



Division of Forensic Science 2022 Annual Report

May 30, 2023

*State of Delaware
Department of Safety and Homeland Security
200 South Adams Street
Wilmington, DE 19801*

John Evans, Director

Melissa Newell, Deputy Director

Dr. Gary Collins, Chief Medical Examiner

Jessica Smith, Chief Forensic Toxicologist

Amrita Lal-Paterson, DNA Technical Leader

Ashley Wang, Forensic Chemistry Unit Leader

Johna Esposito, Quality Assurance Manager

Table of Contents

The Division of Forensic Science	3
Divisional Initiatives, Collaboration, and Information Sharing.....	4
Overview.....	4
National Violent Death Reporting System.....	5
Centers for Disease Control Biorepository Program	5
Delaware Drug Monitoring Initiative.....	5
Disaster Preparation	6
Overall Reporting & Collaboration.....	6
Community Engagement.....	7
Assessment, Accreditation, and Quality Assurance.....	7
Medical Examiner Unit.....	9
Overview	9
Other Unit-Specific Highlights	10
Partners	10
Data	11
Toxicology	19
Overview.....	19
Staffing and Accreditation	20
Data	20
Projects and Grants	26
DNA.....	28
Overview.....	28
CODIS.....	28
Casework and Grants	29
Data	33
Forensic Chemistry	35
Overview.....	35
Staffing.....	35
Casework and Accomplishments	35
Data	36
Projects and Grants	40
Conclusion	40



**STATE OF DELAWARE
DEPARTMENT OF SAFETY AND HOMELAND SECURITY
OFFICE OF THE SECRETARY
P.O. BOX 818
DOVER, DELAWARE 19903-0818
302-744-2680**

**The Honorable John Carney
Governor**

**The Honorable Nathaniel McQueen, Jr.
Cabinet Secretary**

May 30, 2023

To the Citizens of Delaware:

I am honored to recognize the outstanding work of the men and women of the Division of Forensic Science (DFS) detailed in this year's annual report. Their dedication and professionalism have resulted in numerous accomplishments in a very difficult time.

DFS continues to evolve to meet the growing need to support development and growth that better serves the justice system throughout the state. Forty training opportunities were provided to the DFS team in 2022, which is more than ever.

In 2022, several outside auditors conducted an on-site surveillance assessment. The Division's policies and workflows were checked for compliance with hundreds of Accreditation and Quality Assurance Standards.

Based on the assessment, the team found that the DFS demonstrated competence to operate a management system that fulfills all applicable requirements, including those specified within the DFS management system.

The DFS was re-accredited to International ISO 17025:2017 standards. The DNA Unit was audited and again found to be compliant with the FBI Quality Assurance Standards and re-accredited. The DFS maintains the highest scientific standards and ensures organizational and individual integrity by meeting accreditation standards and certifications.

The Division continued to successfully pursue state funding and federal grant opportunities, allowing DFS to undergo several renovations. The morgue renovation at the Georgetown office included a new autopsy workstation to ensure a more efficient workspace. Also, the lobby at the Wilmington office was renovated with new and improved lighting, ceiling tiles, and flooring, resulting in a brighter and updated lobby area for visitors.

Outreach efforts, coupled with data sharing and collaboration, led to the Division being established as a key contributor across state agencies for developing policies and initiatives to safeguard the health and safety of all Delawareans.

Please join me in extending sincere thanks and congratulations to the women and men of DFS for a year filled with many accomplishments and success.

Sincerely,

A handwritten signature in blue ink that reads "Nathaniel McQueen, Jr." in a cursive style.

Secretary Nathaniel McQueen, Jr.



STATE OF DELAWARE
DEPARTMENT OF SAFETY AND HOMELAND SECURITY
DIVISION OF FORENSIC SCIENCE
200 South Adams Street, Wilmington, DE 19801
302-577-3420

The Honorable John Carney
Governor

The Honorable Nathaniel McQueen, Jr.
Cabinet Secretary

To My Fellow Delawareans:

On behalf of the men and women of the Division of Forensic Science (DFS), I am happy to present the 2022 Annual Report, which highlights the outstanding work and critical role that the DFS plays in the criminal justice process in Delaware.

The Mission of the DFS is to provide the most reliable scientific analysis of evidence for the administration of justice. Sound and timely pathology and forensic science services are provided for the justice system, driven by crimes committed and deaths occurring in the State of Delaware.

The organizational structure of the Division is a collaborative model where each discipline is equally invested in the overall success of the Division. A stratified model of accountability is used, where each team member has a specific role toward meeting the overall mission. I am proud to report that the DFS continued to meet the mission in 2022 despite any challenges presented throughout the year, which is a testament to the commitment and professionalism of the team at DFS.

By continuing to meet accreditation standards and certifications, the DFS maintains the highest scientific standards and ensures both organizational and individual integrity. The work ethic of the employees of the DFS is strong and we hold true to our core values of Integrity, Honesty, Thoroughness, Timeliness and Professionalism.

The DFS recognizes the significance of data sharing and works together with the Department of Health & Social Services, the Division of Public Health, the Department of Justice, the Delaware Information and Analysis Center, Law Enforcement and Federal partners to combat the on-going opioid epidemic and any other public health issues.

In 2022, the Division continued to pursue both state funding and federal grant opportunities, which allowed the DFS to expand its data sharing capacity by providing information regarding dangerous fentalogues and additives such as xylazine and nitazine. The Division has also increased its academic interface with the Delaware academic community by promoting forensic internship programs and participating in quality data collection and research. The Division firmly believes these efforts will promote interest in forensic science disciplines among Delaware students and lead to stronger information sharing projects. These outreach efforts, coupled with data sharing and collaboration lead to the Division being established as a key contributor across state agencies for the development of policies and initiatives to safeguard the health and safety of all Delawareans.

I would like to thank the Criminal Justice Council for their continued support in providing grant funding in 2022, which provided much needed supplies, equipment, and training opportunities for the valued staff at DFS.

I would like to recognize the members of the Commission on Forensic Science for their dedication and commitment to providing oversight and guidance to foster professionalism within, and the development and growth of, the Division of Forensic Science. I am confident that with the continued work of the Commission and with the support of Governor John Carney and the General Assembly, the forward momentum of the Division of Forensic Science will continue in 2023.

I take great pride in the hard work and dedication of the men and women of the Division of Forensic Science and for their continued focus on providing the level of service that our customers and stakeholders deserve and expect. I remain confident that our staff will meet any challenge in order to fulfill our mission.

Sincerely,

A handwritten signature in black ink, appearing to read "John R. Evans". The signature is fluid and cursive, with the first name "John" and last name "Evans" clearly distinguishable.

John R. Evans, Director

The Division of Forensic Science

The Division of Forensic Science is comprised of four units including the Medical Examiner, Toxicology, DNA, and Forensic Chemistry. It is the mission of the Division of Forensic Science to provide the most reliable scientific analysis of evidence for the administration of justice. The Medical Examiner Unit serves the State of

Delaware with objective medicolegal death investigations in order to provide accurate death certification that complies with the standards set by the National Association of Medical Examiners (NAME) and the



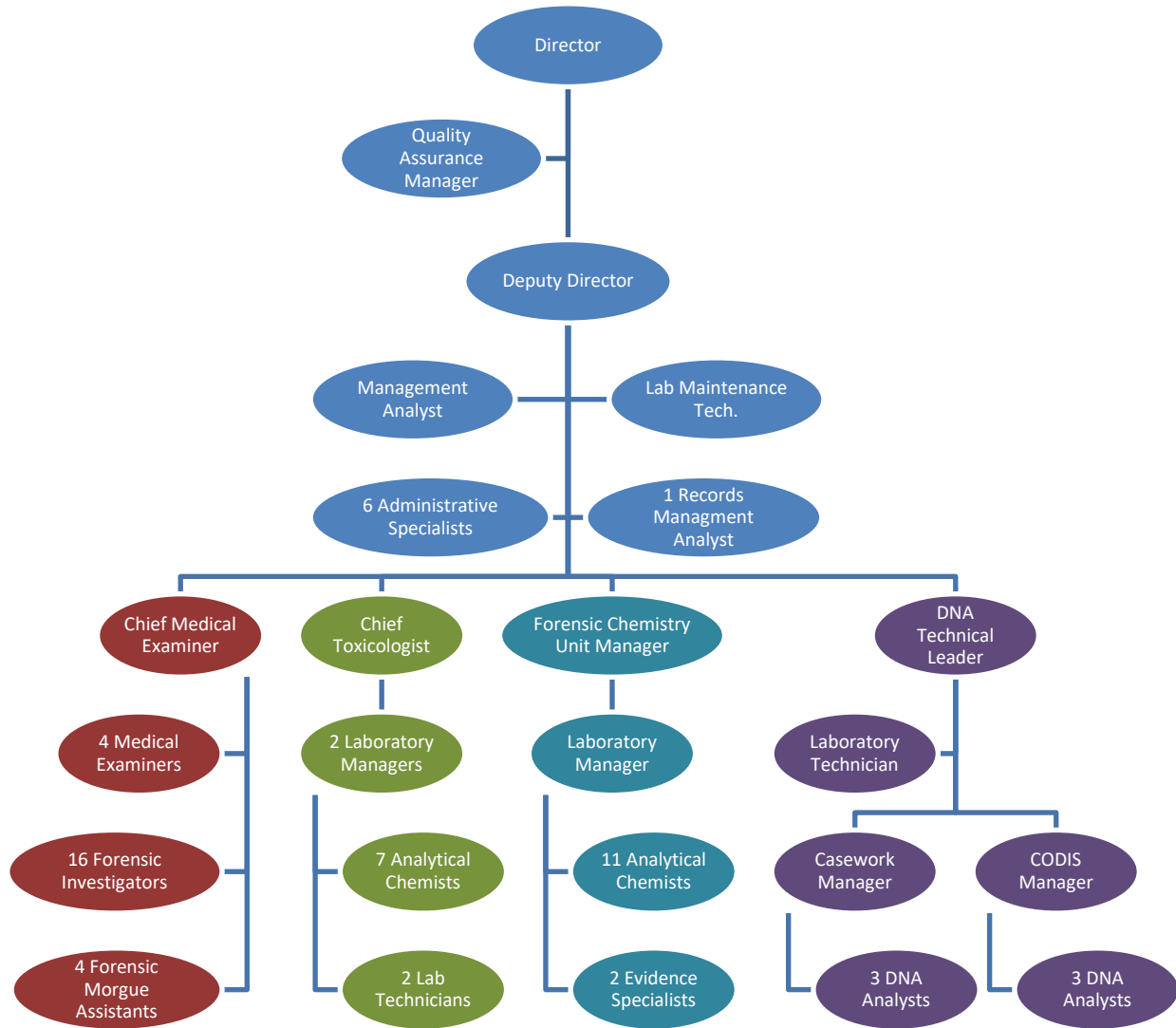
Division of Forensic Science, Wilmington, DE

Delaware statutes. The Toxicology Unit performs analyses on biological specimens submitted by the medical examiner and Delaware law enforcement agencies for the presence (or absence) of volatiles and drugs. The Toxicology Unit is committed to providing state-of-the-art, timely forensic analyses that comply with the standards set by ISO/IEC 17025:2017 and the American Board of Forensic Toxicology (ABFT). The DNA Unit provides Delaware law enforcement agencies with a forensic DNA testing program that complies with the standards set by the DNA FBI Quality Assurance Standards and ISO/IEC 17025:2017. The Forensic Chemistry Unit tests physical evidence seized by Delaware law enforcement agencies, for the identification of controlled substances and fire debris analysis. Like the other Laboratory Units, the Forensic Chemistry Unit is committed to providing state-of-the-art, timely forensic analyses that comply with the standards set by ISO/IEC 17025:2017.

In 2014 the Commission on Forensic Science was created by state statute. The Commission is charged with providing oversight and guidance to ensure professionalism and integrity within the DFS and to support development and growth that better serves the justice system.

During 2022, the DFS continued to enhance operations and administration, embracing every challenge as an opportunity to improve. The DFS has maintained accreditation with the ANSI National Accreditation Board (ANAB). Additionally, the Medical Examiner Unit continues to be accredited through the National Association of Medical Examiners (NAME) and the Toxicology Unit meets the standards

established by the American Board of Forensic Toxicology (ABFT). The dedicated staff at the DFS continues to demonstrate a professional commitment to providing accurate, timely, and responsive forensic science service to all members of the criminal justice community in Delaware.



2022 DFS Organizational Chart. (Note that vacant positions are included in totals.)

Divisional Initiatives, Collaboration, and Information Sharing

Overview

The Division of Forensic Science believes that sharing of data and DFS information adds value to multiple governmental and academic initiatives. Working together across agencies, federal and state

governments, and other stakeholder organizations supports the health and safety of the citizens and visitors of Delaware. Currently, DFS participates on two statewide commissions related to child death and overdose death, two CDC funded projects, the Delaware Drug Monitoring Initiative, and several other forensic data driven projects with both our public health and law enforcement partners.

To forward the mission, the Division is continuously working on a comprehensive reporting system aimed at producing standardized information to key government and private sector stakeholders statewide. This work is identified as the Delaware Forensic Science Reporting Project (DFSRP).

