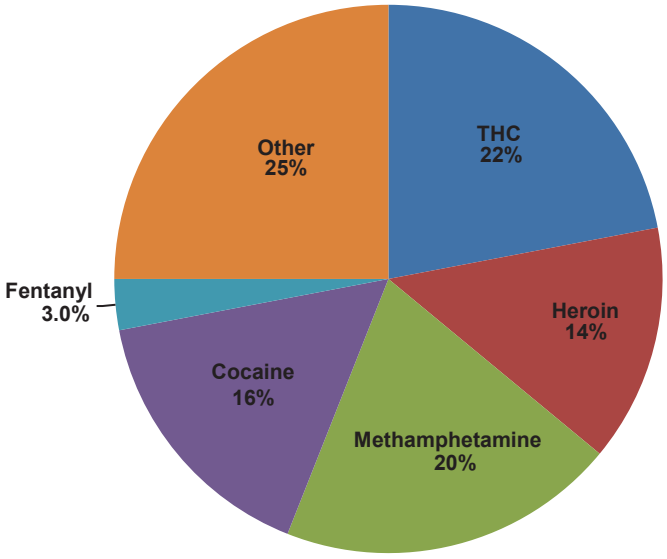
As illustrated on the next page, the unit has continued to see an increase in fentanyl and fentanyl analogs as well as other new psychoactive substances, which require additional safety measures and more analytical resources. To assist with the increase in drug complexity, a new GC-IR instrument was acquired in 2018 and validated to utilize in complex cases.



Controlled Substance Drug Frequency

Due to the increase in opioid related deaths across the nation and the associated threat that this poses to law enforcement and staff, the WSCL has modified internal protocols. First, to assist law enforcement, all three locations offer use of their hoods for agencies to do field testing if needed. This service is offered on Tuesday afternoons and Friday mornings for a two to three hour window. Agencies are required to call ahead to make arrangements and must bring their own supplies including test kits and PPE. They are also informed that the analysts will not perform or interpret field tests results.

There has been a varied response between the three laboratories. Milwaukee has only had two submitters since this service was started in 2017, while Wausau has had their hoods used a total of 12 times and Madison 22 times.



To the left is a summary of the drugs that were encountered most frequently in 2018. The data was extracted from the reports to the National Forensic Laboratory Information System operated by the Drug Enforcement Administration. A single case may include multiple drugs. Since 2010 (below) there has been a significant increase in the frequency of methamphetamine, heroin, and fentanyl and a corresponding decrease in THC and cocaine. Further, analysis of heroin cases over the past three years has become more complex, with mixtures of fentanyl and fentanyl analogs within heroin samples.

	2010	2015	2016	2017	2018
THC	40%	34%	28%	22%	22%
Heroin	10%	20%	18%	15%	14%
Methamphetamine	6%	18%	17%	20%	20%
Cocaine	25%	14%	14%	14%	16%
Fentanyl	0.2%	0%	3.0%	0.5%	3.0%
Other	19%	14%	20%	29%	29%

WSCL Adjustments for the Opioid Epidemic

Inside the laboratory, heroin cases follow a typical multiple unit work flow in which packaging will go to either the Latent Print or DNA Unit while the powdered material will be tested by the Controlled Substance Unit. This scenario depends on the packaging being separated from the drugs prior to submittal. If the drugs are not separated, then the Controlled Substance Unit will perform their analysis and separate the packaging material for transfer to DNA or Latent Print.

In cases of overdose deaths or possible fentanyl cases, analysis by Latent Prints or DNA are delayed until the Controlled Substance Unit has analyzed the powder or residue. If fentanyl or any of the fentanyl analogs are identified, the case is closed administratively for the other units. If no fentanyl (or analog) are identified, then the case is put in the que to be worked by the requested unit.

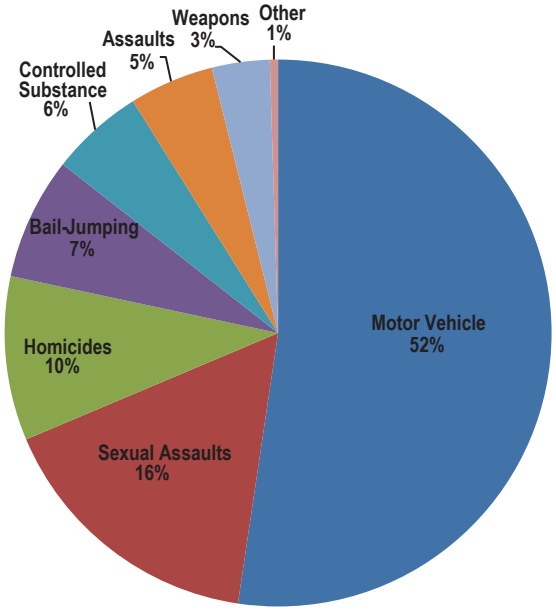
There have been limited instances where an ADA has still requested DNA be done on cases which had fentanyl present and they have been worked.

