

2015

# Forensic Laboratories Annual Report

Sedgwick County, Kansas

Regional Forensic Science Center  
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## **LABORATORY LEADERSHIP**

All laboratory managers are case-working and proficiency tested scientists.

### **Director and Chief Toxicologist**

*Timothy P. Rohrig, Ph.D., F-ABFT*

### **Chief of Criminalistics**

*Justin Rankin*

### **Toxicology Lab Manager**

*Kimberly Stephens, M.S.*

### **Forensic Biology/DNA Manager**

*Shelly Steadman, Ph.D.*

### **Quality Assurance Manager**

*Robert Hansen, M.S.F.S.*

## **LABORATORY MISSION**

*To serve the citizens of the Sedgwick County Kansas Region, by ethically providing accurate and unbiased scientific analysis of evidence to the law enforcement and judicial communities.*

## **INTRODUCTION**

The Regional Forensic Science Center officially opened on December 21<sup>st</sup>, 1995. The Center houses the Office of the District Coroner and the Forensic Science Laboratories [FSL]. The Forensic Science Laboratories are comprised of three major sections: Criminalistics, Forensic Biology/DNA and Forensic Toxicology. Within the Criminalistics Section are the Drug Identification Unit, Firearms / Tool Mark Unit, and the Trace (Fire Debris) Unit.

The FSL is staffed with highly-trained and experienced forensic scientists, many who have advanced scientific degrees [MS, MSFS, Ph.D.]. The technical staff has well over 200 years of combined professional experience. For 2015 laboratory staff consisted of 18 scientist and 3 support personnel.

In April of 1996, the Forensic Science Laboratories began accepting cases for firearms examinations. Three months later, the Biology Section provided forensic examinations for the identification of biological fluids. The Toxicology Laboratory began producing comprehensive examinations in post-mortem toxicology in support of the District Coroner in September of 1996. This was followed by the FSL providing forensic drug identification for local and regional law enforcement agencies. In November of 1996, fire debris analysis was added to the Criminalistics Section. In January of 1997, The Center opened the first STR DNA Laboratory in the State of Kansas.

Since 2003, the Forensic Science Laboratories have been accredited by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board [ASCLD/LAB] under the ASCLD/LAB-*Legacy* program.

In February 2014, the Laboratory Division was granted ASCLD/LAB-*International* accreditation for Forensic Testing Laboratories in the categories of Controlled Substances, Quantitative Analysis, Human Performance Forensic Toxicology, Post-Mortem Forensic Toxicology, DNA-Nuclear, Body Fluid Identification, Fire Debris,

Firearms, and Serial Number Restoration. The ASCLD/LAB-*International* accreditation program evaluates the laboratory's management system, and technical procedures and practices against criteria set forth in *ISO/IEC 17025:2005*, the testing laboratory requirements of the *ASCLD/LAB-International* Supplemental Requirements.

Striving for and meeting the requirements of the *ASCLD/LAB-International* program demonstrates the Center's commitment to excellence in the services we provide to our submitting agencies.

## **SIGNIFICANT ACHIEVEMENTS**

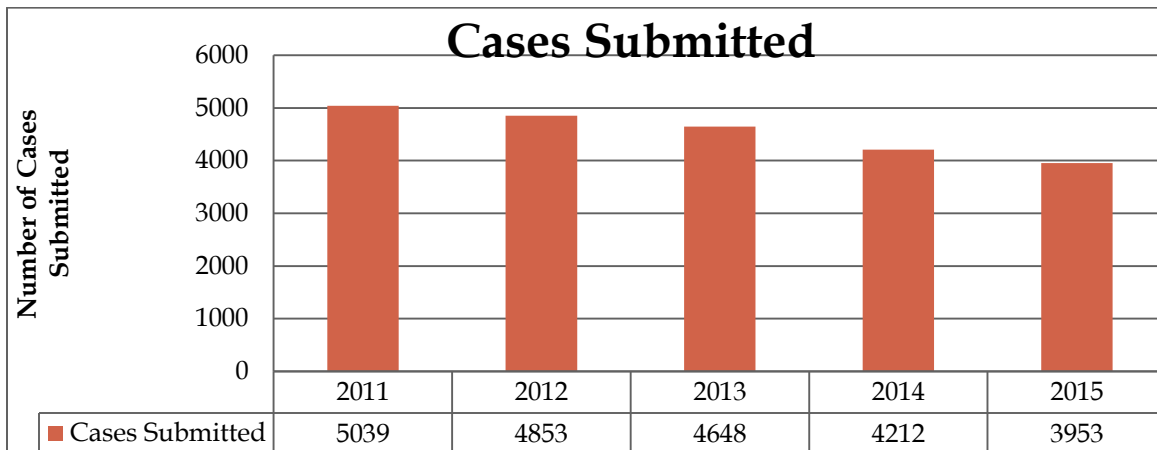
- Publications:
  - TP Rohrig and CA Hicks, "Brain Tissue: A Viable Postmortem Toxicological Specimen", *Journal of Analytical Toxicology*, 2015, vol. 39, 137-139.
  - Steadman, S., Hooper, S., Geering, S., King, S., and Bennett, M., "Recovery of DNA from latent fingerprint tape lifts archived against matte acetate", *Journal of Forensic Sciences*, 2015, 60:3, 777-782.
- The laboratory presented :
  - TP Rohrig, "Alcohol Facilitated Sexual Assault", presented at the Graduate Seminar Series in Forensic Science at Emporia State University, September 2015.
  - TP Rohrig, "Interpretation of Hair and Urine Drug Test Results", Kansas Alliance for Drug Endangered Children, Wichita, Kansas, September 2015.
  - TP Rohrig, "Postmortem Interpretation: Interpretive Considerations and Challenges", Society of Forensic Toxicologists Annual Meeting, Atlanta, Georgia, October 2015.
- Laboratory Staff enhanced their technical/professional expertise by attended several workshops / training sessions at conferences / symposiums, or webinars:
  - 67<sup>th</sup> Annual Scientific Meeting of the AAFS, February 18 – 20, 2015.
  - Troubleshooting Sample Preparation, February 19, 2015.
  - GeneMapper IDX Training and PowerQuant Demo and Training, March 9, 2015.
  - Everything You Need To Know About GC/MS Ionization Processes, March 24, 2015.
  - Mid-America 2015 Forensic DNA Conference, April 8, 2015.
  - Breaking Bad Chromatography Habits Seminar Tour 2015, May 21, 2015.
  - Hi-Point Firearms Familiarization, May 24 – 29, 2015.
  - 46<sup>th</sup> Annual AFTE Training Seminar, May 24 – 29, 2015.
  - Armourer's Course, May 28, 2015.
  - Quantifiler Trio and GlobalFiler Demonstration, May 27 – 28, 2015.
  - Ring of Fire, May 24 – 29, 2015.
  - MGT-416 Continuity of Government Operations Planning For Rural Communities, June 9, 2015.
  - Internal Auditor Training, August 10, 2015.

- 53<sup>rd</sup> TIAFT Meeting, August 30 - September 4, 2015.
  - Promega Technology Tour, September 24, 2015.
  - The Utilization of LC-MS-MS in Development of Solid-Phase Extraction Methods, September 25, 2015.
  - False Positive and False Negative Error Rates in Cartridge Case Comparison, September 25, 2015.
  - Postmortem Toxicology: From Autopsy to Interpretation, October 19, 2015.
  - GC Troubleshooting in 20 Pictures (Part 1), October 26, 2015.
  - Regioisomer Differentiation for Substances Using GC-IR, November 4, 2015.
  - 21<sup>st</sup> Annual National CODIS Conference, November 17 - 18, 2015
  - ASCLD/LAB - International Assessor Training, December 7 - 11, 2015.
  - GC Troubleshooting in 20 Pictures (Part 2), December 17, 2015.
  - The Law, Ethics, and DNA Interpretation, December 30, 2015.
- 2015 Grant Funding:
    - Justice Assistance Grant [JAG] - \$43,000
  - Visiting Professor
    - Toxicology Laboratory hosted Dr. Mark Baron from the University of Lincoln, United Kingdom for a one week sabbatical.

## **FORENSIC SCIENCE LABORATORIES SERVICE OVERVIEW**

### **Case Submissions**

The Forensic Science Laboratory continues to experience a significant demand for its expert services. The five year average of cases submitted is 4541. **Figure 1** illustrates the number of forensic laboratory cases submitted for examination for the past 5 years.



**Figure 1** Number of forensic laboratory cases submitted for examination (law enforcement and District Coroner post-mortem evidence submissions).



## Sedgwick County vs. Out-of-County Cases

The Sedgwick County Regional Forensic Science Center serves as the principle Forensic [Crime] Laboratory for all of Sedgwick County Law Enforcement Agencies and provides forensic services to many other counties and municipalities within the state of Kansas [Table 1]. However, the vast majority of forensic laboratory services were provided for Sedgwick County Law Enforcement agencies (~95%). A significant portion of the out-of-county cases was in support of the Sedgwick County Coroner's out-of-county autopsies.