National Violent Death Reporting System

Created by the Centers for Disease Control and Prevention (CDC) in 2002, the National Violent Death Reporting System captures extensive information about incidents, such as death certificates, mental health history, life stressors, job information, weapons used, victims and suspects, incident location, and other characteristics, to provide a clearer understanding of violent deaths. This surveillance system, implemented in all 50 states, the District of Columbia, and Puerto Rico, links the “who, when, where and how” to inform decision makers and develop prevention efforts to reduce violent deaths in our communities.

DFS remains a key partner in the National Violent Death Reporting System (NVDRS) and the Delaware violent Death Reporting System (DVDRS) by providing autopsy and toxicology information on homicide and suicide deaths in Delaware. This work requires abstractors to collect key data from the DFS for the purposes of supporting effective prevention strategies to reduce violent deaths in Delaware.

Centers for Disease Control Biorepository Program

Funded by the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC), The Sudden Death in the Young Case Registry (SDY) gathers information to learn about sudden death in children and find ways to prevent future fatalities. Delaware is one of 13 participating states in the project and collaborates with the staff of the Child Death Review Commission to identify causes of sudden death in our Delaware Children. A DNA sample is collected by the Medical Examiner Unit and the genetic information is used by researchers to identify causes of death in the hopes of preventing similar deaths in the future, as well as provide valuable information for the health and well-being of surviving siblings.

Delaware Drug Monitoring Initiative

In 2016 a team of individuals from the State of Delaware were selected to participate in a learning lab with the National Governors Association (NGA) in Washington DC. Delaware was one of only four states chosen to receive grant funding to examine methods for information sharing across state

departments and divisions. The Division of Forensic Science collaborated with the Office of Emergency Medical Services (OEMS), the Delaware Information & Analysis Center (DIAC) and the Division of Substance Abuse and Mental Health (DSAMH). The result of this collaborative effort produced a report that is now being distributed quarterly to stakeholders both statewide and federally.

The Delaware Drug Monitoring Initiative (DMI) utilizes data derived from the DFS, Delaware Emergency Medical Reporting System (DEMRS), Delaware Information and Analysis Center (DIAC), and the Delaware Division of Substance Abuse and Mental Health (DSAMH) to be used for situational awareness. The purpose of this initiative is to share consistent, actionable information to address the issues related to the drug epidemic affecting Delaware. The data provided in this report is aimed at assisting multiple agencies across Delaware in an effort to identify those in jeopardy of addiction and/or overdose. These efforts will help inform both law enforcement and public health officials as they work to identify additional treatment needs or programs. While all the data is housed under the respective agencies, the DMI report is created collaboratively within the DIAC for broader reach to key stakeholders. This work has opened the door for collaborative reporting statewide.

Disaster Preparation

The statewide Mass Fatality Plan is an ongoing effort in collaboration with the Division of Public Health to be prepared for a disaster. The Division of Forensic Science has participated in table-top disaster drills and on-scene disaster drills. The purpose of these exercises was to identify areas of strength and weakness, and to test the Mass Fatality Plan before the occurrence of a state disaster. As part of this work, DFS has developed internal Critical Incident Standard Operating Guidelines (SOG). These guidelines provide DFS staff with a framework for emergency operations that falls within the scope of other statewide disaster plans.

The second step of disaster preparation is the development of a statewide Family Assistance Center (FAC) plan. This plan is being modeled after the National Transportation & Safety Board efforts to promote a centralized location for multiple agencies to assist families during a disaster.

Overall Reporting & Collaboration

Data collected by the DFS is used in collaboration with other agencies such as Department of Health and Social Services, the Division of Public Health, the Division of Substance Abuse and Mental Health (DSAMH) the Department of Justice, DIAC, and other law enforcement organizations to promote the health and safety of the citizens of Delaware. In 2022, the DFS expanded its data sharing capacity by providing information regarding dangerous fentalogues and additives such as xylazine and nitazine.

The Division has also increased our academic interface with the Delaware academic community by opening our doors to tours, promoting forensic internship programs, and participating in quality data collection and research. The Division firmly believes these efforts will promote interest in forensic science disciplines among Delaware students and lead to stronger information sharing projects.

Overall, these external relationships have two goals: to educate stakeholders and collaborators on the principles and processes of the DFS, and to establish the Division as a key contributor across state agencies for the development of policies and initiatives to safeguard the health and safety of all Delawareans.

Community Engagement

One of the goals of the Division is to engage community partners by providing informational resources and encouraging scientific learning. Community outreach this year included lectures and tours given to both college and high school level students, including Delcastle Technical High School, Middletown High School, Widener University, and Salem Community College. Job shadow opportunities across all of the units at the DFS continue to be offered to college level students, resulting in 12 successful opportunities in 2022. The professional staff of the Division of Forensic Science is committed to promoting scientific knowledge and community collaborations.

Assessment, Accreditation, and Quality Assurance

Accreditation is a key component of the quality assurance program at the DFS. To be accredited means that the various units within the DFS are routinely inspected by outside organizations who ensure that the policies, procedures, and/or practices within the Division adhere to strict national or international standards. Standards followed by the DFS include those set forth by the International Organization for Standardization (ISO), the American National Standards Institute National Accreditation Board (ANAB), the American Board of Forensic Toxicology (ABFT), the National Association of Medical Examiners (NAME), and the Quality Assurance Standards (QAS) established by the Federal Bureau of Investigation (FBI).

ISO 17025:2017 Accreditation

The International Organization for Standardization is the world's largest developer and publisher of international standards. Laboratories use ISO 17025 to implement a quality system aimed at improving their ability to consistently produce valid results. Since the standard is about competence, accreditation is a formal recognition of the demonstration of that competence.

The DFS was originally ISO 17025 accredited in 2004 and has continually achieved the highest level of quality standard competency for testing with annual re-accreditation. The current ISO 17025 accreditation was provided by ANAB, which also publishes additional standards that must be adhered to for accreditation, and is scheduled to expire on November 30th, 2024.

American Board of Forensic Toxicology Accreditation

ABFT is dedicated to enhancing and maintaining standards of practice in the field of forensic toxicology.

The toxicology laboratory at the DFS is accredited to the ABFT standards, provided by ANAB and scheduled to expire on November 30th, 2024.

National Association of Medical Examiners Accreditation

The purpose of the NAME accreditation standards is to improve the quality of the medicolegal investigation of deaths in this country. NAME accreditation is an endorsement by NAME that the Division provides an adequate environment for medical examiners to practice their profession and offers reasonable assurances that the ME office serves its jurisdiction well.

The DFS has been NAME accredited since 1980 and continues to be in good standing with this organization.

FBI Quality Assurance Standards

The FBI's Quality Assurance Standards (FBI QAS) describe the requirements that laboratories performing forensic DNA testing or utilizing the Combined DNA Index System (CODIS) shall follow to ensure the quality and integrity of the data generated by the laboratory. The DFS has been compliant with the FBI QAS since 1997.

Medical Examiner Unit

Overview

The duties of death investigation for the State of Delaware fall to the Medical Examiner Unit (MEU), led by the Chief Medical Examiner (ME), Assistant MEs, Forensic Morgue Assistants, and Forensic Investigators. This Unit is responsible for investigating all suspicious and violent deaths in the State and performs postmortem examinations on cases that fall under its jurisdiction. The Unit operates out of three locations: the main office in Wilmington, the Tobin Building on the Stockley campus in Georgetown, and a satellite office in Dover (Kent County).

In 2022 the MEU investigated 3637 deaths, which is a 5.7% increase in deaths investigated when compared with 2021. In 2022, the MEU accepted jurisdiction for and certified 1760 (or 48%) of the deaths investigated. The deaths certified by the MEU represents 15.6% of all deaths registered in the State of Delaware. As expected, the deaths from drug and alcohol intoxication continue to increase in 2002. The accidental deaths from drug and alcohol intoxication increased by approximately 4.3% from 514 deaths in 2021 to 537 deaths in 2022.

	2018	2019	2020	2021	2022
Autopsies	690	707	760	920	878
Inspections	296	289	331	374	412
Total Examinations	986	996	1091	1294	1290
Inquiries*	381	450	504	485	470
Total Deaths Certified	1367	1446	1595	1779	1760
Non-Jurisdiction Investigations*	927	1239	1606	1661	1877
Total Medical Death Investigations	2294	2685	3201	3440	3637

*Note that inquiries are cases under the ME jurisdiction which did not require an examination and non-jurisdiction cases are investigated but determined not to be under ME jurisdiction.

The MEU reviews and approves all requests for cremations for decedents expiring in the State. The MEU reviewed 4694 cremation requests in 2022 for cases that were not investigated by the medical examiner.

The Medical Examiner collaborates with the Gift of Life Organ Donor Program to approve organ and tissue donations in Delaware. In 2022 the DFS-MEU approved donations from 288 organs and tissue donors. Organs procured included heart, liver, kidneys, lungs, and pancreas. Tissues procured included cornea, skin, long bones, heart valves, and veins.

Other Unit-Specific Highlights

- In 2022 the Unit moved to a paperless system for records management. This process has greatly improved the efficiency of records management and distribution.

- In the last quarter of 2022, the autopsy suite in the Georgetown location was renovated.

Operations at the facility was



The newly renovated operational autopsy suite in DFS – Georgetown.

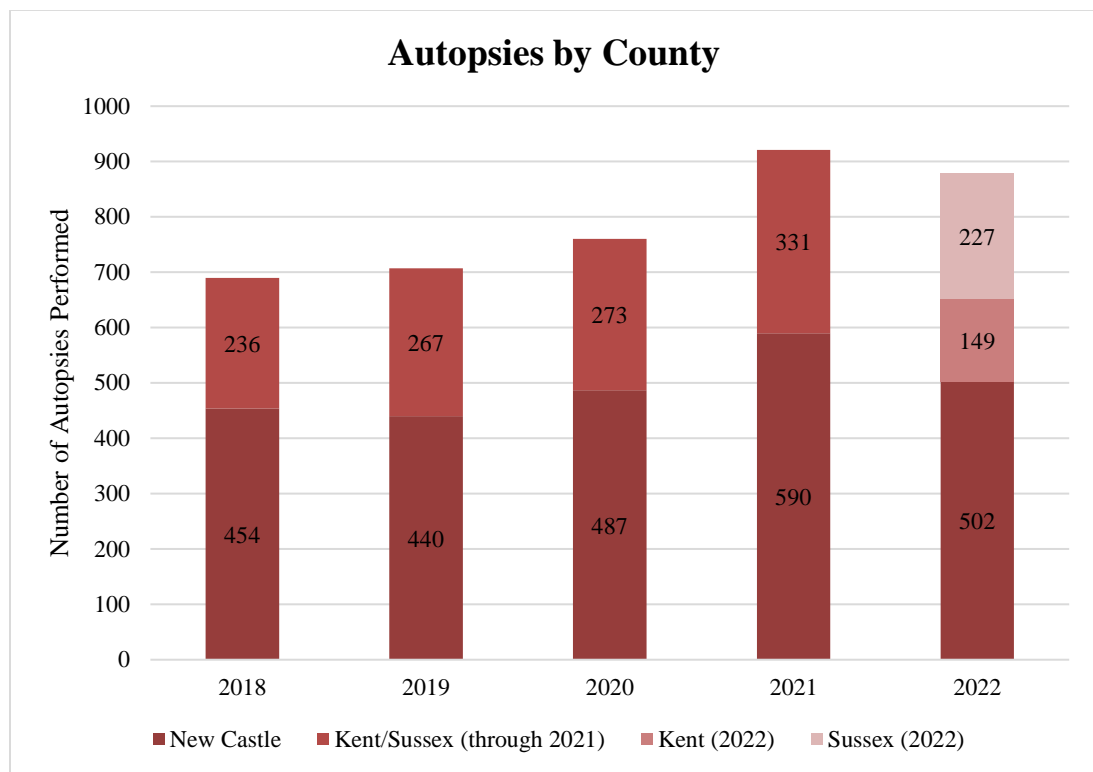
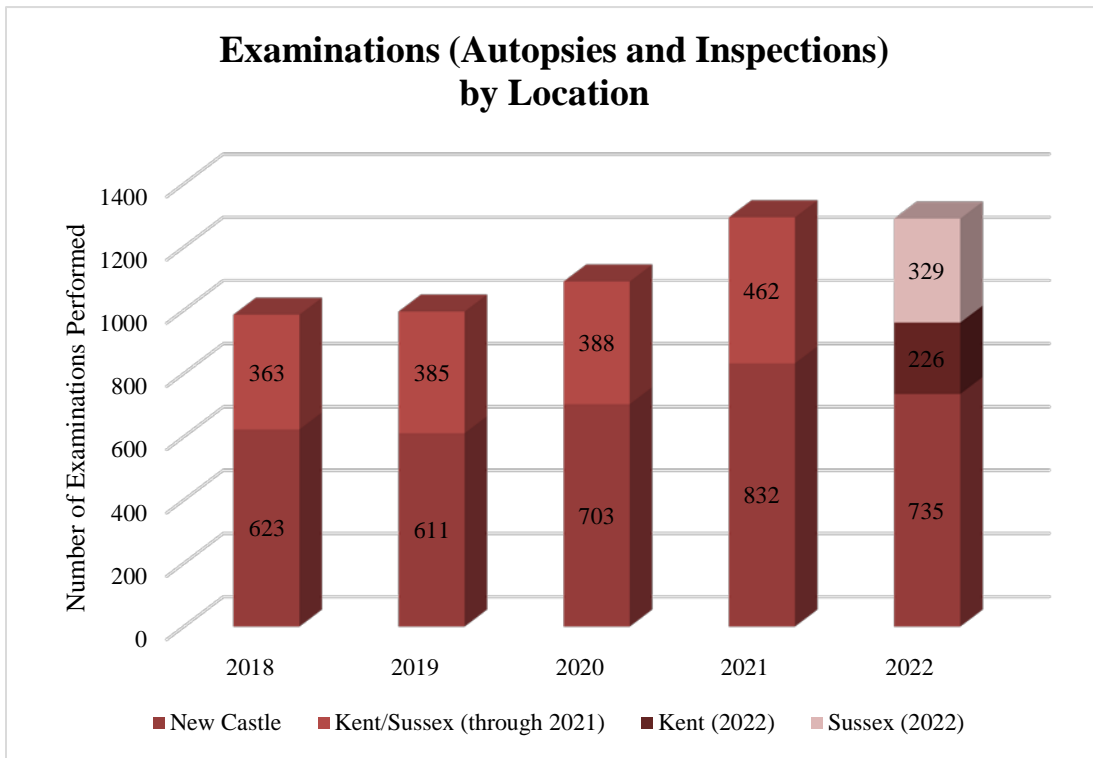
closed for the months. The improvements included replacing the floors of the autopsy suite and receiving area and new autopsy workstation and dissecting table.