Forensic Toxicology Cases

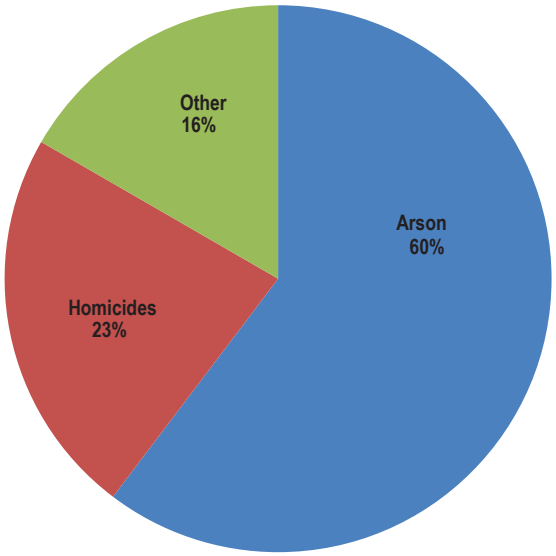
	2016	2017	2018
Case Intake	3831	3899	3897
Case Output	4076	3856	4051
Avg.Turnaround	52 days	34 days	51 days

In recent years, the Toxicology Unit has completed the training of four new analysts in the Madison and Milwaukee laboratories. This, coupled with overtime, has enabled the unit to improve turnaround time. The unit continues to train its newest analyst in the Milwaukee laboratory.

As demonstrated by the graph, evidence received in the unit is often collected to assist in investigations of operating while intoxicated (OWI), drug facilitated sexual assault, endangering safety, and violations of probation or parole.



Trace Evidence Cases



The Trace Unit has two analysts that work out of the Milwaukee lab and service the entire state. The largest challenge for the unit is training new staff due to vacancies created by retirement and promotion.

As demonstrated by the graph, typical case types worked by the unit include arsons, homicides, hit and runs, burglaries and criminal property damage.

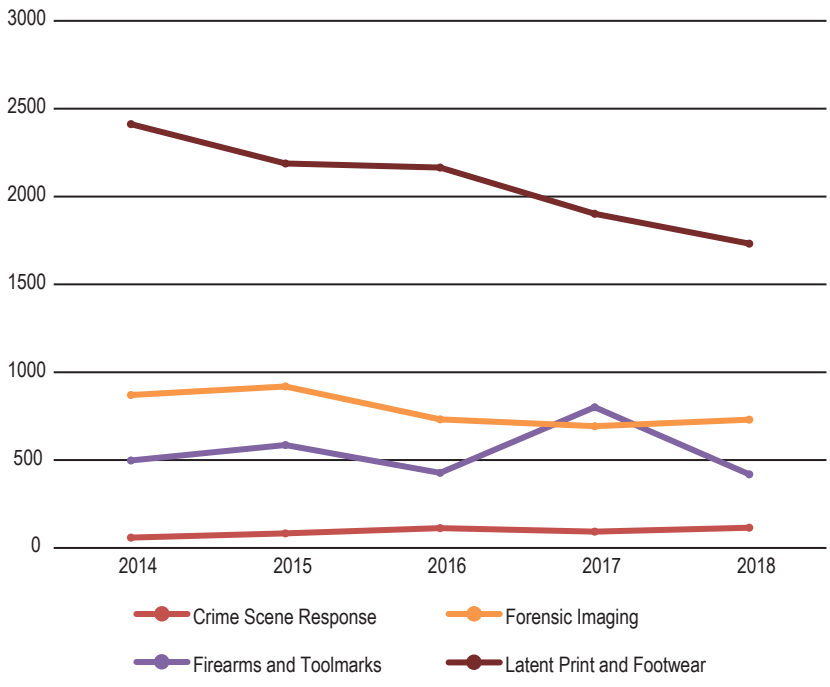
	2016	2017	2018
Case Intake	157	157	126
Case Output	151	133	134
Avg.Turnaround	34 days	56 days	70 days

Criminalistics Section

The Criminalistics Section is the most multifaceted section in the laboratory. In general, the Criminalistics Section utilizes scientific principles to complete pattern recognition and interpretation, as well as, forensic imaging analysis. At the WSCL, the Criminalistics Section consists of five units: Automated Fingerprint Identification System (AFIS), Crime Scene Response, Firearms and Toolmarks, Forensic Imaging, and Latent Print and Footwear.

Automated Fingerprint Identification System	Perform comparative analysis on ten print to ten print evidence and known standards and maintain the Automated Fingerprint Identification System. In addition, conduct database searches and provide technical and analytical support to state and federal agencies.
Crime Scene Response	Respond to calls from law enforcement agencies for assistance at major crime scenes and autopsies. Locate, document, and collect evidentiary items.
Firearms/Toolmarks	Analyze firearms for operability, perform comparative analysis on fired bullets and cartridge casings, and maintain the National Integrated Ballistic Information Network. In addition, conduct serial number restorations, distance determinations, and tool mark comparisons.
Forensic Imaging	Perform forensic video, image analysis and enhancement, from various forms of media or image capture devices. Use specialized techniques, high resolution imaging equipment and forensic applications to record and recover information. Provide photographic and video imaging services to all disciplines within the WSCL, DOJ, law enforcement agencies and district attorneys throughout the state.
Latent Print and Footwear	Develop and recover friction ridge (finger) prints and footwear impressions from items of evidence. Compare prints/impressions with known exemplars to establish identity/exclusion/association and conduct database searches.