**Table 1:** Contributing Agencies

Alcohol Tobacco and Firearms	Goddard USD 265 Police Dept.	Overland Park Police Department
Barber County Coroner	Greenwood County Coroner	Park City Police Department
Bel Aire Police Department	Hamilton County Coroner	Pratt County Coroner
Butler County Coroner	Harper County Coroner	Reno County Coroner
Cheney Police Department	Harvey County Coroner	Riley County Police Department
Clearwater Police Department	Haysville Police Department	Salina Police Department
Cowley County Coroner	Hodgeman County Coroner	Sedgwick County Coroner
Drug Enforcement Agency	Kansas Highway Patrol	Sedgwick County Sheriff
Derby Police Department	Kansas Bureau of Investigations	Shawnee County Coroner
Dodge City Police Department	Kingman County Coroner	Sumner County Coroner
Eastborough Police Department	Kiowa County Coroner	Valley Center Police Department
ELDorado Correctional Facility	Labette County Coroner	Wichita Fire Department
Elk County Coroner	Maize Police Department	Wichita Police Department
Ellis County Coroner	McPherson County Coroner	Wichita State Univ. Police Dept.
Garden Plain Police Department	Mount Hope Police Department	Winfield Corrections
Goddard Police Department	Mulvane Police Department	

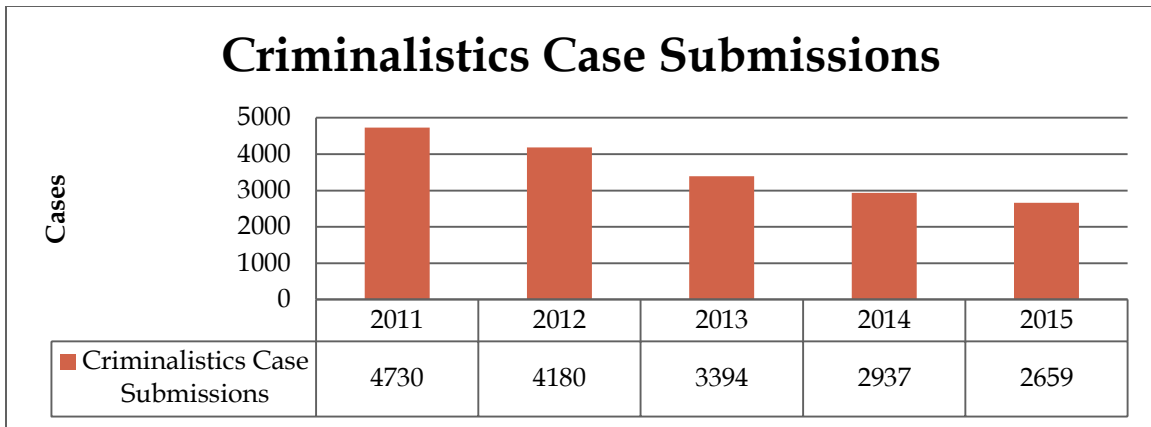
**Table 1:** List of law enforcement agencies, fire departments, and county coroners the forensic laboratories provided services for in 2015.

## CRIMINALISTICS SECTION

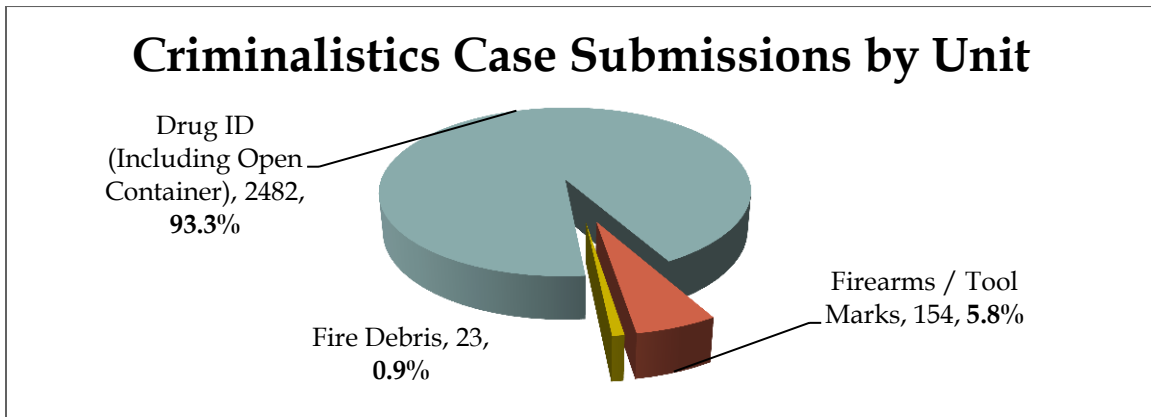
The Criminalistics Section receives the majority of the cases submitted to the Forensic Laboratories. The Criminalistics Section provides forensic examinations in Drug Identification, Open Container [Beverage Alcohol] Analysis, Firearms & Tool Marks, Serial Number [Firearms] Restoration and Trace Evidence [Fire Debris]. **Figure 4** illustrates the trend in forensic case volume submitted to the Criminalistics Section. **Figure 5** illustrates the volume and percentage of cases submitted to each unit of the criminalistics section.

Starting in 2012, each section of the Center started counting cases in a more uniform manner, so that cases with subsequent submissions only get counted once per unit. This accounts for the majority of the case submission count drop between 2011 and 2012.

In 2013, the Drug ID Laboratory started actively working with the Wichita City Prosecutors Office and Wichita Police Department on being more selective on what cases to submit for analysis. Since that time, cases that are submitted are those necessary for charging and/or prosecution. This change in policy is responsible for the majority of case submission decrease outlined in **Figure 4**. Also, this has provided a quicker turn-around time on cases and a more efficient use of laboratory resources.



**Figure 4** Number of cases submitted for analysis to the Criminalistics Section, which includes Drug ID, Firearms / Tool Marks, and Fire Debris over a five year period.

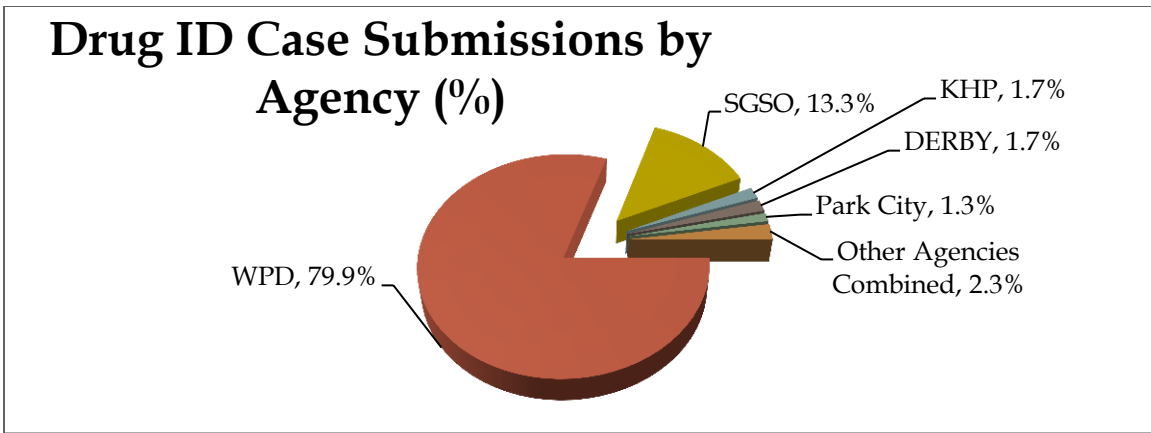


**Figure 5** Volume and percentage of cases submitted for each Criminalistic Laboratory Section.

## Drug ID Unit

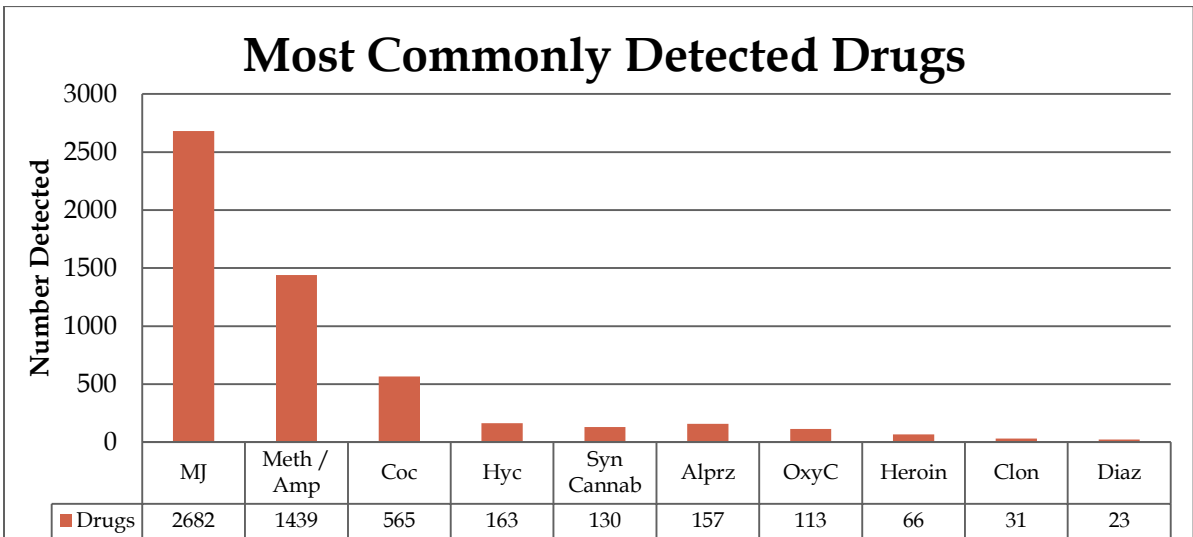
The majority of cases submitted to the Criminalistics Section [Figure 5] are for illicit drug identification. Open Container is the second most abundant case type, accounting for approximately 11% of the cases submitted for analysis to the section, and includes cases with and without associated drug evidence. Open container cases submitted without associated drugs accounted for 8.9% of total cases submitted to Drug ID.