Partners

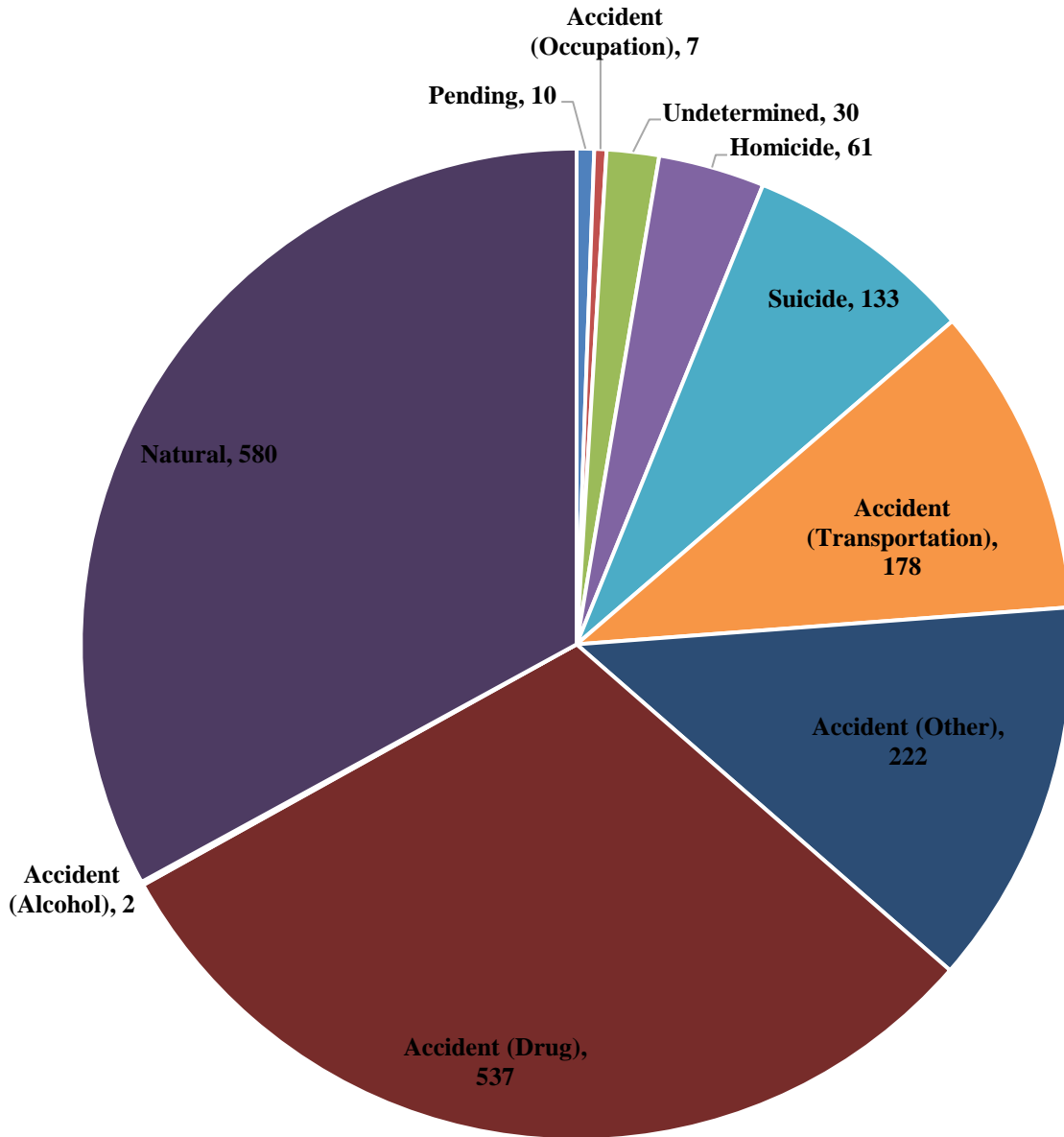
The MEU would not be able to accomplish our mission without the support of the Department of Safety and Homeland Security and the Delaware General Assembly. In addition, it is important to note the many agencies who assist in providing services to the MEU. These agencies include: Delaware law enforcement agencies, the Attorney General’s Office, Fleet Services, Office of the Child Advocate, the staff of all our Delaware hospitals, the Delaware Funeral Directors Association, the Gift of Life Donor Program, the Office of Vital Statistics, and all the funeral homes and health care practices that work with the Division. The MEU and Division values our relationships with all these agencies.

Data

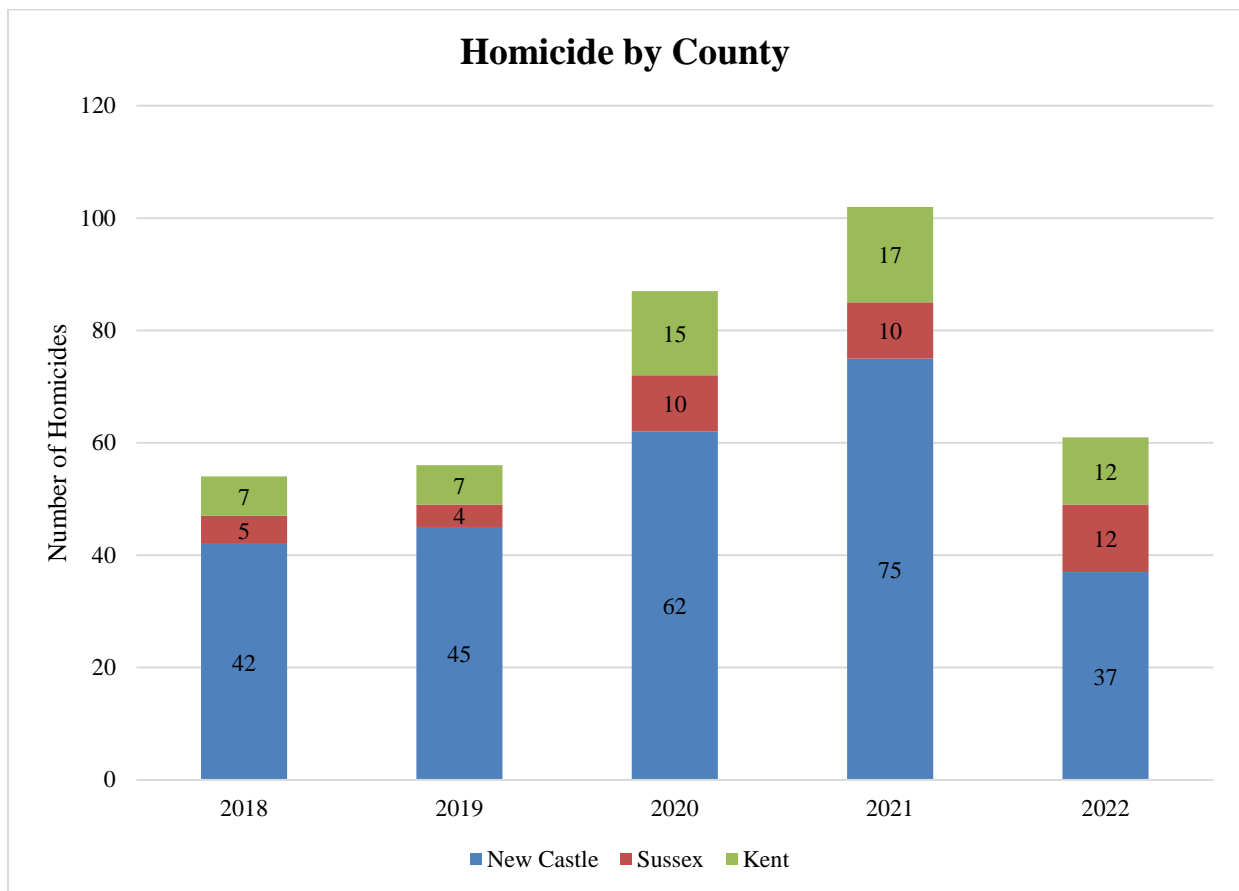
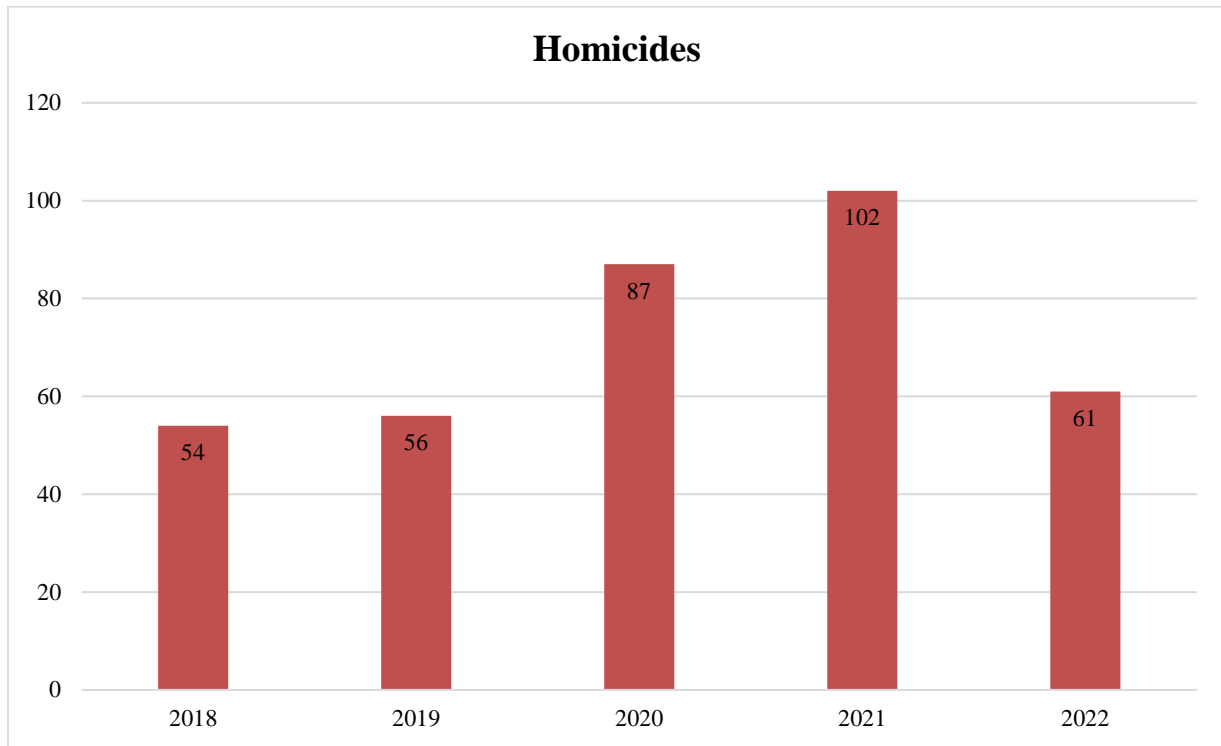
Cases Reviewed