Criminalistics Output



The Criminalistics Section had several challenges which directly impacted output. All areas have been significantly impacted by personnel turnover which has resulted in staff being pulled from working cases to address training for new hires. In addition, all of the disciplines have worked cases without clear submission guidelines, which meant that the number of items submitted per case could range from one item of evidence to hundreds of items for a single case. In 2018, the Latent Print Unit scientific staff responded to the submission challenge by adopting new guidelines, which enabled the unit the ability to only work with scientifically viable surfaces that allowed for more meaningful evidence being analyzed. In addition, the group evaluated workflows and procedures. The units in Criminalistics have maintained a high level of output despite the various significant challenges they have encountered through the years.

Criminalistics Software: AFIS Upgrade

The Wisconsin Automated Fingerprint Identification System (AFIS) was established in 1992 to digitize, manage, and automate the processing of incoming arrest records, and to provide a means to search unsolved latent prints against known standards. This system is used by both the Crime Information Bureau (CIB) and the WSCL to manage criminal history records, perform applicant background checks and identity confirmation, and search unsolved latent finger and palm prints related to criminal investigations. Additionally, the AFIS interfaces with law enforcement sites, 2-finger fast ID searches throughout the state, and with the Federal Bureau of Investigation's Next Generation Identification System (NGI).

Since its inception, the AFIS has undergone several updates to increase accuracy, storage, processing speed and record management. Presently, the system cannot maintain functionality under the stress of continuous data increases. At the end of 2018 the AFIS contained the following (numbers are approximate):

Stored Subject Records	Stored Unsolved Latent Prints
1,590,000 Fingerprint records	37,000 Latent Fingerprints
384,000 Palm Print records	6,000 Latent Palm Prints

The WI DOJ is now working with IDEMIA to upgrade the existing AFIS to a cloud-based solution, MorphoBIS 5.x, to keep our software and applications current with future updates and modalities provided automatically. An extensive list of improvements is expected with the upgrade including new technology, process modifications and search accuracy. The following list is not all inclusive but intended as a general overview of updates and improvements.

- Advanced search and data storage technology: updated search algorithms, new coding applied to incoming and existing records, more standard data captured; i.e. multi-registration retention for each subject, and an expanded palm database to include upper palms.
- Process improvements: streamlined workflows that reflect operational needs, training workflows incorporated into the system, addition of quality assurance steps and documentation, blind verification, bias reduction and error management, improved interfaces with other applications.
- Modifications: expanded database and archive size, lossless file retention, individual workstations (cloud-based app) for all latent examiners; greatly improves unit process efficiencies with file searching and documentation, searches can be launched and saved to the state and national level from one application, all results returned to the same application, solved latents automatically purged, statute of limitations workflow to remove specific cases; system documented and DOJ defined, digital documentation of conclusions to reflect WSCL policy and national standards.
- Additions: CIB workstation for record tracking and manual entry, CIB facial recognition modality, case AFIS component; a case management tool, as well as technology to be leveraged for quality assurance purposes, error reduction, case documentation, and training purposes.

The upgrade solution will significantly improve latent and ten-print case workflows, increase data capture and retention, refine search results and ensure adherence to federal changes regarding system security and record management.

Criminalistics Software: AFIS Upgrade Budget

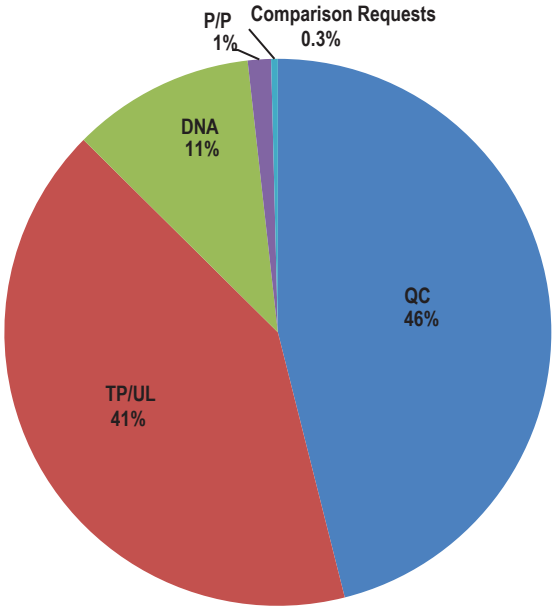
The AFIS Project is large scale and will incur expenses that will run from FY19-FY28. A portion of the cost will be from a grant. The grant funding is from the National Criminal History Improvement Program (NCHIP) 15 grant which has matching requirements. The non-grant portion of the funding will primarily come from criminal history background check fees. There are some additional information and technology costs that are part of the Bureau of Computing Services budget that are driven by the need to replace/upgrade hardware and for additional capacity to run this system, plus the costs of project management.