The agency that submits the greatest volume of drug evidence is the Wichita Police Department [WPD]. This is apparent in Figure 6, as nearly 80% of cases received are from the Wichita Police Department. Agencies other than the Wichita Police Department [WPD] and the Sedgwick County Sheriff's Office [SGSO], such as the Kansas Highway Patrol [KHP] and the Derby Police Department [Derby] comprise approximately 7% of the total cases submitted.



**Figure 6** Percentages of Drug ID cases submitted from the largest contributing agencies.

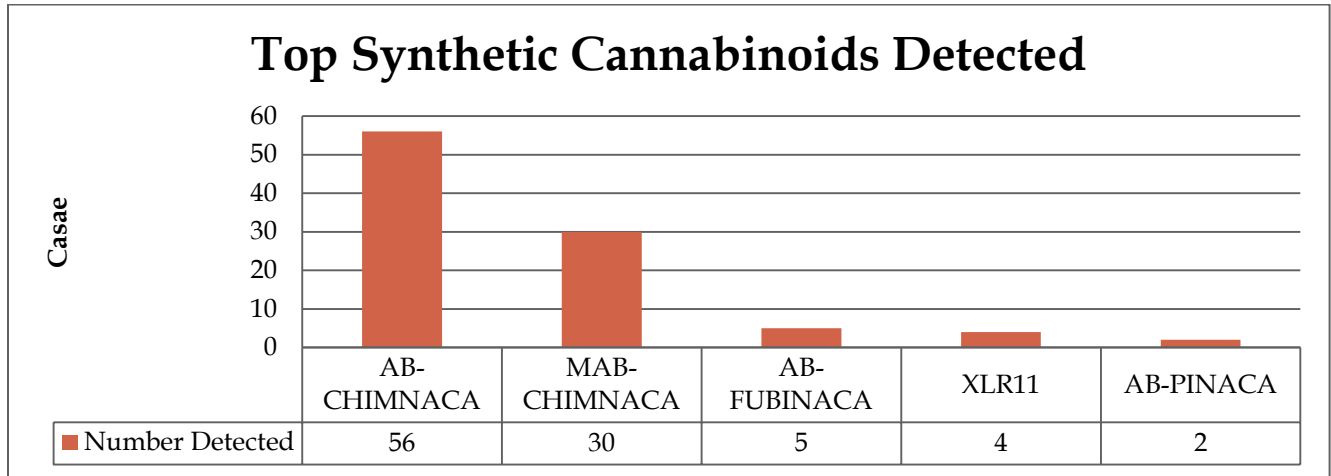
In 2015, the Drug Identification Unit examined thousands of exhibits for the presence of controlled substances. Consistent with years past, the majority of drug exhibits were identified as marijuana, cocaine, and methamphetamine. The section continues to see a steady submission of synthetic cannabinoids (“K2”, “spice”, “potpourri”) and designer stimulants (substituted cathinones aka “bath salts”). Designer Stimulants detection increased from 9 in 2014 to 22 in 2015. Also, the unit performed 99 methamphetamine quantitations and 67 cocaine base / salt form determinations (FTIR), which are required for federally charged cases. **Figure 7** illustrates the count for each of the seven most commonly detected drugs by the Drug ID Unit.



**Figure 7** Ten (10) most commonly detected drugs from 2015 examinations were Marijuana (MJ), Methamphetamine/ Amphetamine (Meth/ Amp), Cocaine (Coc), Hydrocodone (Hyc), Synthetic Cannabinoids (Syn Cannab), Alprazolam (Alprz), Oxycodone (OxyC), Heroin, Clonazepam (Clon), and Diazepam (Diaz).



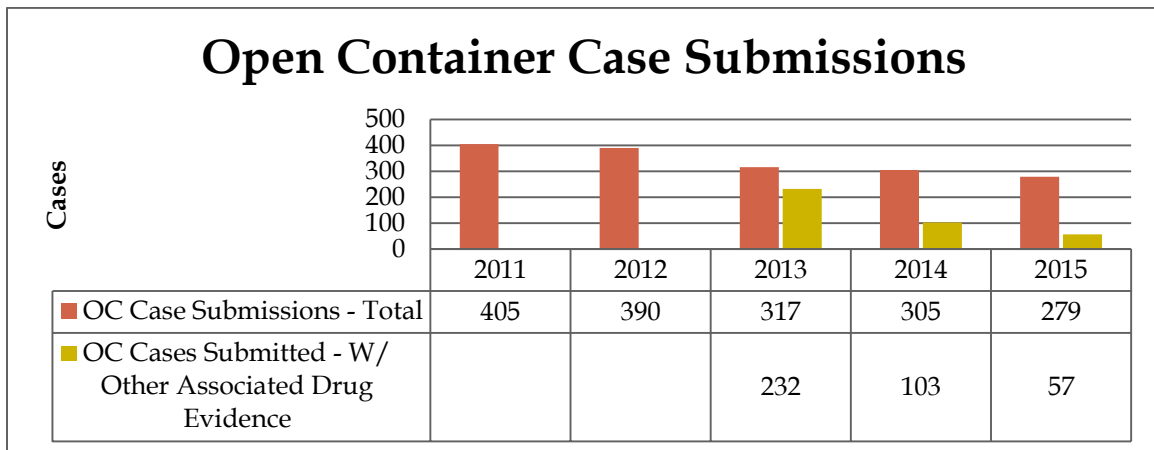
Synthetic Cannabinoids have been detected in many of Drug ID casework samples in 2015. **Figure 8** illustrates the five most commonly detected.



**Figure 8** Five most commonly synthetic cannabinoids detected from 2015 examinations.

### Open Container / Beverage Alcohol

Open Container/Beverage Alcohol analysis is conducted in support of the state and local DUI laws, prohibition of minors to possess alcohol, and other liquor law violations. **Figure 9**, illustrates the number of open container cases submitted between 2011 and 2015.

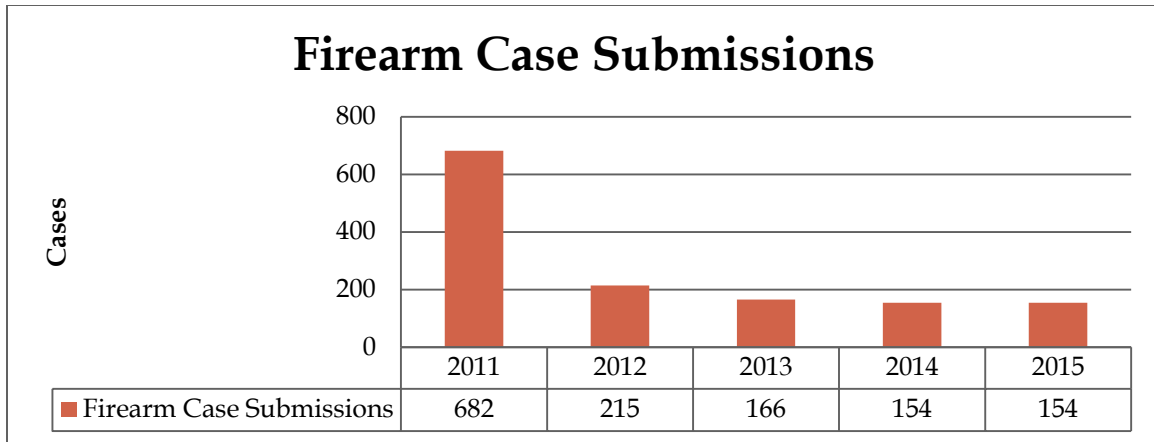


**Figure 9** Number of open container cases submitted. Data for 2015 includes the number of open container cases submitted that also had other controlled substances submitted (i.e. marijuana, cocaine, etc.). The blanks in the chart indicate that there is no data for this calculation for 2011 or 2012.