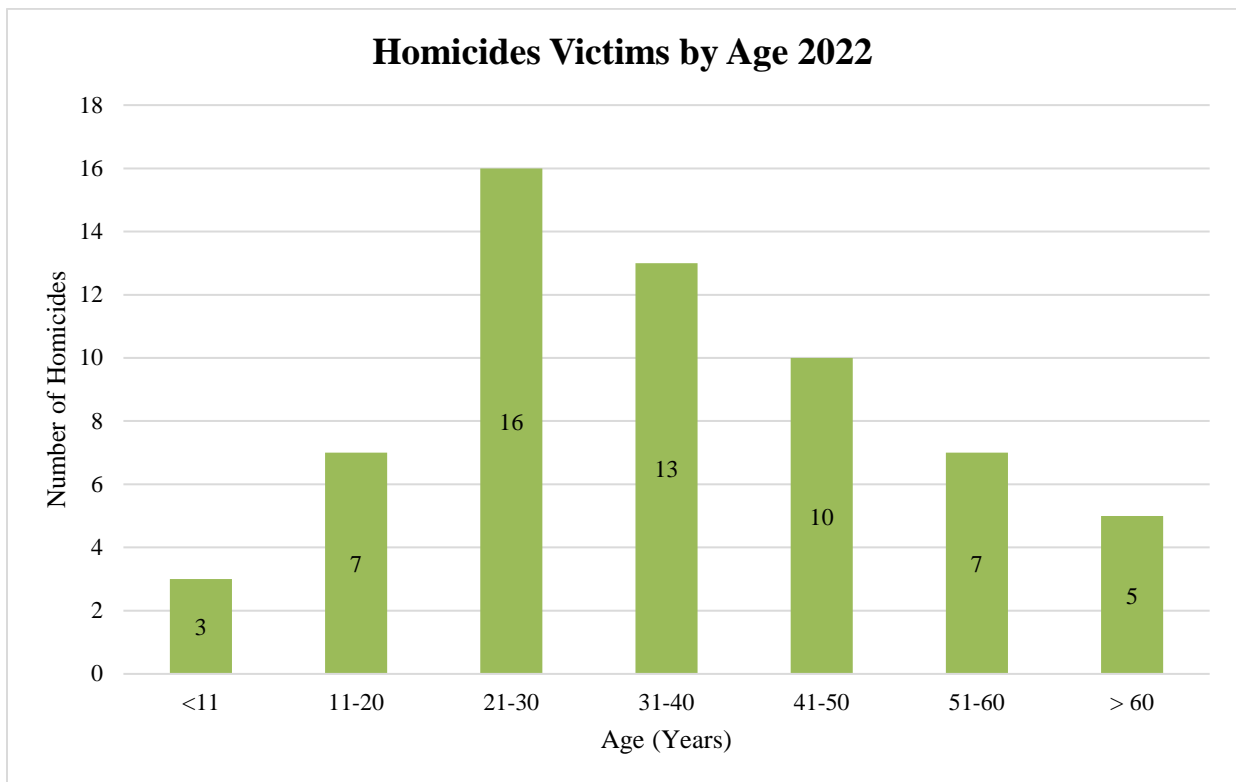
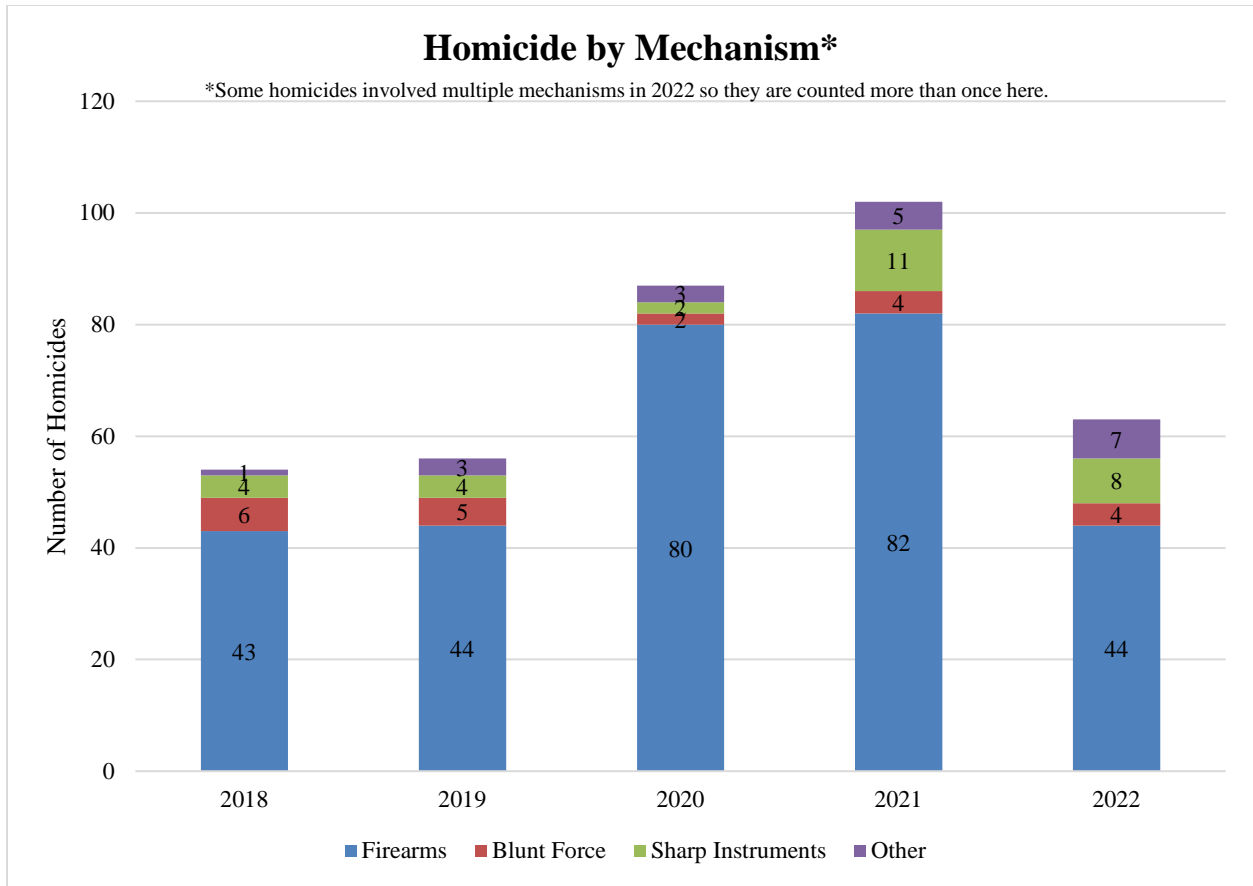


2022 Deaths Certified by Manner

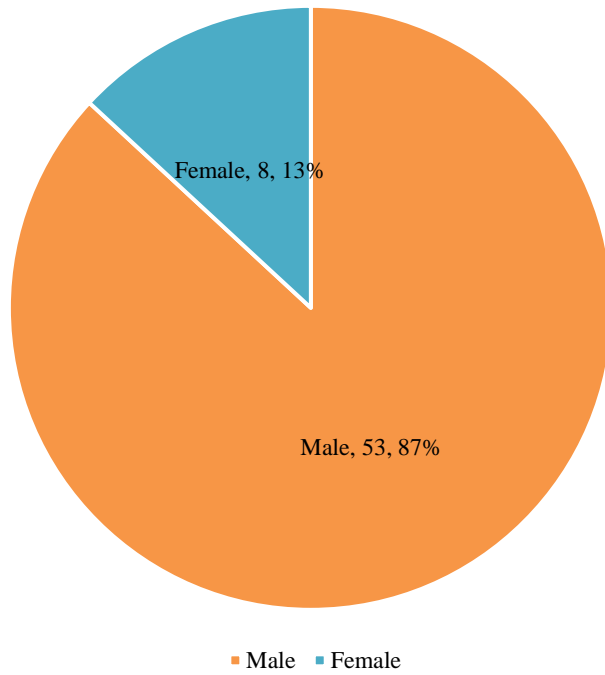


Homicides

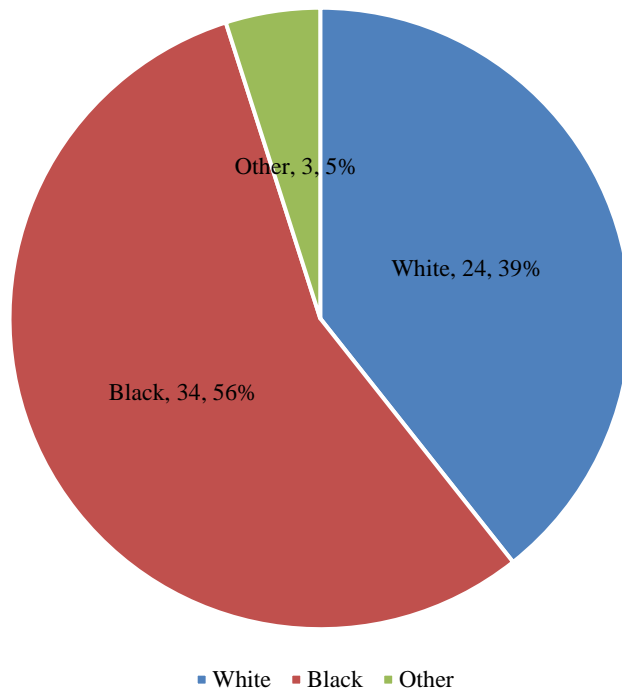




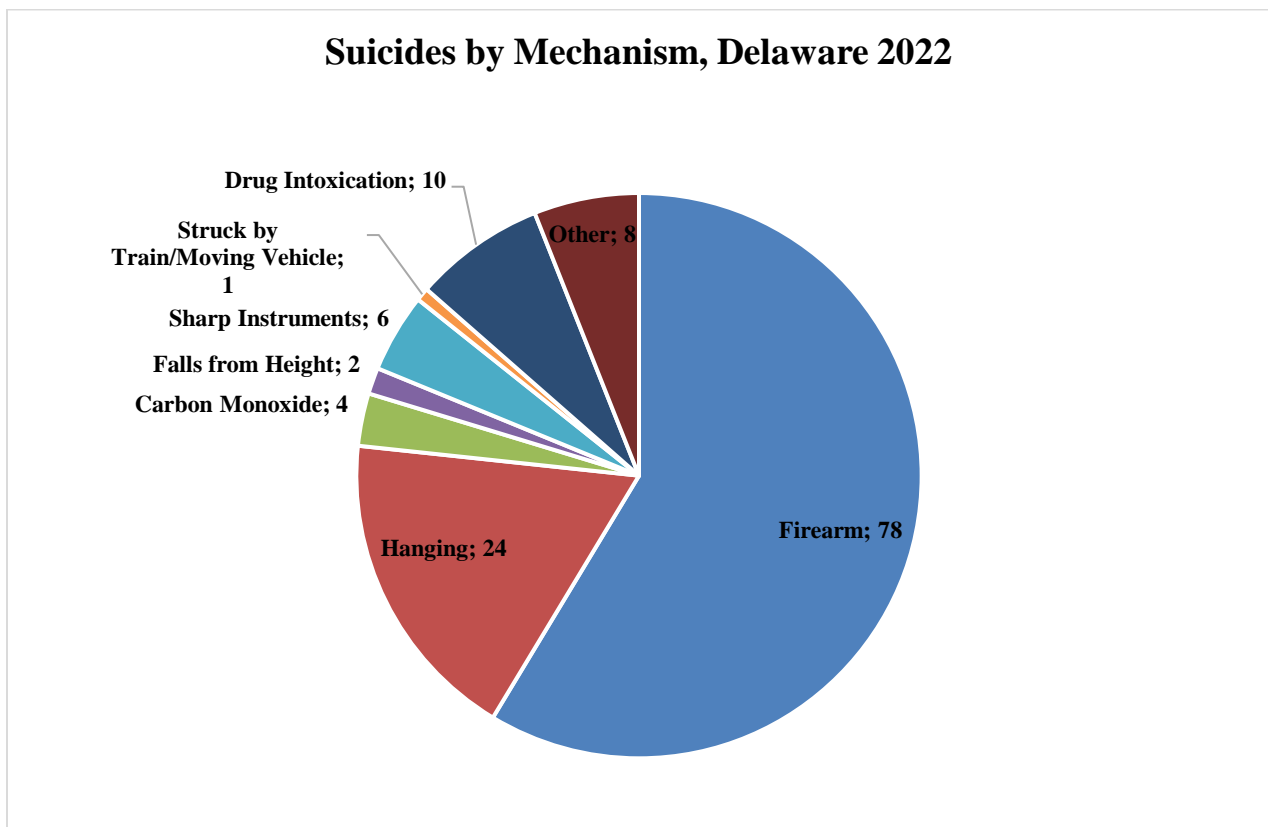
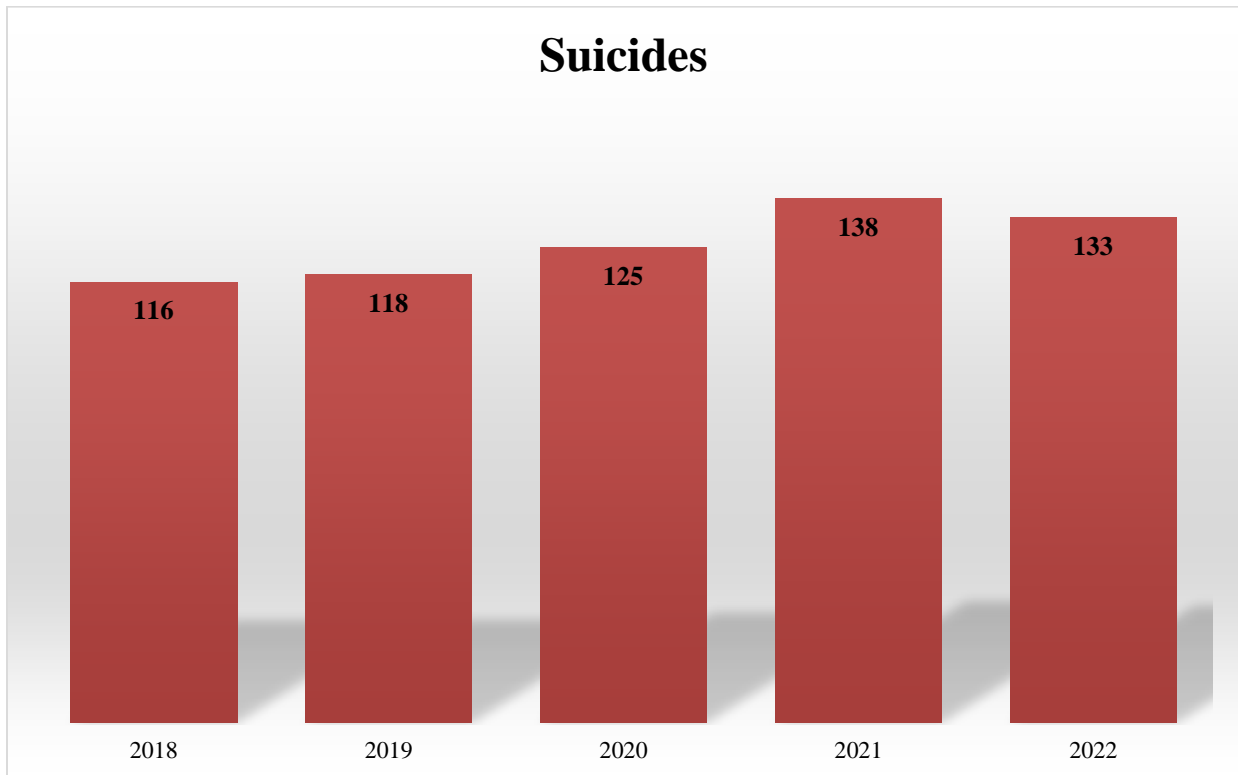
2022 Homicide Victims by Gender