	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28
WSCL	$446,865	$2,501,837	$978,771	$1,001,374	$1,024,655	$1,048,635	$1,073,333	$1,098,773	$1,124,977	$1,151,966
Grant	$1,647,051	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	**$2,093,916**	**$2,501,837**	**$978,771**	**$1,001,374**	**$1,024,655**	**$1,048,635**	**$1,073,333**	**$1,098,773**	**$1,124,977**	**$1,151,966**

Automated Fingerprint Identification System Unit

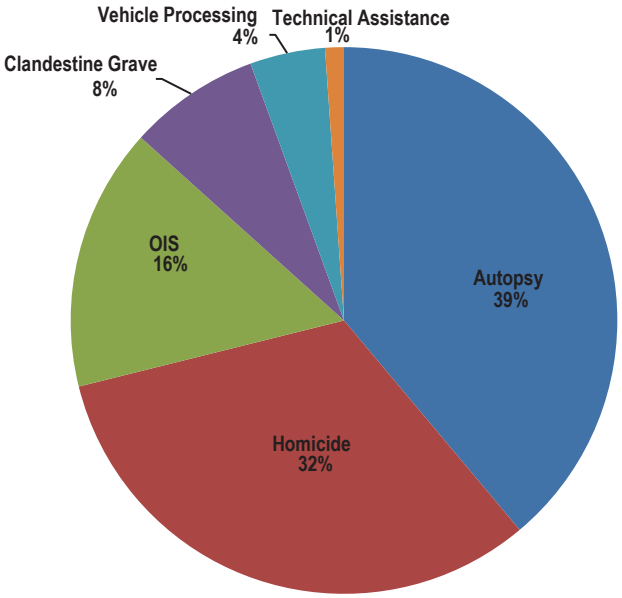
The AFIS is the central repository for fingerprint records in the State. The AFIS Unit works closely with CIB, the DNA Databank Unit, and the Latent Print Unit. This unique environment requires an AFIS technician to possess the skills necessary to perform friction ridge analysis on hundreds of prints per day. Comparisons are performed on a variety of media, including paper sources, inked ten-print cards, and digital images. The unit supports the Latent Print Unit by performing the preliminary analyses on all Ten-Print to Unsolved Latent images in the database as well as the DNA Databank Unit by performing all fingerprint comparisons on DNA submission forms. Furthermore, the unit supports the CIB by verifying fingerprints on expungement requests and consolidation records, as well as performing examinations for external agencies including the Department of Corrections.

	2016	2017	2018
Quality Control (QC)	116292	114014	131412
Ten Print to Unsolved Latent (TP/UL)	110661	105703	117987
DNA Submission Forms	36184	33408	30843
Print to Print Verification (P/P)	3858	3730	3913
Comparison Requests	0	756	1127



As demonstrated by the graph and table, there are five main types of analysis performed in the unit: quality control, examination of ten-print to unsolved latent prints, examination of DNA submission forms, print to print comparisons, and comparison requests. Although the number of comparison requests may seem small, the amount of work required is significant and represents a large accomplishment.

Crime Scene Response Caseload



The Crime Scene Response (CSR) Unit provides technical assistance to law enforcement agencies in the scene processing of major crimes. Members of the CSR Unit are trained to properly document and assess a variety of crime scenes, including homicides, attempted homicides, abductions, officer-involved critical incidents, the recovery of human remains and cold cases. Team members are able to detect, document, collect and properly package items of evidentiary value, preserving these items for analysis in the crime laboratories. The CSR Unit strives to provide law enforcement quality work through on-going training and the evaluation of resources. In 2018, the WSCL responded to 122 requests from law enforcement.

	2016	2017	2018
Responses	88	91	122
Avg.Turnaround	23 days	29 days	30 days

Crime Scene Response Infrastructure: New Vehicle

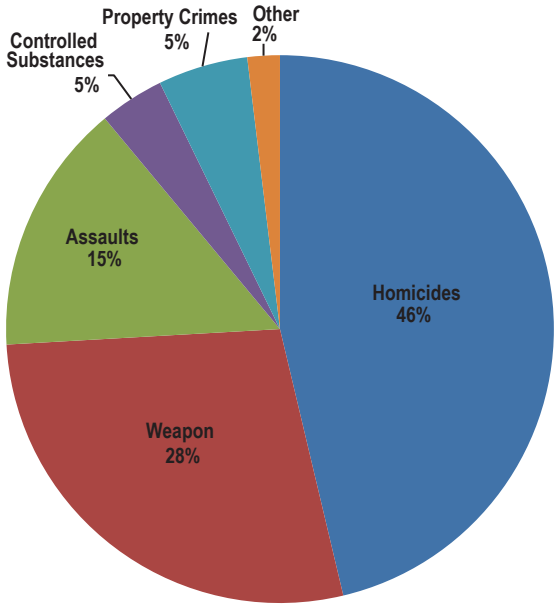
In 2018, the Madison laboratory worked with North Central Emergency Vehicles to build a custom Braun Ambulance box to mount on a DOA supplied chassis. In February 2019, the vehicle was delivered to Madison laboratory and loaded with the necessary CSR equipment. Subsequently, the extra crime scene response vehicle in Madison, a Chevy Suburban, was able to be transferred to Milwaukee's CSR Unit. This transfer has resulted in each laboratory having the appropriate vehicle for the scenes in their jurisdiction: Madison – one ambulance style vehicle, Wausau – one ambulance style vehicle, Milwaukee – two suburban style vehicles.