## Firearms/Tool Marks Unit

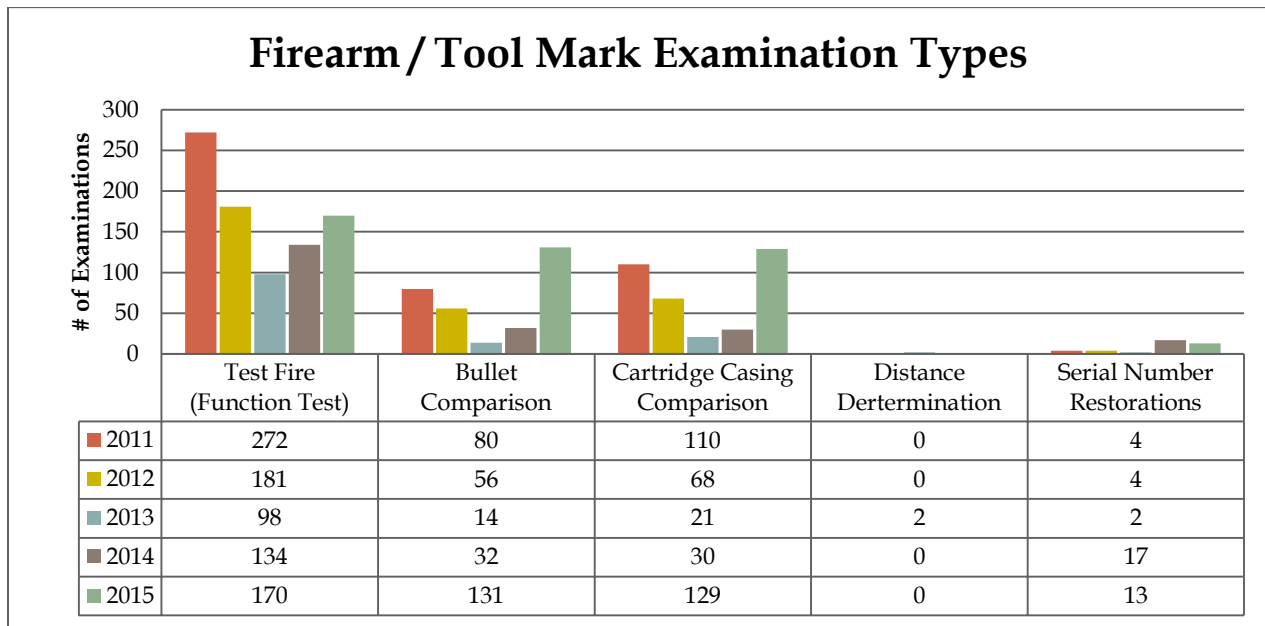
Firearm and Tool Mark examination is conducted to support state and federal laws. The Firearms/Tool Marks Unit conducts many types of forensic examinations. The majority of examinations involve operability (function) tests on the submitted firearms. As shown in **Figure 10**, the number of cases submitted to the unit has remained relatively constant over the last several years.

The “drop” in the number of cases from 2011 to 2012 is due to the use of an updated / uniform method of calculating case submissions. Subsequent submissions under the same case number are no longer included when counting case submissions within this Unit.



**Figure 10** Firearm / Tool Mark case submissions from 2011 through 2015.

**Figure 11** outlines the case types (test fire, bullet comparison, cartridge casing comparison, distance determination, serial number restoration) that were examined during the year. Omitted from the figure is Tool Marks, which consisted of one examination.

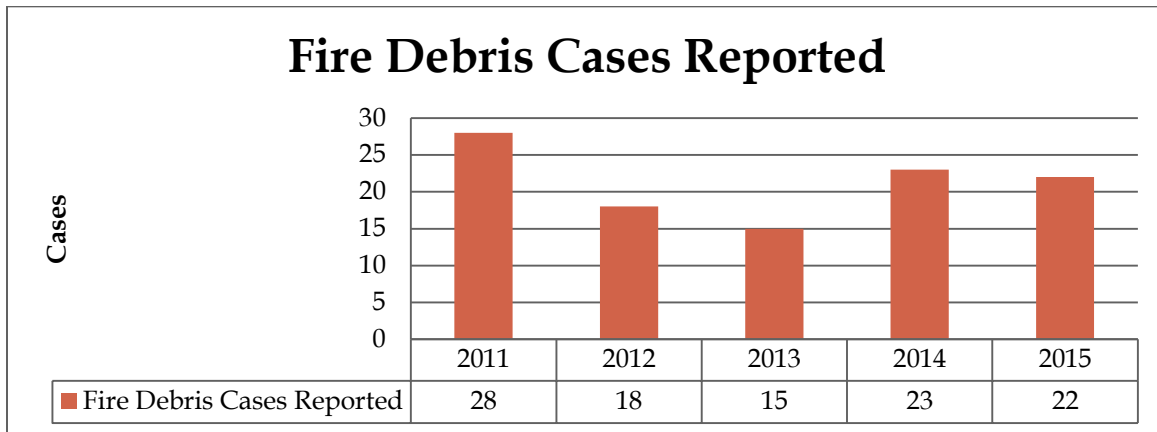


**Figure 11** Case types examined in the Firearms / Tool Marks unit; classified as test fires, bullet comparisons, cartridge case comparisons, distance determinations, and serial number restorations.

## Trace Evidence Unit

The Trace Evidence Unit at the Center examines fire debris cases in support of fire investigations. The information provided to the investigator aides in determining if a fire was accidentally or intentionally set for purposes ranging from insurance fraud to homicide.

In the first full year of performing casework since reinstating the section, Fire Debris reported 23 cases. The trend of case submissions over the last five years is illustrated in **Figure 12**.



**Figure 12** Number of fire debris case reports issued over a five year period.

## FORENSIC BIOLOGY/DNA SECTION

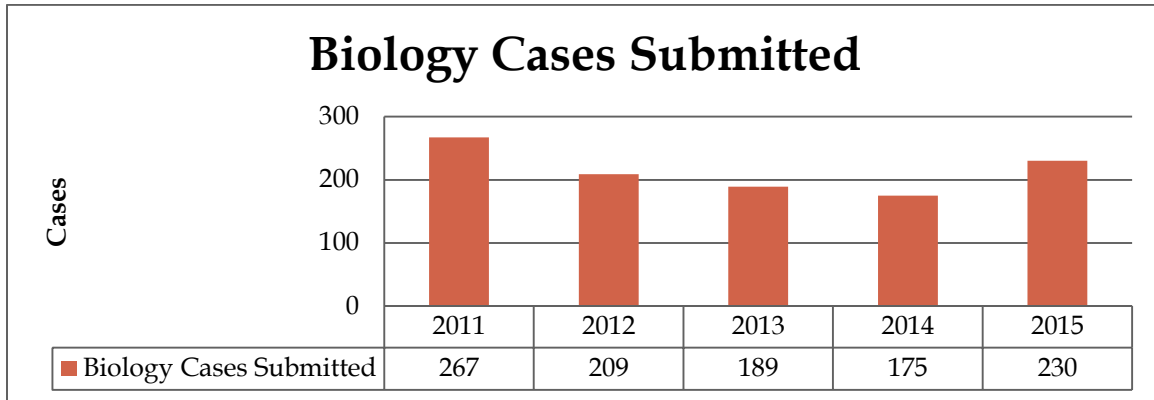
The Biology/DNA Section examines evidence from a variety of cases including, sex crimes (rape, indecent liberties, incest, etc.), homicides, property crimes, assaults, and forensic identifications (unidentified bodies).

The section screens evidence for the presence of biological evidence (blood, semen, saliva, feces, and urine). For DNA analysis, the section generates short tandem repeat (STR) profiles from biological material left at crime scenes. Once profiles are established from the scene exhibits, they can be compared to reference standards collected from individuals believed to have some association to the scene (victims, suspects, or other known individuals). Ultimately, results are interpreted and a conclusion drawn as to whether the reference standard profiles are consistent with or excluded from the crime scene profiles. The nature of forensic samples collected at crime scenes vary greatly and can result in high quality single source profiles (fresh blood stains). Alternatively, the samples may have been left by multiple individuals or exposed to environmental elements (low quantity/degraded samples). All of these factors affect the laboratory's ability to obtain a comparable profile and statistical analysis is performed by analysts so that power of discrimination can be clearly presented to a jury when an association is made between a reference sample and a scene exhibit.

In 2015, the Biology/DNA section received 230 cases for forensic DNA examination. The trends of case submissions over the past five years are illustrated in **Figure 13**. While there has been a decline in the number of cases submitted since 2011, this does not reflect the number of exhibits per case, nor does it reflect the complexity of those exhibits.

The challenging nature of the DNA samples submitted for DNA analysis is illustrated by the routine need to consume the evidence for testing due to the limited size and/or compromised nature of samples collected at crime scenes. In 2015, 37% of Biology Section cases involved consumptive testing and 56% of all forensic questioned items submitted were consumed. Notification processes involved with consumptive testing lengthen the timeline for conducting the analysis, and the associated judicial processes generally commence after the submission to the lab has been made.