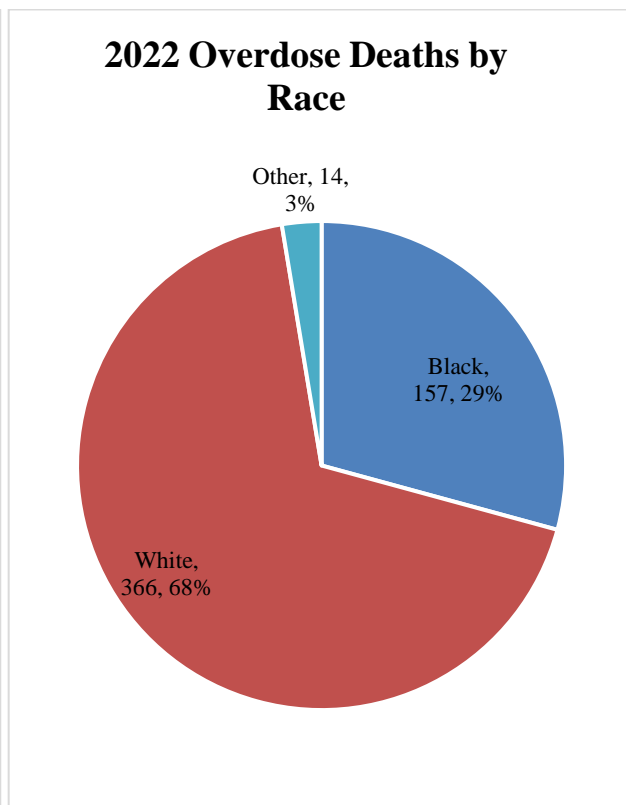
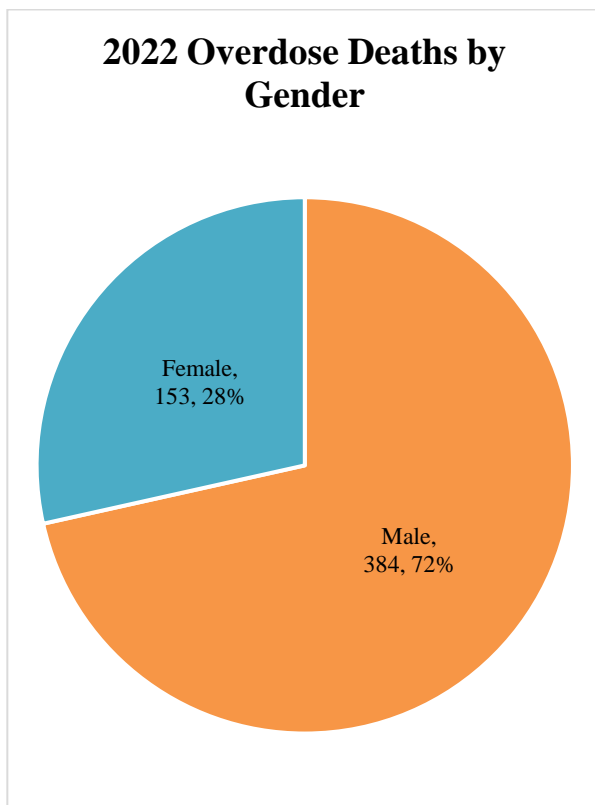
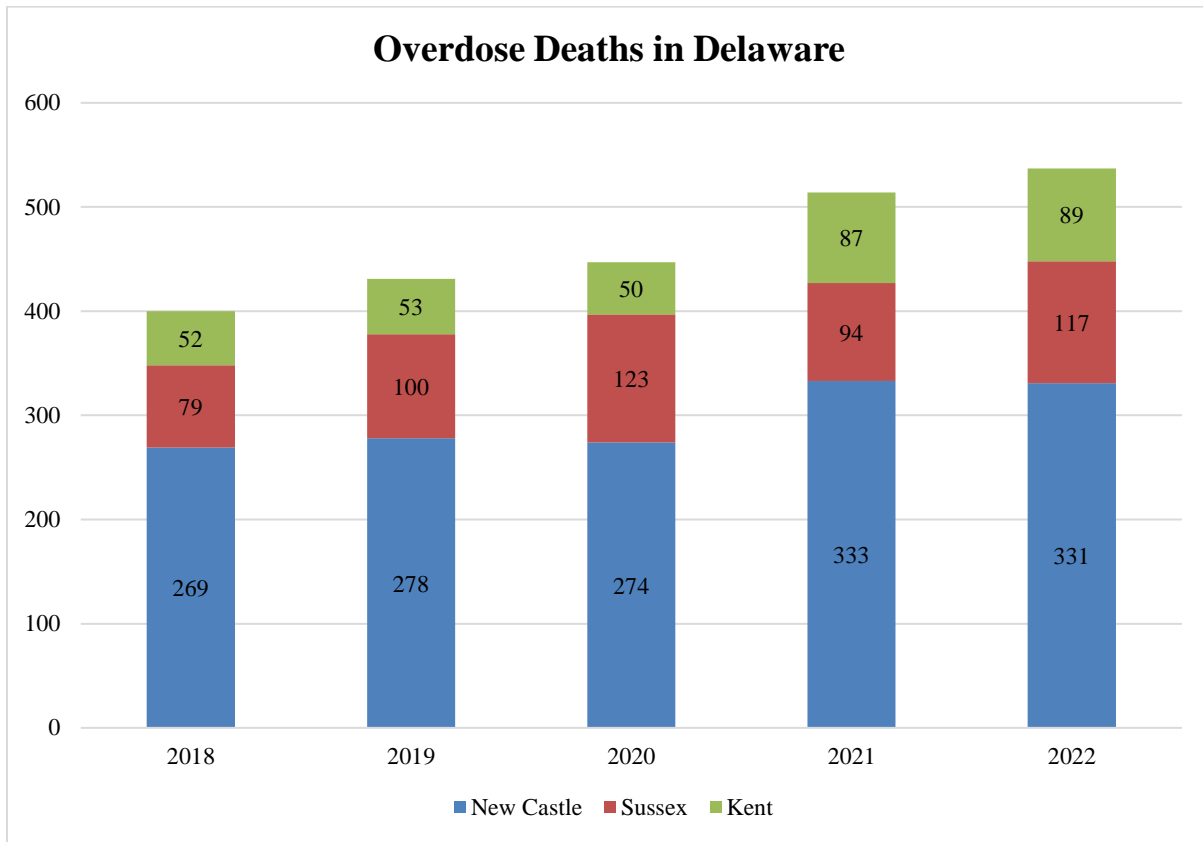
2022 Homicide Victims by Race

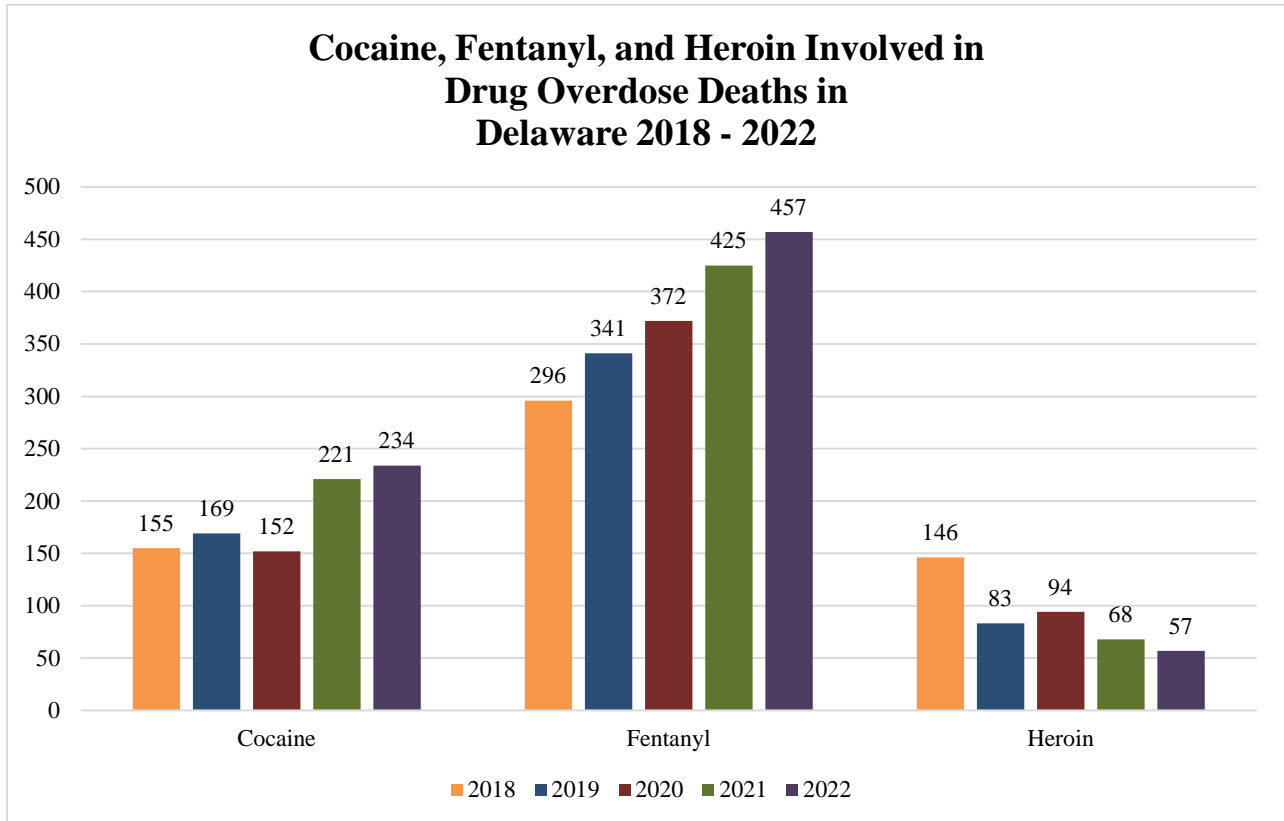
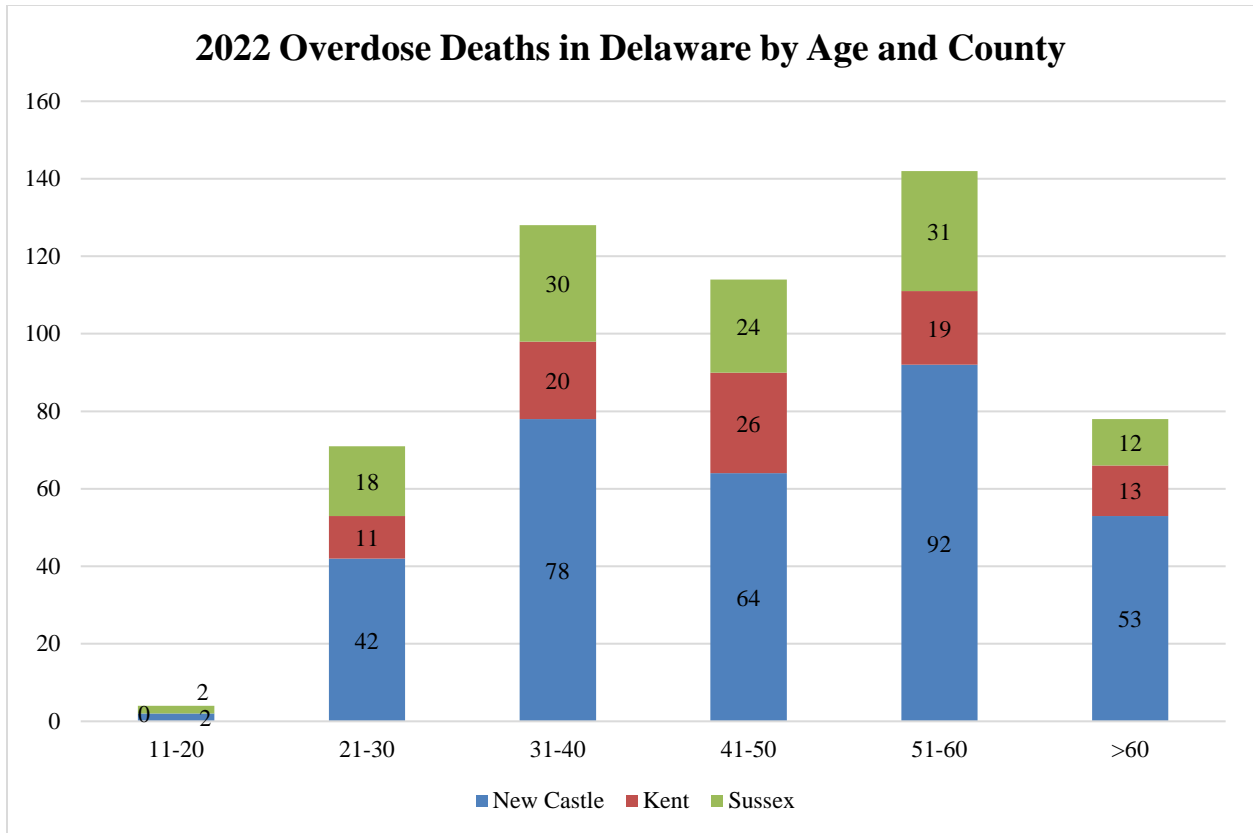


Suicides



Drug Overdose Deaths





Toxicology

Overview

The Toxicology (Tox) Unit of the State of Delaware Division of Forensic Science handles both postmortem and Driving Under the Influence (DUI)/Other cases. The unit is comprised of a staff of 12: the Chief Forensic Toxicologist, the Casework Laboratory Manager I, the Research Laboratory Manager I, seven Analytical Chemists (five for casework and two for research), and two Laboratory Technicians (one full-time and one part-time).