Firearms and Toolmarks Caseload

Forensic Firearm examination is the forensic process of examining the characteristics of firearms as well as any cartridges or bullets left behind at a crime scene. The basis of this type of comparison analysis is founded on the premise of uniqueness between items upon close visual examination. The uniqueness of each firearm transfers to cartridge cases and bullets whenever the weapon is fired which has been proven through the physical sciences (physics, metallurgy, metallography and materials science). The firearms examiners at the WSCL testified a total of 47 times in 10 counties in 2018 (including 2 Daubert hearings). In addition, the team worked two high profile cases that challenged them with evidence submissions: one case involved examinations on 192 items of evidence and another had 396 items of evidence.

Toolmarks	2016	2017	2018
Case Intake	14	18	25
Case Output	12	17	0
Avg.Turnaround	460 days	511 days	--

Firearms	2016	2017	2018
Case Intake	596	708	446
Case Output	415	784	419
Avg.Turnaround	119 days	171 days	210 days



As demonstrated by the graph, a majority of the caseload in the unit were related to homicides, weapons, and assaults. Property crimes remain the most prominent Toolmark offense type.

Footwear Database Pilot

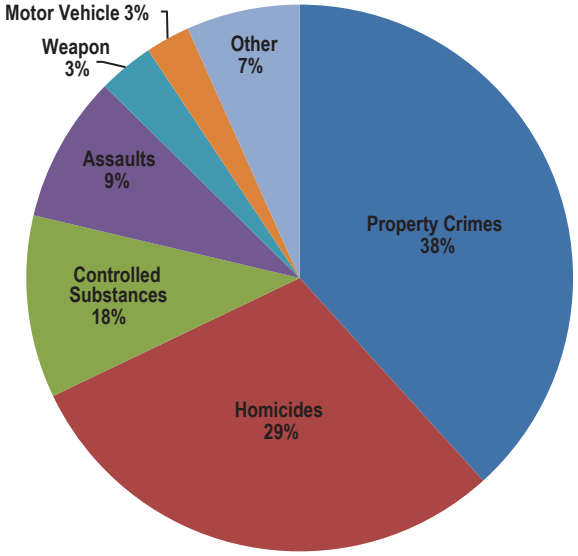
Until acquisition of a new footwear database the laboratories were limited in their ability to complete footwear cases without a submitted footwear standard from the agency. The Solemate FPX database will allow the WSCL to routinely accept cases, without a standard, in an effort to provide investigative leads by searching key features of a footwear impression taken at a crime scene. Information obtained for an investigative lead may include make, model, date of release and images of the shoe print, including soles and uppers. As the internal stock of footwear overlays increases, this technology also provides the means to create a laboratory reference database, aptly used for size comparison purposes. Additionally, for cases submitted with standards, the laboratories are developing criteria to support a database search when an exclusion conclusion is rendered. This too has the potential to provide investigative lead information to agencies.

Forensic Imaging Caseload

The Forensic Imaging Unit (FIU) provides photo and video imaging and analysis services for state law enforcement agencies, attorneys and all disciplines within the WSCL. The FIU utilizes specialized equipment to digitally capture and recover information while maintaining a true and accurate record of physical evidence. The unit provides a wide range of forensic photography services including: high resolution and full spectrum imaging, 1:1 reproduction, video analysis, analogue to digital conversion and court exhibits (charts, enlargements, digital presentations). The FIU also offers a wide range of photography training to internal and external customers.

Imaging	2016	2017	2018
Case Intake	31	28	62
Case Output	41	30	59
Avg.Turnaround	133 days	94 days	62 days

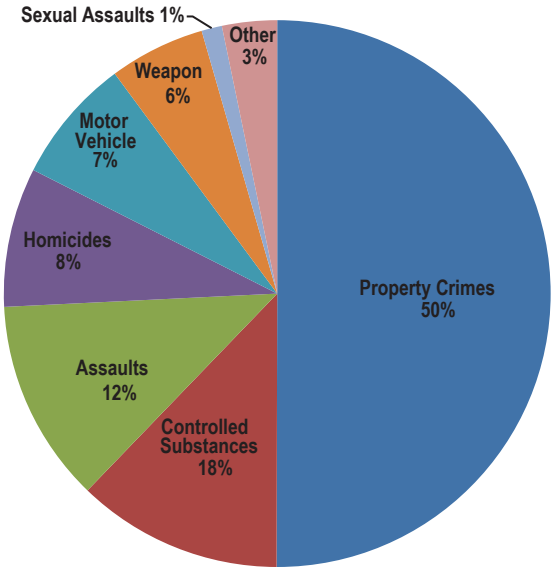
Work Orders	2016	2017	2018
Case Intake	621	683	698
Case Output	691	663	671
Avg.Turnaround	58 days	30 days	32 days



As demonstrated by the graph, a majority of the caseload in the unit is from homicides, property crimes, and possession of a controlled substance.