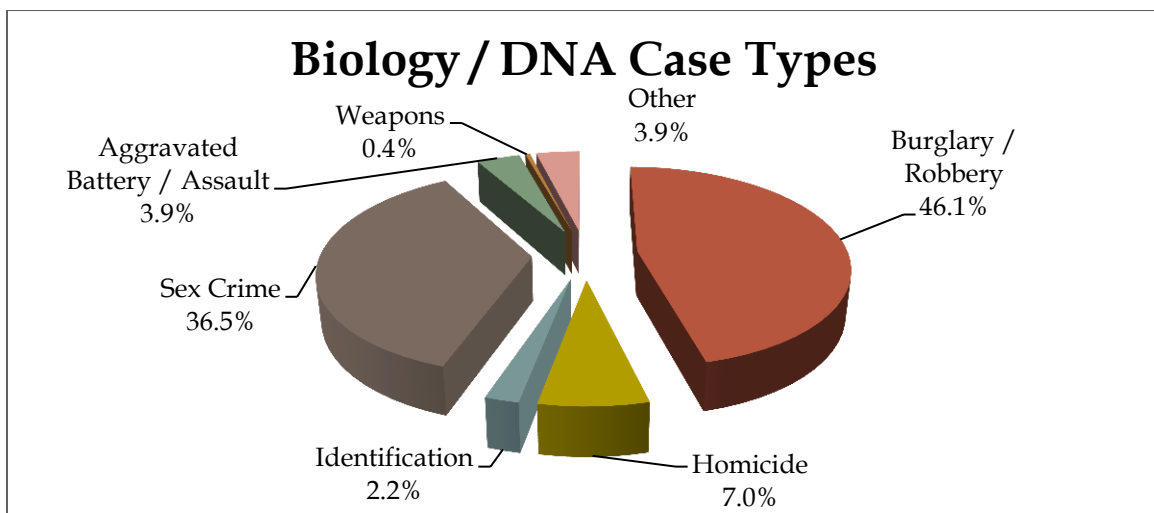
Also, the number of CODIS entries, associated hits generated, and oversight of this database, entails a large amount of scientist time. Samples compared as a function of database management are not reflected in the number of cases submitted or accounted for as a separate “case type” in the figures below.



**Figure 13** Number of cases submitted to the Biology / DNA Section over a five year period.

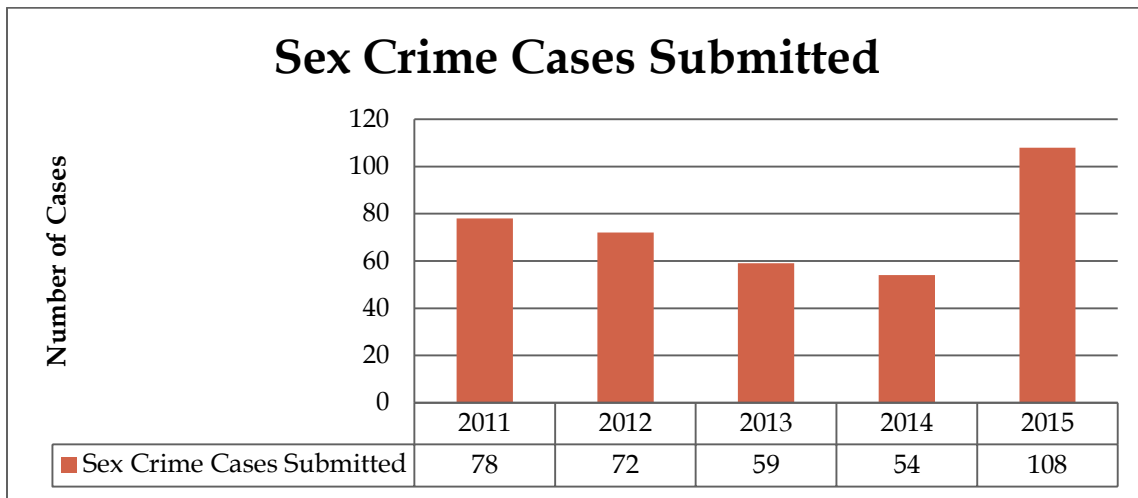
As depicted in **Figure 14**, over half of the cases submitted for biological examination are robbery/burglary with sex crimes being the second overall.

Property crimes continue to be processed if the evidence submitted has a high likelihood of resulting in a profile suitable for CODIS entry. Given that these crimes have a high recidivism rate, they have an exceptional solvability factor when crime scene profiles are searched against the database.



**Figure 14** Classification of cases submitted for Biology/DNA analysis. Four percent (4%) of the case types are categorized as other. This category may include cases involving arson, vandalism, auto theft, attempted murder, vehicular homicide, narcotics, stalking, etc. The section identified human remain(s) in five (5) cases through Forensic DNA analysis.

**Figure 15** illustrates the number of Sex Crime cases submitted to the Biology / DNA Laboratory over the last five years. In 2015, the laboratory saw a 100% increase in case submissions over the number submitted in 2014 and a 61% increase over the previous four year average.

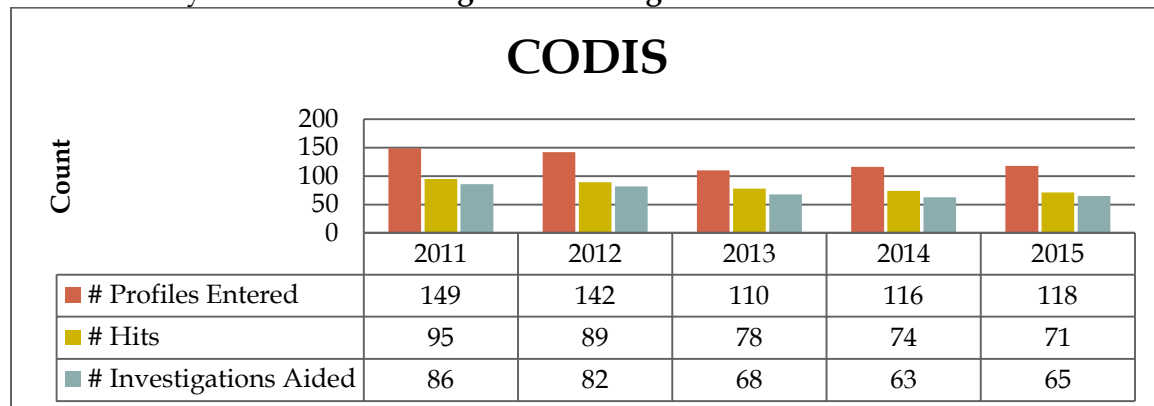


**Figure 15** Count of Sex Crime cases submitted to the Biology / DNA Laboratory over the last five years.

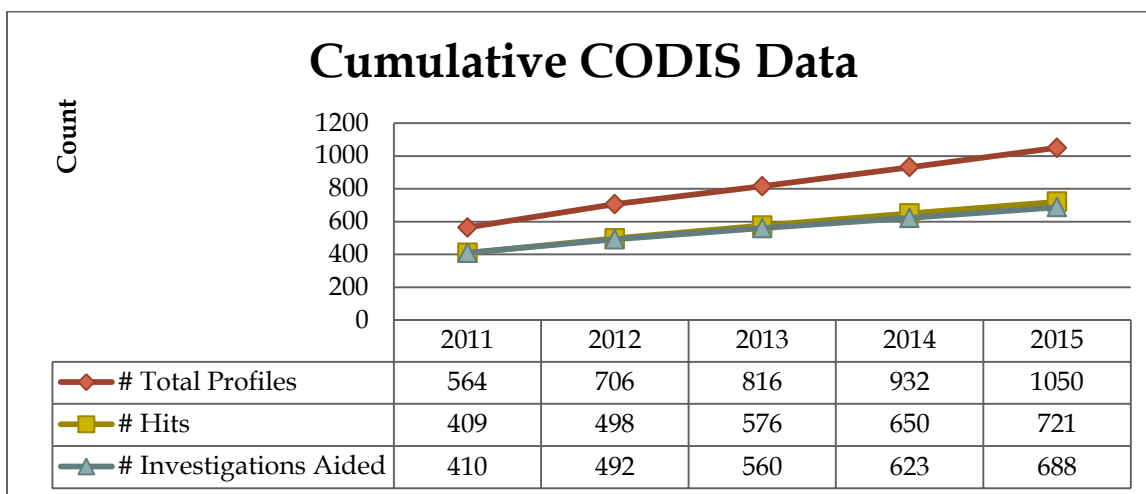
## CODIS

In 2007 Kansas became an all arrestee state, meaning that law enforcement will collect DNA samples for any person arrested for qualifying offenses. The DNA profile generated from the arrestee/offender is inputted into the state database (SDIS) in Topeka, KS and is available to be searched against the unknown profiles the section enters into our local database (LDIS). In late 2009, the Sedgwick County DNA Laboratory adopted new procedures for the release of investigative lead information, to include formal written and reviewed notifications for database associations.

Ultimately, the increased number of associations resulted in an increase in reports generated, as well as an increase in the number of known samples processed to confirm and prosecute these additional CODIS hits. All factors taken together caused a spike in workload that was realized in 2010 and continued throughout 2011. By 2012, the vast majority of the backlogged offender samples had been added to the database and the increase in workload due to CODIS investigative leads begins to level off. Trends in CODIS activity are illustrated in **Figure 16** and **Figure 17**.



**Figure 16** As the CODIS database expands at the local, state, and national level, the number of reports issued will increase accordingly.