Most cases (including all DUIs) begin with a preliminary ELISA (Enzyme-linked Immunosorbent Assay) Drug Screen, which tests qualitatively for the following 18 drugs/drug classes: Amphetamine, Methamphetamine, Opiates, Phencyclidine, Buprenorphine, Methadone, Benzodiazepines, Cocaine, Barbiturates, Cannabinoids, Oxycodone, Fentanyl, Carisoprodol, Diphenhydramine, Ketamine, Meperidine, Tramadol, and Zolpidem. Positives from this screen are entered for additional confirmatory testing. A Special Testing ELISA panel is also available, which includes Acetaminophen and Salicylates.

The Toxicology Unit has 10 confirmatory procedures for the following drug classes/drugs (and their metabolites), which provide quantitation (concentrations or amounts of drugs): Amphetamine-type Stimulants and Bupropion (AMP); Antidepressant, Antihistamine, and Cyclobenzaprine (ADP)¹; Benzodiazepine, Z-drug, and Quetiapine (BENZ); Cannabinoid; Cocaine; Fentanyl, Fentanyl Analog, and Synthetic Opioid (FENT); Methadone; Opioid; Phencyclidine; and Tramadol. All confirmatory procedures utilize Gas Chromatography-Mass Spectrometry (GC-MS) except the AMP, ADP, BENZ, and FENT methods, which use Liquid Chromatography-MS/MS (LC-MS/MS).

In addition to the ELISA Drug Screen, the Toxicology Unit has two confirmatory (but qualitative) drug screens. The Alkaline Drug Screen (ALKDS) procedure covers approximately 200 different compounds, and the Acidic/Neutral Drug Screen (ANDS) covers another approximately 20 compounds.

Alcohol/Volatiles Analysis using Headspace Gas Chromatography with Flame Ionization Detection (GC-FID) is another routine procedure used by the unit. In addition to ethanol, this procedure provides quantitation of acetone, isopropanol, and methanol and qualitative identification of acetaldehyde and 1,1-difluoroethane.

¹ Note that the validation of this method was completed in December 2022 at which time it was implemented for casework, as will be detailed later.

Staffing and Accreditation

The Toxicology Unit hired four new employees in 2022, bringing the team to full staff. A Laboratory Technician started in January, and the newly created Analytical Chemist position in the research section was filled in February. Another part-time Laboratory Technician started in June, and another Analytical Chemist in the research section started in September. Furthermore, one Tox Unit team member was out for 12 weeks on parental leave. All of these newly filled positions have meant that the team has spent a significant amount of time training, but the unit is fortunate to not have had any resignations in 2022.

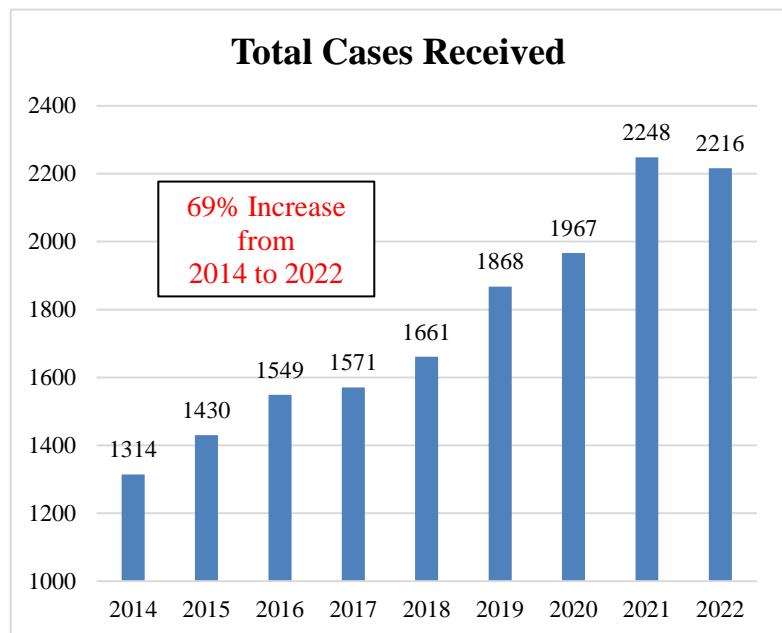
The Tox Unit is an accredited laboratory—both to the standards set by ISO/IEC 17025:2017 and to those by the American Board of Forensic Toxicology (ABFT). The unit had a reaccreditation onsite audit in March 2022 and maintained its laboratory accreditation requirements.

Data

The below statistics have been hand-gathered and hand-tallied.

Total Cases Received and Total Tests Performed

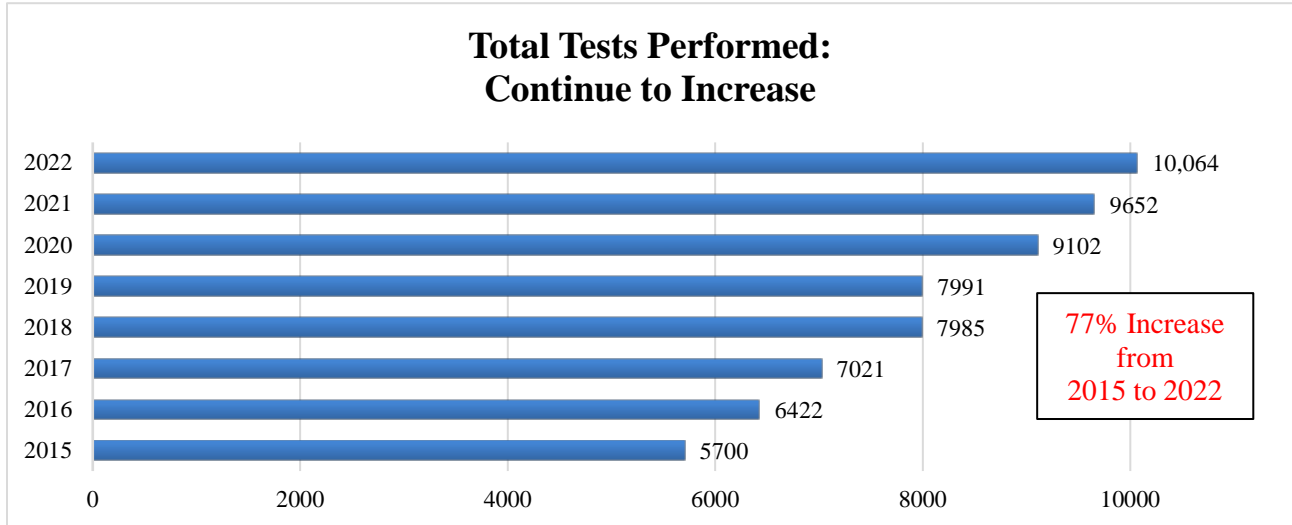
In 2022, the Toxicology Unit received **1008 DUI/Other cases** and **1208 postmortem cases²** for testing. This equated to a total of **2216 total cases received** and **10,064 total tests run in 2022**. This bar graph shows how the number of cases received has steadily increased since 2014—**up 69% over the past nine years**. Note that 2022 was the first time in the past nine years wherein there was actually a slight *decrease* in the total cases received; however, as will be explained, the total workload still



increased due to cases being more challenging and requiring more tests. Because each case may have multiple samples and/or require more than one test, and because the unit also runs 38 proficiency test samples each year (as well as verifications and sometimes repeat samples), the number of tests performed

² Note that this total does not include an additional 129 cases that were received by the Tox Unit as “Save Only” cases and for which no testing was completed.

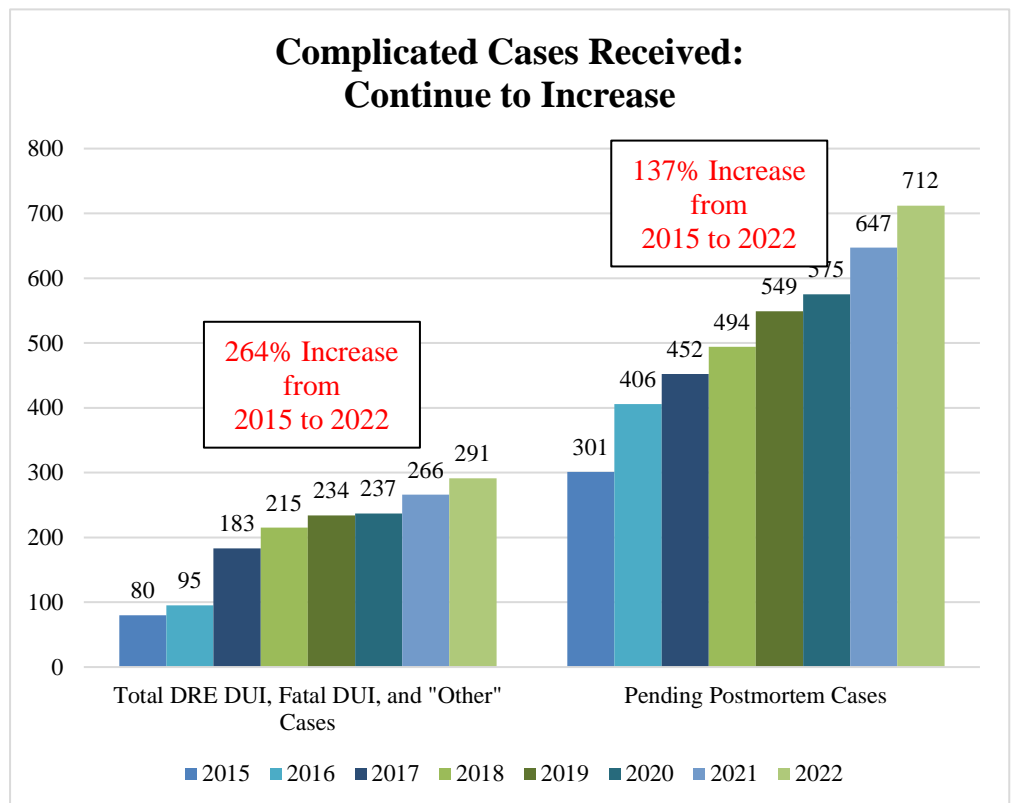
far exceeds the number of cases received each year. In 2022, there were 10,064 tests performed in the Tox Unit—a **77% increase since 2015** (when 5700 tests were performed). Note that this is the first time the unit exceeded 10,000 tests run in a year. Despite increases in workloads and many newly hired positions, the Tox Unit managed to keep turnaround times at acceptable levels.



Increase in Complicated Cases

**DRE DUI, Fatal DUI, and
“Other” Cases**

To really get a handle on the amount of work being done in the unit, one needs to examine the number and type of tests that are being completed. DUI cases received from Drug Recognition Experts (DREs), for example, generally require significantly more testing than non-DRE cases. The same is true for fatal and “Other” cases such as



inquiries into child death or endangerment (including children who have died while caregivers were drug-impaired and children consuming drugs themselves). As the chart shows, the number of DRE, Fatal, and “Other” cases are rising precipitously, **up 264% since 2015**.

Pending Postmortem Cases

Similarly, different types of postmortem cases require varying amounts of time to complete. Pending cases, so named because the cause and/or manner of death is/are pending further investigation (and which include suspected drug deaths), comprised 59% of the postmortem cases received in 2022. These pending cases often require multiple tests, including time-consuming ALKDS procedures and/or advanced quantitative confirmations. The number of postmortem pending cases is **up 137% since 2015**. The Tox Unit often receives hospital samples from drug overdose deaths for complete testing.

ELISA Drug Screening Data

The below tables display the ELISA Drug Screen results to show the number of positives for each drug/drug class for all cases as percentages of the total cases received. It is important to note that this is screening data, so these are strictly preliminary/presumptive results.

Of the DUI/Other cases received in 2022, 55.4% screened positive for cannabinoids (marijuana), and 42.0% screened positive for fentanyl. Cocaine and benzodiazepines are the next top two categories. The percentages of cases screening positive for methamphetamine and amphetamine have increased over recent years, from 4.2% in 2018 to 14.1% in 2022 and from 5.6% to 10.0%, respectively.