Latent Print and Footwear Caseload

The Latent Print and Footwear Unit develops and recovers friction ridge and footwear impression evidence using a variety of physical and chemical processing methods. When suitable fingerprints or impressions are developed, they are examined and compared with known standards to establish an identification or exclusion. Due to the nature of the work, the unit works closely with the AFIS and FIU, and as such their workload directly impacts those two areas.



As demonstrated by the graph over 50% of the cases worked in the unit are from property crimes and possession of a controlled substance.

Latent Print	2016	2017	2018
Case Intake	2182	1894	1304
Case Output	2093	1836	1706
Avg.Turnaround	136 days	168 days	224 days

Footwear	2016	2017	2018
Case Intake	63	39	19
Case Output	72	66	26
Avg.Turnaround	259 days	269 days	256 days

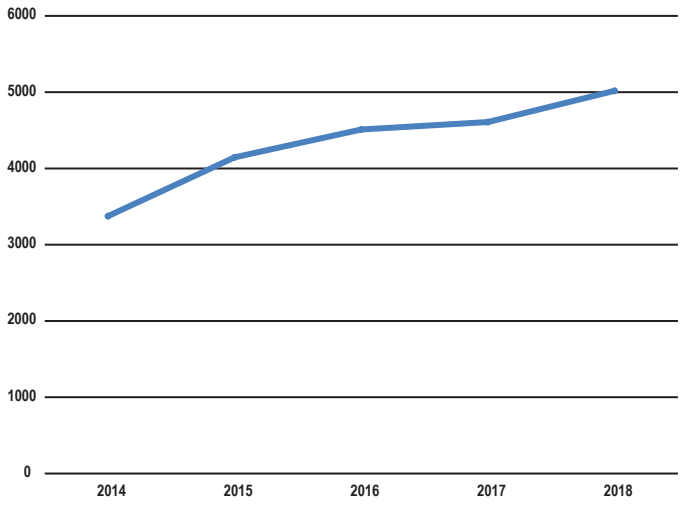
Deoxyribonucleic Acid (DNA) Section

The primary function of the DNA Section is to analyze and compare biological material from evidence and/or individuals required by Wisconsin state law to provide a reference DNA sample. At the WSCL the DNA Section consists of two units: DNA Analysis and DNA Databank.

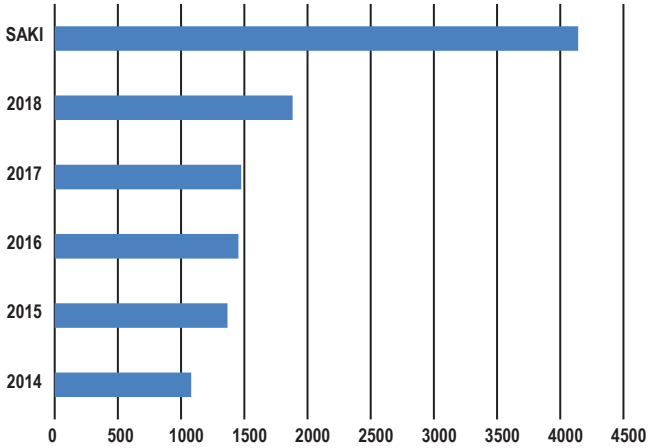
DNA Analysis	Examine evidence for the presence of biological material. Develop, analyze, and interpret DNA profiles utilizing scientific techniques. Compare DNA profiles with known standards to establish identity/exclusion/association and conduct database searches.
DNA Databank	Receive, verify acceptability, develop, analyze and maintain a repository of reference DNA samples in the Combined DNA Index System (CODIS).

DNA Analysis Output

The DNA Section was impacted heavily by the large WiSAKI project. The DNA Analysis Unit also observed several challenges which had a direct impact on the output of active cases. These challenges included technology updates which resulted in new equipment and validations, training of new personnel for LTE and grant funded positions, and a much-needed refresh of the DNA Submission guidelines, which made submitting evidence clearer for agencies. All aforementioned alterations occurred simultaneously with an increase of violent felony submissions and completion of the WiSAKI project. The DNA Databank Unit was also significantly impacted by personnel turnover, the WiSAKI project as well as processing all DNA Databank samples in house. Throughout these challenges, the DNA Databank Unit maintained effective reporting to agencies as well as a Familial Search Program with requests from agencies across the nation. Despite changes and challenges in the DNA Section, both units have displayed resiliency and maintained a high level of output.



Wisconsin's Sexual Assault Kit Initiative (WiSAKI) : Inventory



This graph demonstrates the number of sexual assault testing completed in each calendar year in comparison to the number of WiSAKI kits tested in two years.