**Figure 17** Number of profiles entered, number of hits, and the number of investigations aided beginning in 2010. The graph and chart depict data from the most recent five years. Since 2010, the average number of profiles entered into CODIS annually is 127 per year, the number of hits average 81 per year, and investigations aided average 73 per year.

### Biology/DNA Reporting

The Biology / DNA section issued 396 reports in 2015. A substantial number of these were related to associations made by the CODIS database. As outlined in **Table 2**, 77 were Offender Hit Notifications, which is when a forensic unknown sample hits to a convicted offender sample at the state or national level. Once an offender name is provided to law enforcement, standards are collected and submitted for analysis and comparison to all of the evidence in the case. In 2015, this resulted in 23 confirmation reports. Associations made within the Local DNA Index System (LDIS) resulted in a total of 32 additional notifications/reports.

Each report and associated case record goes through a review process. While the process has always included a technical review when a record contains technical data and an administrative review on all case records, accreditation requirements mandate that with each hit a formal notification be provided to the investigating agency. This requirement has increased the time spent reviewing case records substantially.

**Table 2:** CODIS Reporting

	Total Reports	Offender Hit Notifications	Confirmation Reports	LDIS Match Reports	LDIS / Offender Hit Notifications	LDIS / Confirmation Reports
2013	331	59	22	19	N/A	N/A
2014	299	55	25	31	N/A	N/A
2015	396	77	23	26	4	2

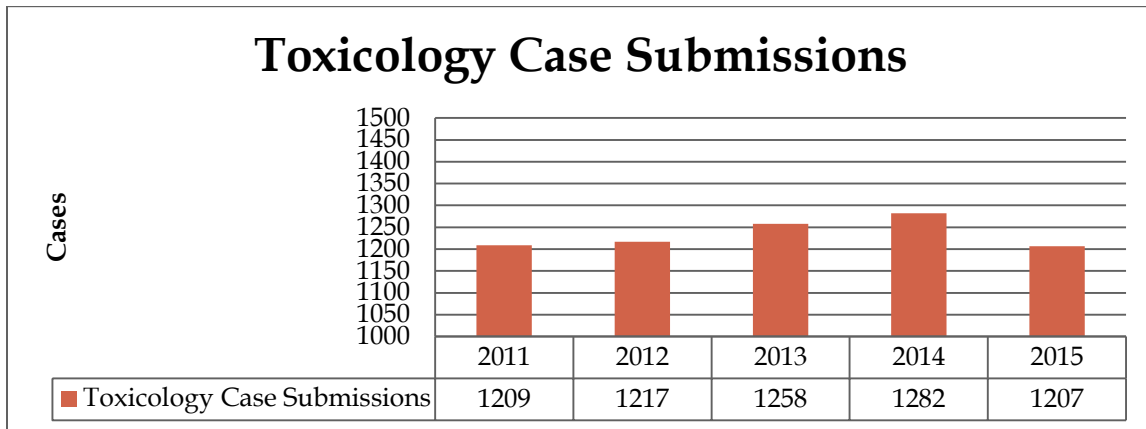
**Table 2:** Total reports issued and the number of CODIS related reports / notifications for 2013 and 2015.

## FORENSIC TOXICOLOGY SECTION

The Forensic Toxicology Section provides comprehensive examinations of post-mortem [autopsy] samples to assist in the determination of cause and manner of death. Specimens collected during the investigation of driving-under-the-influence-of-drugs/alcohol cases and drug-facilitated sexual assault cases are also examined by this section. The Toxicology Laboratory also provides drug testing on children removed from clandestine methamphetamine laboratories.

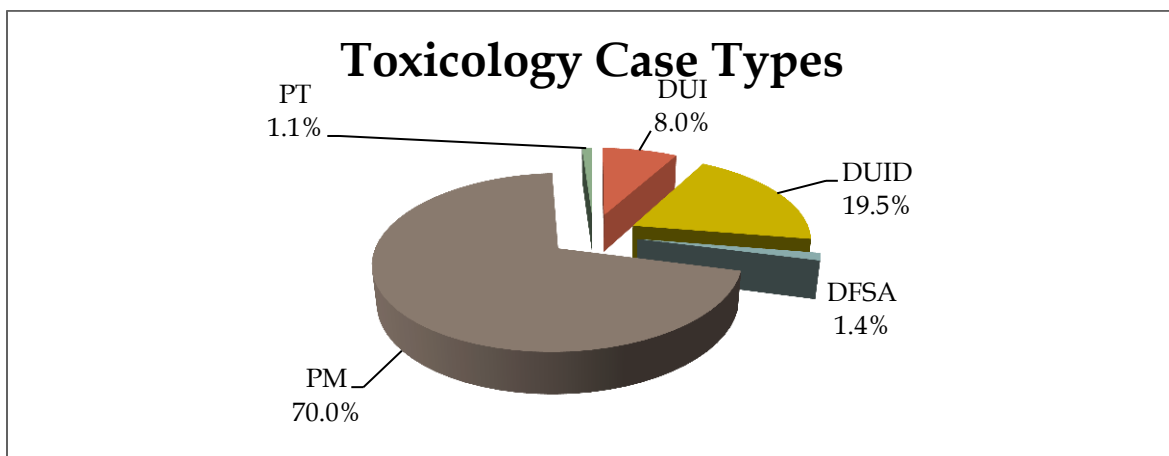
The section continues to expand the number of drugs and poisons it can detect and quantitate.

As illustrated in **Figure 18**, the number of cases submitted has stayed relatively flat over the last five years.



**Figure 18** Number of cases submitted to the Toxicology Section for analysis over a five year period. A significant portion of samples submitted are post-mortem cases, the number of which is dependent upon the number of autopsies performed at the Center.

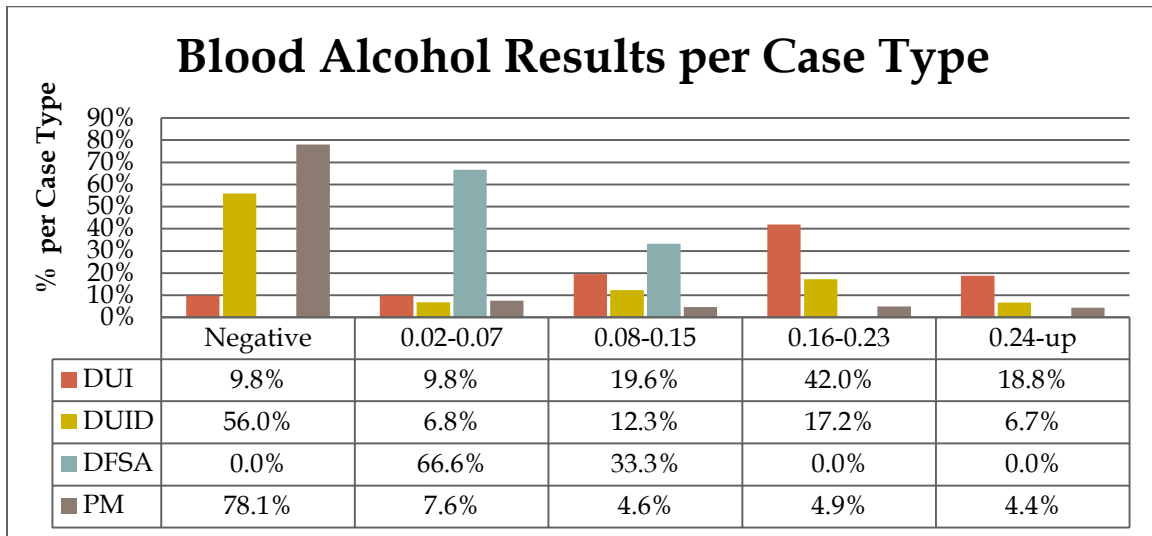
**Figure 19** depicts the percentage of toxicology cases submitted by case type. Toxicological examinations in support of the District Coroner (PM) account for approximately two-thirds of the forensic case work performed by the section.



**Figure 19** Submission of toxicology cases, sorted by case type. DUI (Driving Under the Influence of Alcohol), DUID (Driving Under the Influence of Drugs), PM (Post-Mortem), DFSA (Drug Facilitated Sexual Assault), and Proficiency Tests (PT).

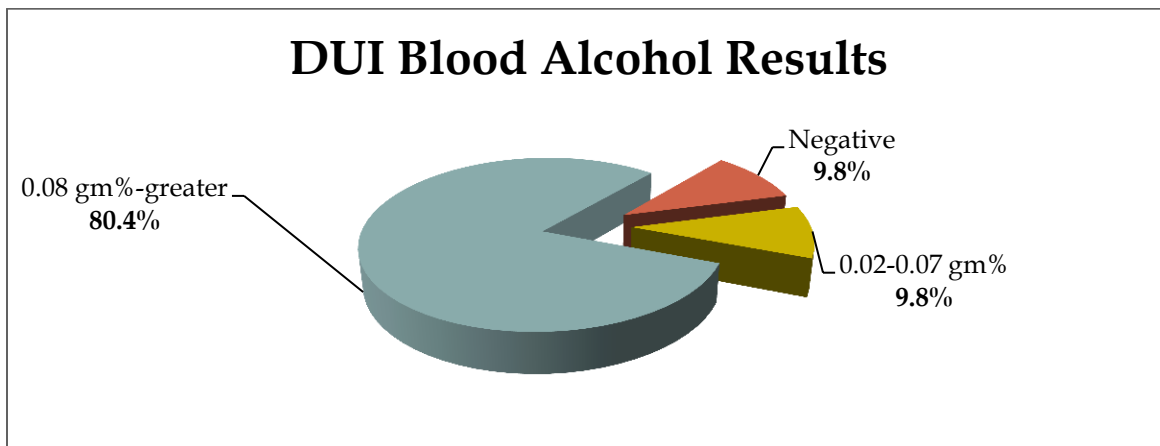
## Alcohol and Drugs

Alcohol continues to play a significant role in all of the FSL toxicology case types [Figure 20]. In approximately 61% of the toxicology alcohol positive DUI cases and 24% of the toxicology alcohol positive DUID cases, the driver was greater than twice the legal limit (0.08 gm%).