DUI/Other Cases:

Drug/Drug Class (Cross-Reactives) on ELISA	Percentage of DUI/Other Cases that Screened Positive				
	2022	2021	2020	2019	2018
Result					
Cannabinoids	55.4%	52.6%	55.3%	57.1%	49.3%
Fentanyl	42.0%	44.2%	41.5%	37.7%	32.8%
Cocaine	27.8%	24.1%	20.8%	20.8%	24.4%
Benzodiazepine	21.2%	20.9%	26.3%	24.7%	21.1%
Opiate	16.4%	17.2%	24.5%	24.1%	24.8%
Methamphetamine	14.1%	14.4%	11.8%	9.7%	4.2%
Methadone	11.9%	13.5%	13.2%	11.9%	7.8%
Amphetamine	10.0%	12.8%	12.2%	8.4%	5.6%
None Detected	8.5%	9.1%	6.4%	5.6%	7.7%
Diphenhydramine	6.2%	5.4%	6.3%	7.2%	6.6%
Phencyclidine	3.5%	6.2%	7.7%	4.9%	7.8%
Buprenorphine	3.5%	5.4%	5.4%	4.4%	4.5%
Oxycodone	3.5%	5.2%	6.6%	8.8%	7.8%

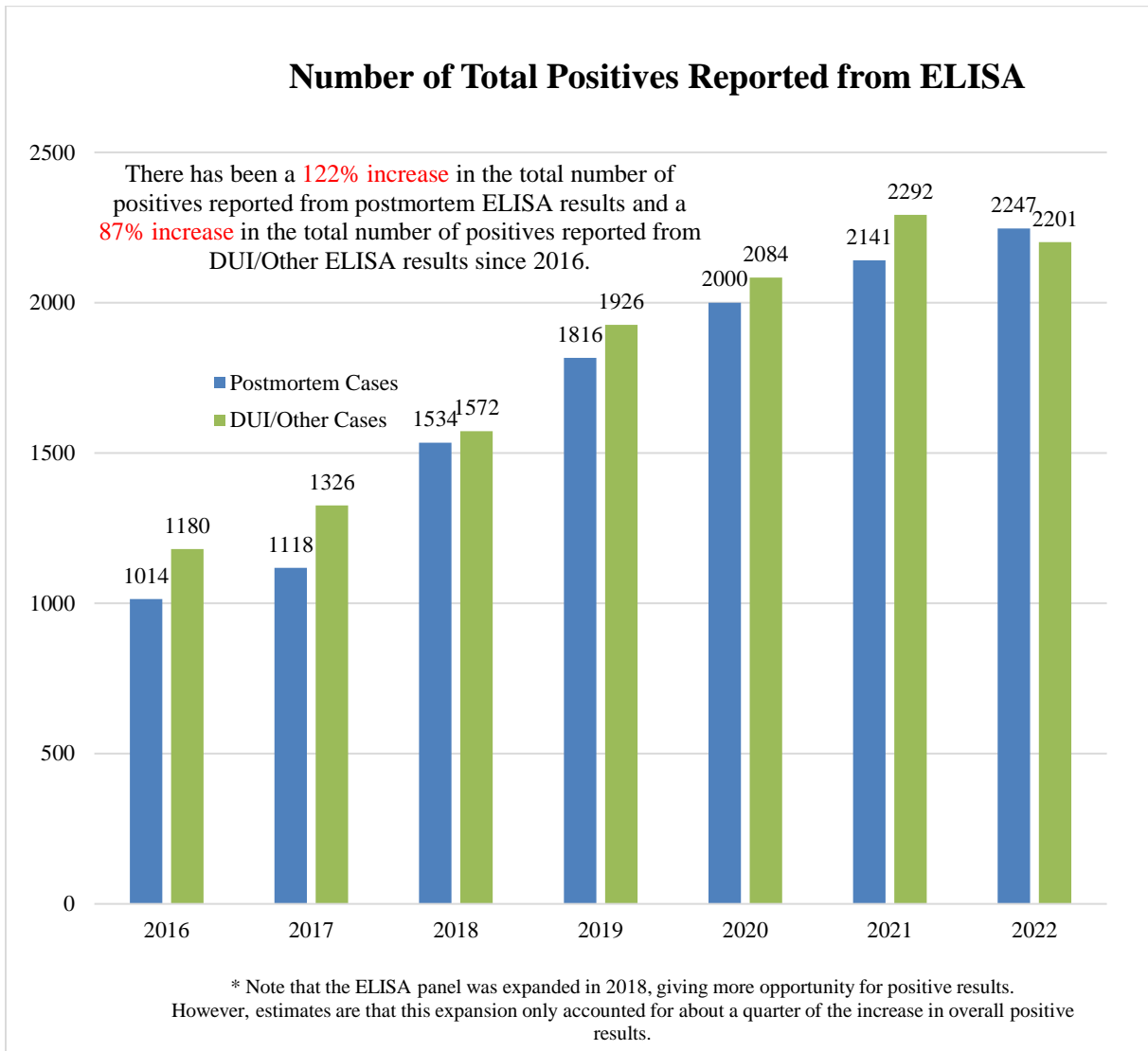
Ketamine	1.3%	0.6%	1.4%	0.6%	0.3%
Zolpidem	1.1%	0.8%	1.1%	1.5%	1.5%
Tramadol	0.7%	0.4%	0.8%	0.7%	0.6%
Barbiturate	0.6%	0.4%	0.2%	0.8%	1.3%
Carisoprodol	0.1%	0.6%	0.5%	0.8%	0.4%
Meperidine	0.0%	0.0%	0.0%	0.0%	0.0%

Fentanyl remains the drug on ELISA with the greatest percentage of postmortem cases screening positive (40.4%), as can be seen in the below table. Note that this was the first time fentanyl climbed over 40% for postmortem cases. The next highest percentages, which were all greater than 20%, were as follows: cannabinoids, cocaine, and None Detected. Interestingly, the percentage of cases screening positive for opiates has steadily declined over recent years, from 27.9% in 2018 down to 13.7% in 2022. This is likely because fentanyl has largely replaced heroin. Just like with the DUI/Other cases, increases in methamphetamine and amphetamine presumptive positives across the years covered were seen for postmortem cases as well.

Postmortem Cases:

Drug/Drug Class (Cross-Reactives) on ELISA	Percentage of Postmortem Cases that Screened Positive				
Result	2022	2021	2020	2019	2018
Fentanyl	40.4%	36.5%	39.1%	37.8%	35.8%
Cannabinoids	33.4%	31.0%	32.6%	26.0%	25.9%
Cocaine	25.2%	21.8%	18.2%	21.0%	21.5%
None Detected	22.4%	27.1%	24.2%	25.6%	24.6%
Diphenhydramine	16.6%	17.2%	17.8%	16.5%	14.5%
Amphetamine	15.6%	14.4%	12.7%	11.6%	10.4%
Opiate	13.7%	15.5%	21.3%	25.0%	27.9%
Benzodiazepine	11.8%	10.9%	11.9%	13.1%	14.0%
Methamphetamine	9.1%	8.4%	7.8%	5.1%	3.4%
Oxycodone	5.8%	6.5%	7.4%	9.0%	8.5%
Methadone	4.5%	5.2%	6.2%	4.0%	4.8%
Buprenorphine	4.1%	2.7%	3.7%	4.4%	2.4%
Zolpidem	1.7%	1.3%	1.2%	1.5%	0.8%
Ketamine	1.0%	0.7%	1.1%	0.8%	0.8%
Phencyclidine	1.0%	0.9%	1.0%	0.8%	1.4%
Tramadol	1.0%	1.1%	1.7%	2.7%	1.6%
Barbiturate	0.7%	0.6%	0.8%	0.6%	0.8%
Carisoprodol	0.3%	0.6%	0.3%	0.4%	0.3%
Meperidine	0.0%	0.0%	0.1%	0.0%	0.0%

As the below chart shows, the number of total positives reported from the ELISA Drug Screen has risen sharply in the last seven years—**up 122% for postmortem cases and up 87% for DUI/Other cases.**



Top Ten Reported Compounds from Confirmatory Procedures

The below tables show confirmatory results. The inactive marijuana metabolite, delta-9-carboxy-tetrahydrocannabinol (THC-COOH), was confirmed positive in 36.2% of the DUI/Other cases received, in the #1 spot as the top reported compound from confirmatory procedures in 2022, and the active parent compound of marijuana, delta-9-tetrahydrocannabinol (THC), was confirmed positive in 25.6% of DUI/Other casework, in the #4 spot. Fentanyl remained as the second top reported compound for DUI/Other cases at 26.9%, and norfentanyl was third again (26.5%).

DUI/Other Cases:

Top Ten Order	Confirmatory Method	Compound	As a Percentage of Total DUI/Other Cases Received
1	Cannabinoids	Delta-9-Carboxy-Tetrahydrocannabinol	36.2%
2	Fentanyl	Fentanyl	26.9%
3	Fentanyl	Norfentanyl	26.5%
4	Cannabinoids	Delta-9-Tetrahydrocannabinol	25.6%
5	Cocaine	Benzoylecgonine	22.8%
6	Fentanyl	4-ANPP	21.0%
7	Cocaine	Cocaine	14.1%
8	AMP	Methamphetamine	12.5%
9	Cocaine	Ecgonine Methyl Ester	12.0%
10	AMP	Amphetamine	8.4%

For postmortem cases, fentanyl stayed in the #1 spot, where it has been for five straight years (at 39.5% of all postmortem cases received), followed by 4-ANPP (a minor fentanyl metabolite and an intermediate in its synthesis, 32.2%), norfentanyl (a metabolite of fentanyl, 28.3%), and ethanol (28.0%), which was in the #1 spot in 2017 and 2016.

Para-fluorofentanyl, a potent fentanyl analog that is a Drug Enforcement Administration (DEA) Schedule I controlled substance, accounts for 10.1% of postmortem casework and is #8 in the top ten list below. As a subsequent chart shows, in 2020, para-fluorofentanyl was detected in just 4 postmortem cases and 3 DUI/Other cases, compared to 122 and 60 cases, respectively, in 2022. This translates to a 2500% increase in para-fluorofentanyl cases from 2020 to 2022, although the numbers were higher in 2021 for both case types, indicating this may be a short-lived drug trend.

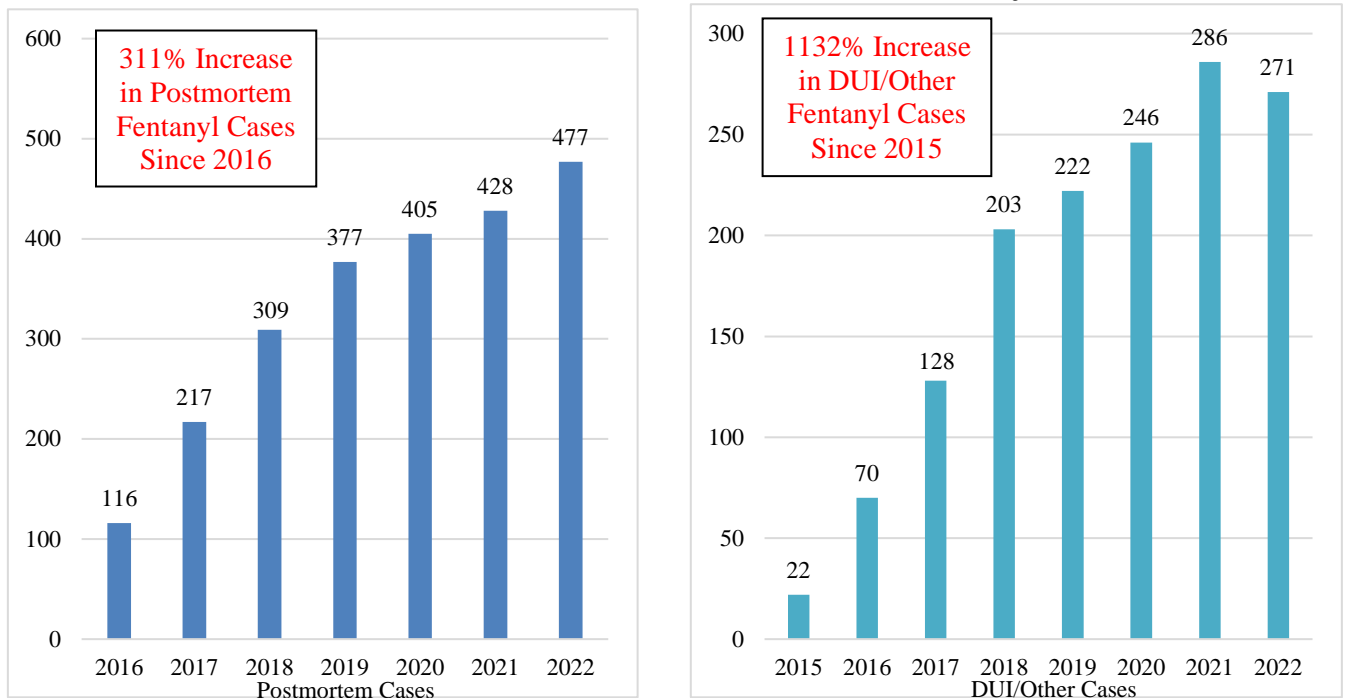
Postmortem Cases:

Top Ten Order	Confirmatory Method	Compound	As a Percentage of Total Postmortem Cases Received
1	Fentanyl	Fentanyl	39.5%
2	Fentanyl	4-ANPP	32.2%
3	Fentanyl	Norfentanyl	28.3%
4	ALC/VOLS	Ethanol	28.0%
5	Cocaine	Benzoylecgonine	24.3%
6	Cocaine	Ecgonine Methyl Ester	21.4%
7	Cocaine	Cocaine	20.5%
8	Fentanyl	para-Fluorofentanyl	10.1%

9	AMP	Methamphetamine	7.1%
10	Opiates	Morphine	7.0%

Fentanyl confirmations in the Tox Unit have increased **311% for postmortem cases since 2016** and **1132% for DUI/Other cases since 2015**, as the below charts illustrate. This was the first time across these eight years that the number of DUI/Other cases saw a slight decrease, but looking at the postmortem statistics shows how the opioid/fentanyl epidemic continues to escalate.