All 557 law enforcement agencies, and all hospitals conducting forensic exams, submitted their kit inventory information to the Department of Justice (DOJ). Approximately 6300 kits were stored in WI, and of these, over 4100 sexual assault kits were designated for testing. The two major reasons why over 2000 kits inventoried were not designated for testing: there was already a conviction related to a sexual assault case investigation for which a kit was collected and stored untested (stored due to WI Statute 968.205), or the victim did not consent to testing of the kit (due to WI Statute 175.405).

WiSAKI: Laboratory Involvement and Impact

WSCL was tasked with maintaining, tracking and analysis of the WiSAKI inventory before and after submission to the vendor laboratories. In August of 2017, the first vendor lab completed cases started to be returned to WSCL. By the end of September 2018, all 4,142 sexual assault kits originally inventoried submitted to the vendor laboratories was completed. However, as final inventories were received and being reviewed by agencies, some additional kits were identified in 2018 and smaller shipments to the vendor labs continued into December 2018. As part of the entire process, the WSCL identified a 34-member DNA Analytical team that was responsible for reviewing each case from the vendor laboratories. This team was over half of the DNA analysts at the WSCL whom assisted with the WiSAKI project, which impacted our resources in working active DNA case submissions.

If a case was deemed positive (foreign DNA was identified from the kit), a separate WSCL report was generated by the WSCL DNA analyst and dual notification was made to the law enforcement agency and DOJ DCI WiSAKI special agents. This allowed for follow up with the law enforcement agency, and the offering of assistance from our DOJ SAKI team.

If a positive case had a profile eligible for CODIS entry, this was addressed in the WSCL report. If the uploaded DNA profile received a hit in CODIS to another case, or offender sample, a WSCL Databank report was issued, again using the dual notification process.

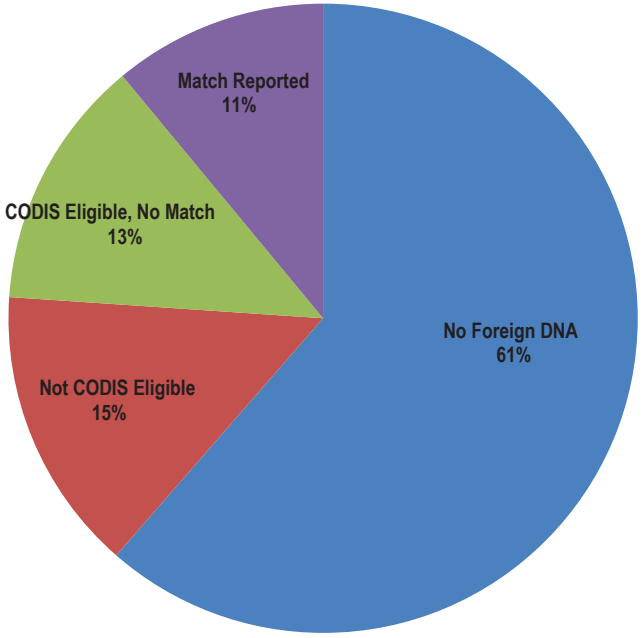
If a case was deemed negative, the vendor lab's report was simply issued to the investigating law enforcement agency. No dual notification to the DCI special agent was made.

A cover letter from the forensic scientist supervisor accompanied a dual notification letter for every set of vendor/laboratory case reports issued to the investigating law enforcement agency.

WiSAKI: CODIS Hit Impact

At the end of the case review, approximately **39%** of the sexual assault kits tested resulted in foreign DNA being identified. Of these 1598 cases, **62% had profiles eligible for entry into CODIS**, and **46% have linked to another case or arrestee or offender profile in CODIS**. CODIS has linked WiSAKI case profiles to CODIS profiles from 15 other states in the United States.

	Cases
No Foreign DNA	2544
Not CODIS Eligible	607
CODIS Eligible, No Match	535
Match Reported	456



WiSAKI Case Impact

Over 4,850 hours were expended by analysts assisting with the WiSAKI project. That means, in total, analysts spent over 15% of their time dedicated to completing this project in 2018 alone. Assuming an average case takes 14 hours to complete almost 350 active cases were delayed during this project causing the pending case load to grow to over 1,100. With the completion of WiSAKI, efforts in 2019 are again focused on reducing the number of active pending cases.

DNA Analysis Caseload

The DNA Analysis Unit examines evidence for the presence of biological material and develops DNA profiles from this material. These DNA profiles are analyzed and interpreted by DNA Analysts utilizing specialized scientific techniques, equipment, and software. DNA Analysts generate reports of their findings which may include conclusions such as if a given individual can be included as a possible contributor to a DNA profile obtained from an item of evidence.