**Figure 20** Percentage of alcohol test result ranges for each category of cases.

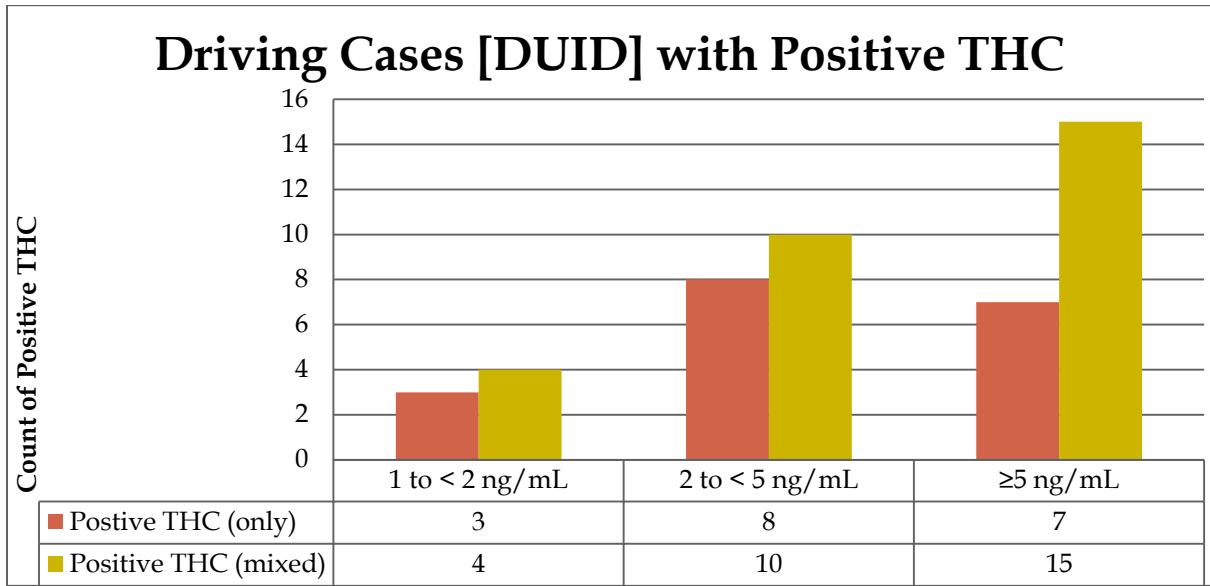
As illustrated in **Figure 21**, the vast majority of samples submitted in Driving-Under-the-Influence [DUI] cases were found to have alcohol concentrations at or above the legal limit of 0.08 gm%.



**Figure 21** DUI blood alcohol results.

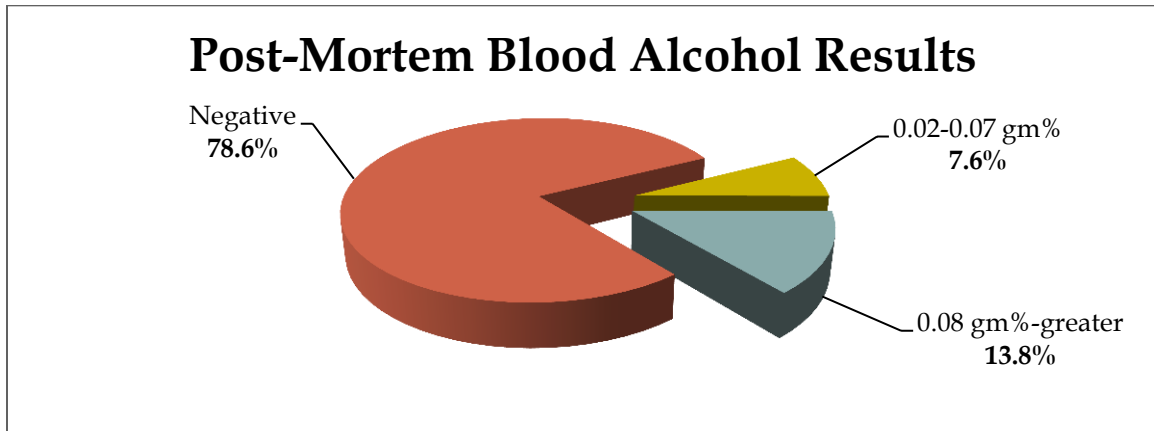


Many driving cases involve drivers that are under the influence of tetrahydrocannabinol (THC). **Figure 22** provides the number of positive THC results from DUID cases analyzed.



**Figure 22** The number of positive tetrahydrocannabinol (THC) specimens analyzed from driving cases (DUID) in 2015. The table compares the number of drivers that tested positive for THC only and drivers that tested positive for THC mixed for any other drugs, including alcohol.

In approximately 21% of the postmortem (PM) case investigations there was a positive finding of alcohol [**Figure 23**].



**Figure 23** Post-mortem blood alcohol results for 2015.

## Drug-Related Deaths

Aside from alcohol, tetrahydrocannabinol / carboxytetrahydrocannabinol [THC: psychoactive ingredient found in marijuana] is the most commonly found drug in post-mortem cases.

**Table 3** depicts the 10 most common drug findings in post-mortem Toxicology cases [excluding ethyl alcohol] for 2015.

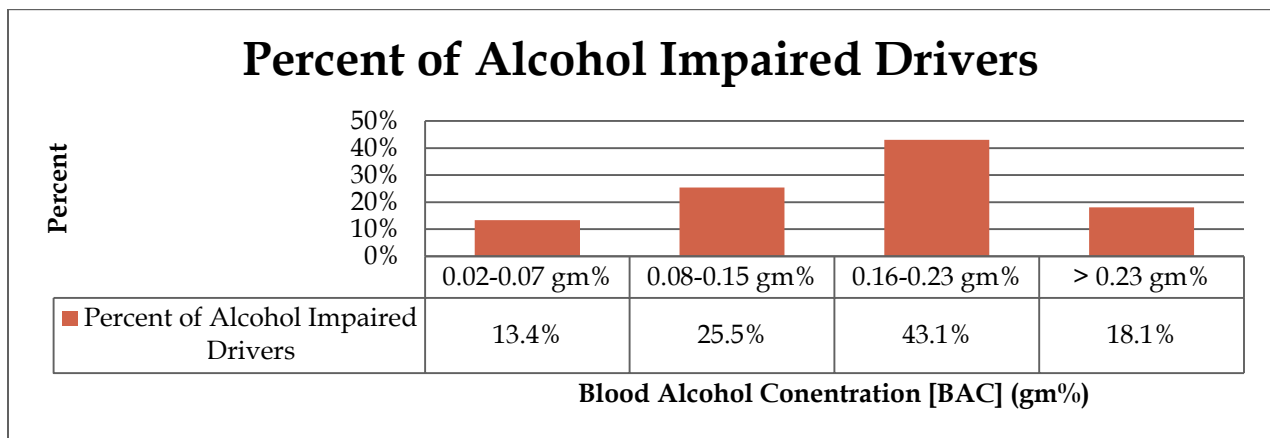
**Table 3: 10 Most Commonly Detected Drugs / Metabolites (Post-Mortem)**

Alprazolam / a-Hydroxyalprazolam
Amphetamine / Methamphetamine
Cocaine / Benzoylecgonine / Cocaethylene
Diazepam / Nordiazepam
Hydrocodone / Hydromorphone / Dihydrocodeine
Methadone / Normethadone / EDDP / EMDP
Morphine / Codeine
Oxycodone
Oxymorphone
Tetrahydrocannabinol / Carboxytetrahydrocannabinol

**Table 3:** The 10 most commonly detected drugs / metabolites (Post Mortem) detected in 2015.

## Alcohol Positive Drivers

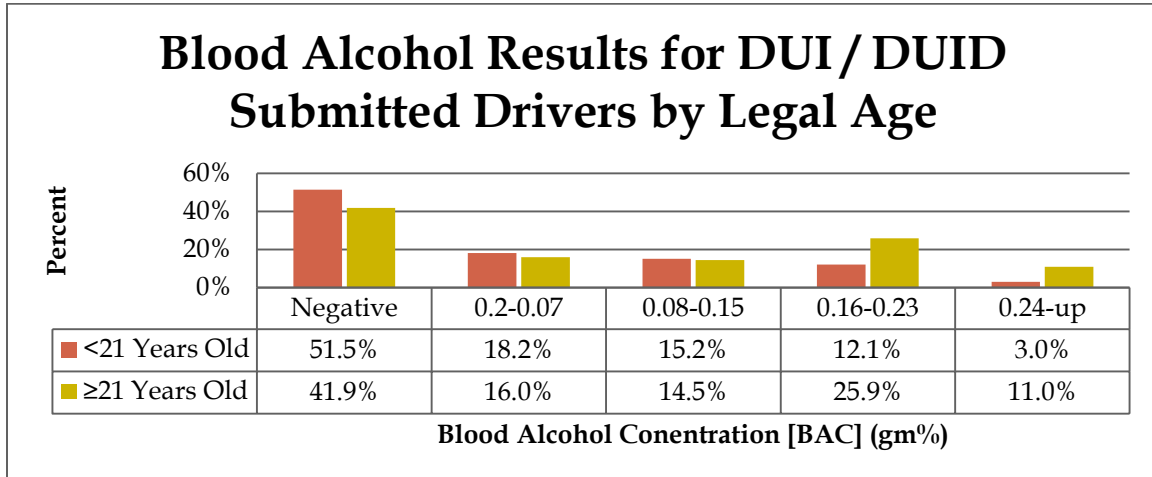
Alcohol plays a significant role in driving under the influence cases. In 2015, 45% of tested samples in DUI and DUID cases were negative for the presence of alcohol. **Figure 24** shows that approximately 87% of alcohol positive drivers were at or above “per se” limit of 0.08 gm%.



**Figure 24** Alcohol test result ranges (gm%) of positively tested samples submitted for DUI and/or DUID.

## Alcohol Positive Drivers - Under the Age of 21

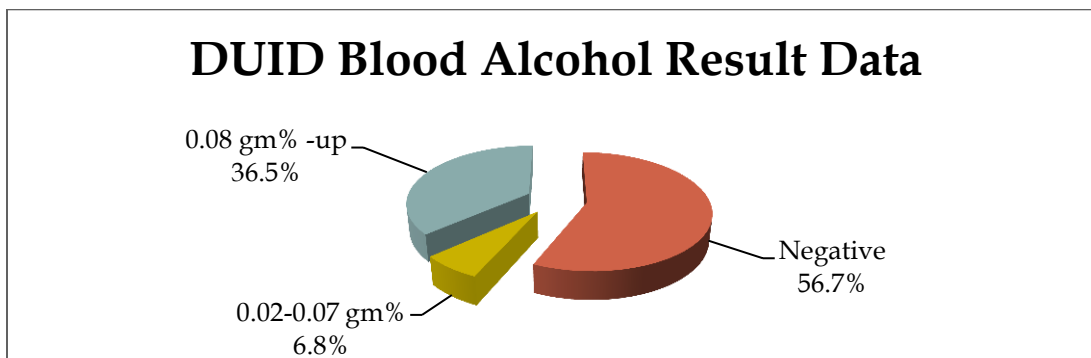
The legal age for possession of alcohol is 21 years old. In 2015, 7.4% of all motor vehicle drivers testing positive for alcohol were under the age of 21. **Figure 25** illustrates the percentages of suspected alcohol impaired drivers by age and the blood alcohol levels for minors vs. legal drinking age.



**Figure 25** DUI and DUID results sorted by age (minors vs. ≥21 y/o). For drivers tested that were <21 years old, 30% had alcohol concentrations ≥0.08 gm%.

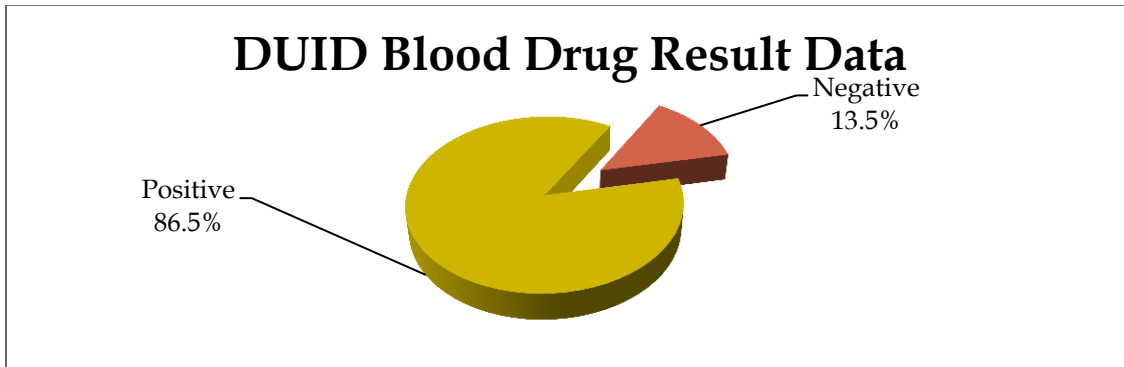
## Drugs and Driving

Fifty seven (57) percent of DUID cases were found to be negative for alcohol upon pre-screening, 7% were cases involving blood alcohol levels at or below the legal limit and 36% of the cases were above the legal limit (0.08 gm% and up) [**Figure 26**].



**Figure 26** General alcohol testing result ranges for DUID submitted cases.

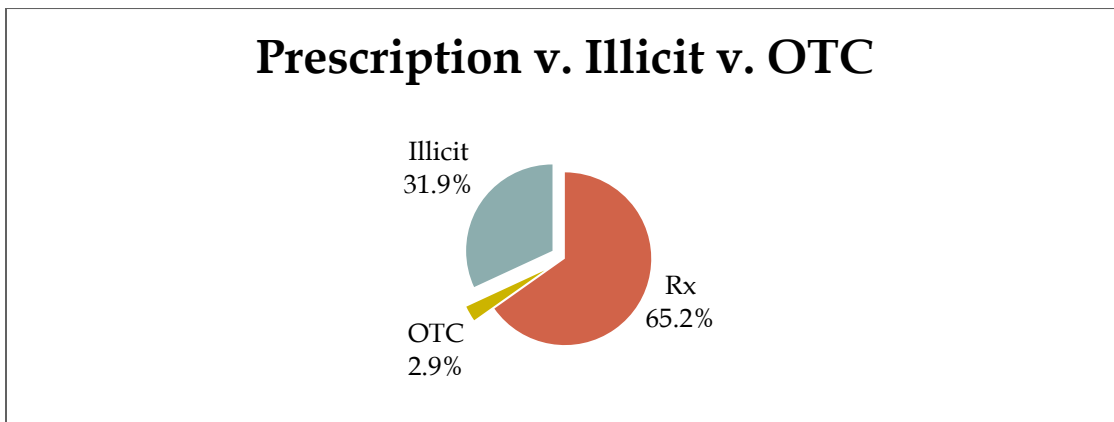
Drugs play a significant role in driving under the influence cases and can cause different levels of impairment. As depicted in **Figure 27**, the majority of DUID cases tested positive for the presence of drugs.



**Figure 27** DUID blood drug results. It was concluded that 87% of individuals suspected of driving under the influence of drugs tested positive.

### Driver Drug Usage

In DUID cases where drugs were detected, 97% were controlled substances and/or prescription drugs. [Figure 28].



**Figure 28** Percentage of prescription (Rx), Illicit, and over the counter drugs (OTC) detected in DUID.

**Table 4** depicts the 10 most common drug detected in driving-under-the-influence-of-drugs [DUID] toxicology cases [excluding ethyl alcohol] in 2015. Citalopram / Escitalopram / Desmethylocitalopram and morphine / codeine were equally detected and were the tenth most common.

**Table 4: 10 Most Commonly Detected Drugs / Metabolites (DUID)**

Alprazolam / a-Hydroxyalprazolam
Amphetamine / Methamphetamine
Butalbital and Oxycodone and Phencyclidine
Carisoprodol / Meprobamate
Diazepam / Nordiazepam
Oxazepam
Hydrocodone / Hydromorphone / Dihydrocodeine
Methadone / Normethadone / EDDP / EMDP
Tetrahydrocannabinol / Carboxytetrahydrocannabinol
Zolpidem

**Table 4:** The ten most commonly detected drugs / metabolites detected in DUID cases in 2015.

## Drug-Facilitated Sexual Assaults

Drug-Facilitated Sexual Assaults [DFSA] continue to be difficult forensic investigations. The cases often involve a perpetrator who will surreptitiously administer a drug to a victim to render them unconscious and sexually assault them. In 2015, the Toxicology Laboratory detected ethanol in all three DFSA cases worked. In DFSA cases, the combined drugs detected are listed in **Table 5**.

**Table 5: Detected Drugs / Metabolites (DFSA).**

Alprazolam / a-Hydroxyalprazolam
Dextromorphan
Diphenhydramine
Doxylamine
Promethazine / Norpromethazine
Tetrahydrocannabinol (THC) / Carboxytetrahydrocannabinol

**Table 5:** Lists drugs detected in Drug Facilitated Sexual Assault (DFSA) Toxicology cases [excluding ethyl alcohol] in 2015.