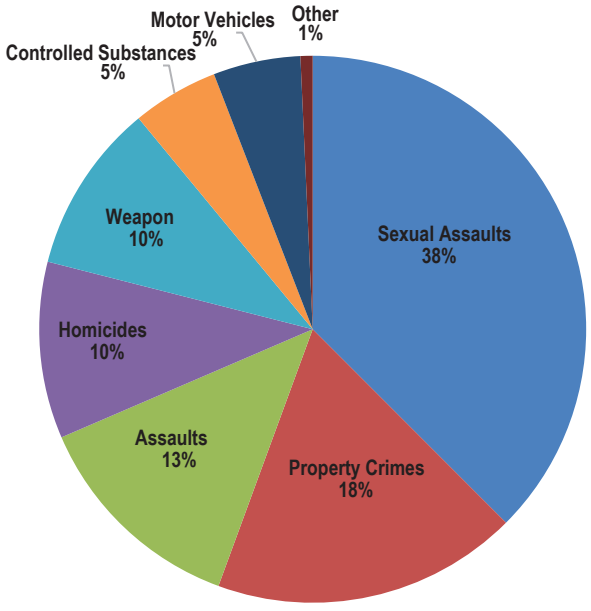
As a result of increasing DNA case submission rates, and the continually evolving field of forensic DNA analysis, the WSCL DNA Unit is regularly evaluating and implementing new technologies to further increase the quality and expediency of the analysis it performs. Recent method improvements such as updated capillary electrophoresis DNA testing equipment and more efficient automated DNA processing techniques were successfully integrated into the DNA Analysis Unit in 2018. Additionally, updated DNA case submission guidelines, and the WSCL creation of a forensic case manager, have assisted with education of law enforcement agencies on the proper evidence and case types for DNA analysis.

Currently, the DNA Analysis Unit is evaluating technologies such as computer driven mathematical analysis of DNA profiles, known as probabilistic genotyping, which is expected to increase both quality and timeliness of DNA testing. The combination of these efforts is anticipated to have an increasingly positive impact on the DNA Analysis Unit and the customers it serves.

	2016	2017	2018
Case Intake	4675	5311*	8626*
Case Output	4199	4782*	5664*
Avg.Turnaround	61 days	76 days	80 days

*Intake and output in the DNA Analysis Unit was impacted by WiSAKI as demonstrated in the previous sections.

The graph demonstrates the case types observed without the contribution of WiSAKI. With the contribution of WiSAKI over 60% of the cases received in 2018 were related to sexual assaults.



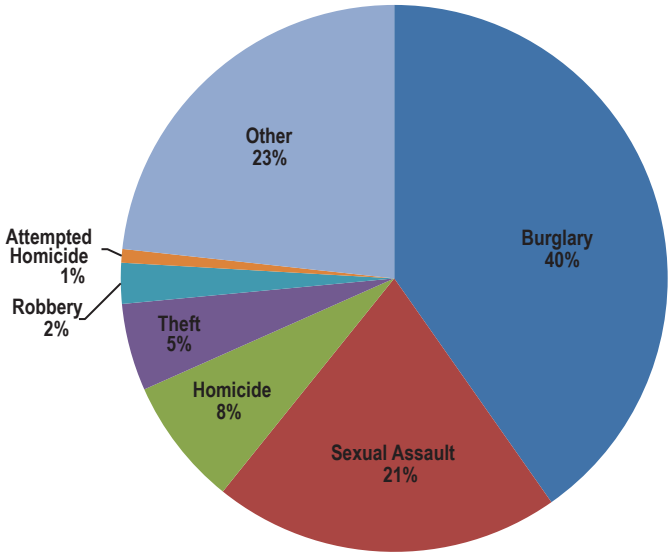
DNA Databank Intake and Investigative Leads

In 2018, the DNA Databank received almost 30,000 reference DNA samples, greater than 60% of which were misdemeanors. The receipt of reference DNA samples is down 10% from 2017. This reduction was also observed in the quarterly intake numbers, with an average of 7,500 samples received per quarter.

The number of profiles uploaded and being searched has steadily increased throughout 2018. Due to the probable cause requirement there is a delay between when the arrest samples received are processed and uploaded to CODIS. Further, approximately 15% of the arrest samples received have been destroyed due to failure to establish probable cause. Importantly, misdemeanor samples continue to have a positive impact on investigative leads for high priority cases and accounted for over 30% of the matches reported out in 2018.

In 2018, a total of 1409 investigative leads, a record high, were reported by the Wisconsin DNA Databank. A little over 450 of the investigative leads provided were related to WiSAKI cases. The WiSAKI workload was also largely limited to three months which placed a tremendous burden on the unit while short staffed. Importantly, the team rose to the occasion to address the highest volume of investigative leads ever observed by the unit.

	2016	2017	2018
Sample Intake	36156	32963	29900
CODIS Upload	31730	31534	27610
Leads Reported	904	1098	1409



As demonstrated in the graph (WiSAKI cases have been eliminated) the case types involved in hits are relatively varied. In 2018, over 30% of the investigative leads provided to law enforcement were high priority or impacting sexual assaults and homicides.

Lastly, work flow and collection improvements have allowed the processing of offender reference DNA samples to be moved in house. Overall, this success has significantly decreased the cost, the turnaround time (decreased to under 30 days from 70) and eliminated the backlog in less than two years. Further, this has allowed the DNA Databank to support an additional project, Familial DNA Searching and provide it as a new tool for law enforcement.