Number of Cases that Confirmed Positive for Fentanyl



Projects and Grants

The Toxicology Unit completed one project in 2022, which was the validation of an expanded *Antidepressant, Antihistamine, and Cyclobenzaprine Confirmation and Quantitation by LC-MS/MS* (ADP) method, which went live for casework in December and was completed entirely in-house. The reason for this project was because cyclobenzaprine and many antidepressants cross-react with our diphenhydramine ELISA assay, causing many false positives. Now, cases that screen positive for diphenhydramine on ELISA will automatically be tested for cyclobenzaprine and antidepressants on confirmation too.

This was a huge project that generated an incredible amount of data (652 pages of validation data in Excel and 27 analytical batches of which 19 were fully processed and used, totaling 7859 pages of raw data!).

With this expanded panel, the unit went from being able to confirm and quantitate 17 analytes to now 31 analytes, shown below. The reporting range is 10-2000 ng/mL for all analytes. This method contains 26 internal standards for 57 total compounds. This is our largest panel to date!

Expanded ADP Panel Analytes

1. Doxylamine
2. Pheniramine
3. Desmethylvenlafaxine
4. Mirtazapine
5. Desmethyilmirtazapine
6. Trazodone
7. Chlorpheniramine
8. Brompheniramine
9. Venlafaxine
10. Clozapine
11. Citalopram
12. Desmethylcitalopram
13. Diphenhydramine
14. Doxepin
15. Desmethyldoxepin
16. Imipramine
17. Cyclobenzaprine
18. Paroxetine
19. Desipramine
20. Desmethylcyclobenzaprine
21. Duloxetine
22. Amitriptyline
23. Trimipramine
24. Nortriptyline
25. Desmethyltrimipramine
26. Fluoxetine
27. Norfluoxetine
28. Clomipramine
29. Sertraline
30. Desmethylclomipramine
31. Norsertraline

The Tox Unit received federal grant funds in 2022 through the Centers for Disease Control and Prevention's (CDC's) Overdose Data to Action (OD2A) cooperative agreement to support their efforts in response to the opioid/fentanyl epidemic as well as through the CJC. With these funds, the unit purchased new laboratory chairs and laboratory supplies/consumables such as ELISA kits, standards, and glassware. Additionally, three team members were able to participate in virtual continuing education training through the American Academy of Forensic Sciences (AAFS).

DNA

Overview

The DNA laboratory consists of two sections, the Databasing or CODIS (COmbined DNA Index System) section and the Casework section. The Databasing section processes all the convicted offender samples submitted to the laboratory from the Delaware State Police/State Bureau of Identification (DSP/SBI), Probation and Parole, and the Department of Corrections (DOC), then uploads the generated DNA profiles into the CODIS database. The Casework section examines evidence, conducts preliminary testing for body fluids, performs DNA testing, and interprets data derived from the tests to draw and support conclusions. The laboratory accepts all types of cases ranging from theft and property crimes to homicides and sexual assaults. The DNA profiles generated from processing casework may also be entered into CODIS at either the State or National index (level).

CODIS

At the beginning of 2022, 81 offender samples had not been uploaded to CODIS. All but one of these samples were received by the laboratory in December of 2021. All these samples were uploaded into CODIS in 2022. In 2022, the CODIS section received an additional 1114 offender samples. This number includes 141 samples that could not be tested due to incomplete submission information. The laboratory received approximately 19% fewer samples in 2022 than in 2021.

The average turnaround time (TAT) for uploading offender samples into the National database decreased in 2022 from an average of 20 total days (15 working days) in 2021 to an average of 18 total days (13 working days) in 2022. We continue to receive offender samples with incomplete submission information. For samples with missing information and samples that do not produce a usable DNA profile, we continue to work with DOC.

In 2022, 1012 offender samples and 147 casework samples were uploaded into the State and National indexes. It should be noted that some offender samples only gave a partial DNA result. These samples were re-processed and uploaded again once additional DNA information was obtained from them. Offender samples were processed monthly, and by the end of the year all samples, except 11, received prior to December 2022 had been uploaded into CODIS. Those final 11 samples were upload in the 1st quarter of 2023.

In 2022, the DNA laboratory had 58 CODIS hits or “matches” from either the State or National index. The national hits include DNA profiles from other states that either hit to a Delaware convicted offender or where DNA profiles uploaded by DFS hit to cases or offenders from other states.

CODIS hits included theft, burglary, robbery, sexual assault, and homicide cases. There have been a handful of incidents where a convicted offender's sample was collected and uploaded on good faith into CODIS. When that offender's profile hit on an evidence sample, during the confirmation steps, it was realized that the profile had to be removed from CODIS because the offender did not have a qualifying offense under Title 11. We have been in contact with DOC about proper collection. Additionally, we have proposed a legislative initiative to collect samples from all felonies.

The table below reflects the types of cases that have hit in CODIS for 2022.

CODIS Hits	Type of Case	CODIS Hits	Type of Case
18	Burglary	3	Robbery
5	Homicides	1	Unidentified remains
15	Sexual Assaults	1	Home Invasion
1	Assault	2	Theft/trespassing/criminal mischief
7	Carjacking/stolen/theft of motor vehicle	2	Aggravated menacing/reckless endangering
1	Fraud	2	Shooting

Casework and Grants

In the beginning of 2022, there were 49 cases that were either assigned but not completed or unassigned from 2021. Twenty-two of those cases were unassigned at the end of 2021, this included cases with suspects and unknown suspects. In 2022, the DNA unit received 682 new case submissions and 44 subsequent submissions for a total of 726 submissions. Subsequent submissions are defined as those cases requiring additional testing after a report has been issued or those cases where a report was held until additional evidence had been submitted and tested. There was an approximate 19% increase in the total number of submissions from the previous year. By the end of 2022, there were 110 cases that were

either assigned but not completed (69) or unassigned (41). This is an increase from the previous year. All those cases are on track to be completed in the 1st quarter of 2023.

The table provides a breakdown of the types of cases received during 2022.

Types of Cases Received in 2022	New Submissions	Supplemental Submissions
Homicide / Att. Homicide	38	21
Sexual Assault	163	11
Assault	28	1
Burglary	64	4
Robbery	18	1
Missing Person/Death Investigation	3	1
Miscellaneous	118	0
Possession of Firearms	230	7
Proficiency Tests	18	0

Our average turnaround time (TAT) decreased approximately 18% from 55 total days in 2021 to 45 total days in 2022. In 2022, not only did the Unit see an increase in the number of cases that were submitted when compared to 2021, but also an increase in the number of specimens examined.

In April of 2022, the Sexual Assault Kit Initiative (SAKI) Testing Policy was implemented by the State of Delaware. Any sexual assault kit that is determined to be “unfounded” by DOJ and/or the law enforcement agency will not be tested, but kits where a potential crime has occurred will be tested by DFS. It should be noted that some of these cases could have additional evidence that may need to be tested by DFS. Of the 163 sexual assault cases submitted for testing, 45 were from years prior to 2022. The average completion turnaround time for sexual assault cases (includes kits and other evidence) is 50 days. This is well within the 90 days noted in the SAKI policy.

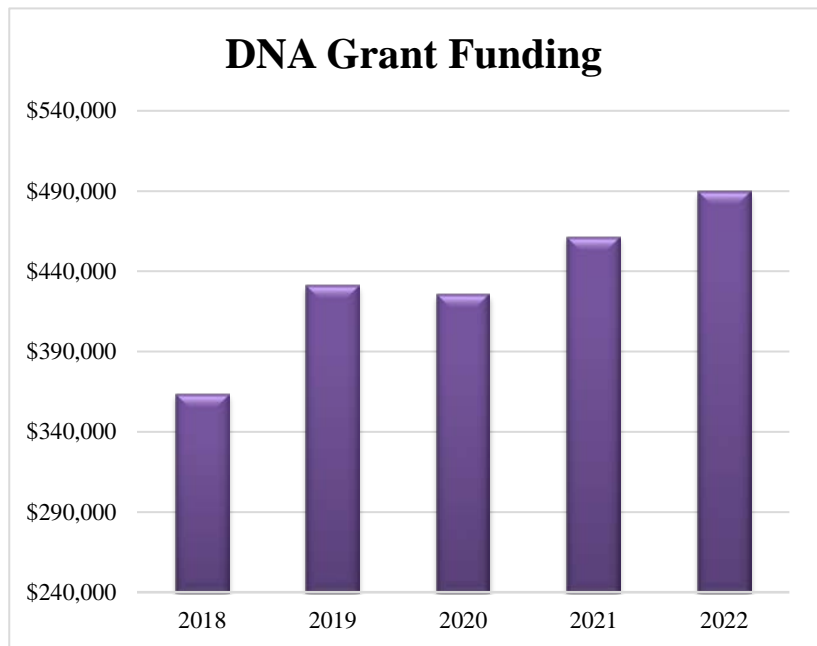
Due to the inability of DFS to hire and retain Forensic Evidence Specialists (FES), in 2022, the Laboratory Managers in DNA have been tasked to do the FES duties as it relates to DNA evidence intake, returns, and scheduling all appointments.

The Casework Manager continues to handle the DNA Backlog Reduction Grants. On September 30, 2022, the DNA Backlog Reduction Grant for FY2020 ended. The closeout documentation by the laboratory was due to the Bureau of Justice Assistance (BJA) by January 30, 2023. The laboratory is currently managing two DNA Capacity Enhancement Backlog Reduction (CEBR) Grants. The FY2021 CEBR grant for \$461,430 closes on September 30, 2023. The FY2022 CEBR is for \$489,843 closes on September 30, 2024.

Grant funds have allowed the DNA unit to function. In 2022, about 95% of the DNA Unit’s operational costs are from grant funds.

Grant funding has increased due to the fact that the DNA Unit uses all the grant funds allotted. In 2019, DFS-DNA laboratory personnel were invited to be a part of the National Institute of Justice (NIJ) and the Scientific Working Group on DNA Analysis Methods

(SWGDM) to develop a “Best Practices for DNA Laboratory Efficiency Improvements” publication.



After many delays due to COVID-19 and grants management moving from NIJ to BJA, this publication was released in 2022, <https://www.ojp.gov/pdffiles1/nij/304051.pdf>.

With the DNA FY2019, 2020, and 2021 grant funds, the laboratory continued to purchase reagents, consumables, and other supplies for processing casework and convicted offender samples, provide required continuing education training for each DNA Analyst, pay for external laboratory audits, purchase proficiency tests for each analyst, and purchase new laboratory software. Examples of equipment and other purchases with grant funds:

- Software to allow the second 7500 instrument to be upgraded to Windows 10
- Renovation of DNA CODIS laboratory
- Purchase of hardware and software for CODIS server upgrade
- Installation of a new biosafety cabinet
- DNA proficiency tests required for analysts to stay current on their accreditation standards.
- External audit for DNA Quality Assurance Standards-needed to maintain accreditation

Validation or performance checks are a critical part of forensic DNA work. Validations are done on new testing procedures, while performance checks are done to determine if there are any effects from upgrades or modifications to previously validated procedures. As noted in previous DFS annual reports, the DNA Laboratory does not have an individual primarily dedicated to performing validation/performance checks studies. Validation/performance checks are done by Analysts and/or Managers in the DNA Unit.

In the last annual report, it was noted that a new laptop was purchased, and a performance check was done on the 7500, an instrument used to determine the amount of DNA in a sample. The laptop was purchased at the end of 2021, but the performance check was done in the 1st quarter of 2022. The laptop and new software allowed for the upgrade from Microsoft Windows 7 to Microsoft Windows 10. Since the laboratory has two 7500 instruments, a 2nd laptop with the updated software was purchased in 2022. The performance check was also completed on that instrument. In DNA, all instrumental software is compatible with Microsoft Windows 10. Upgrade to Microsoft Windows 11 is not possible at this time, as necessary software has not been validated for Microsoft Windows 11 by the various vendors.

All performance checks listed in this report were successful and are currently being used by the laboratory.

Towards the end of 2022, at the National CODIS Conference, it was presented that the new version of the statistical software Popstats will have additional modules for mixture interpretation. The Popstats software has been used at the DFS for many years. Once the upgraded software has been installed on our computers, we will begin validation studies.

DNA

As with all validations, studies must be completed, policies must be in place, and laboratory staff must be trained before using these procedures in casework or databasing. Validation studies and training are also required to maintain laboratory accreditation. During annual audits, validation study documentation is reviewed to determine if a sufficient number of studies have been performed to support the use of the new method/technology in casework/databasing. Training documentation is also reviewed during annual audits.

We continue to use a chemistry kit that examines 27 DNA markers, seven more than the FBI requirement.

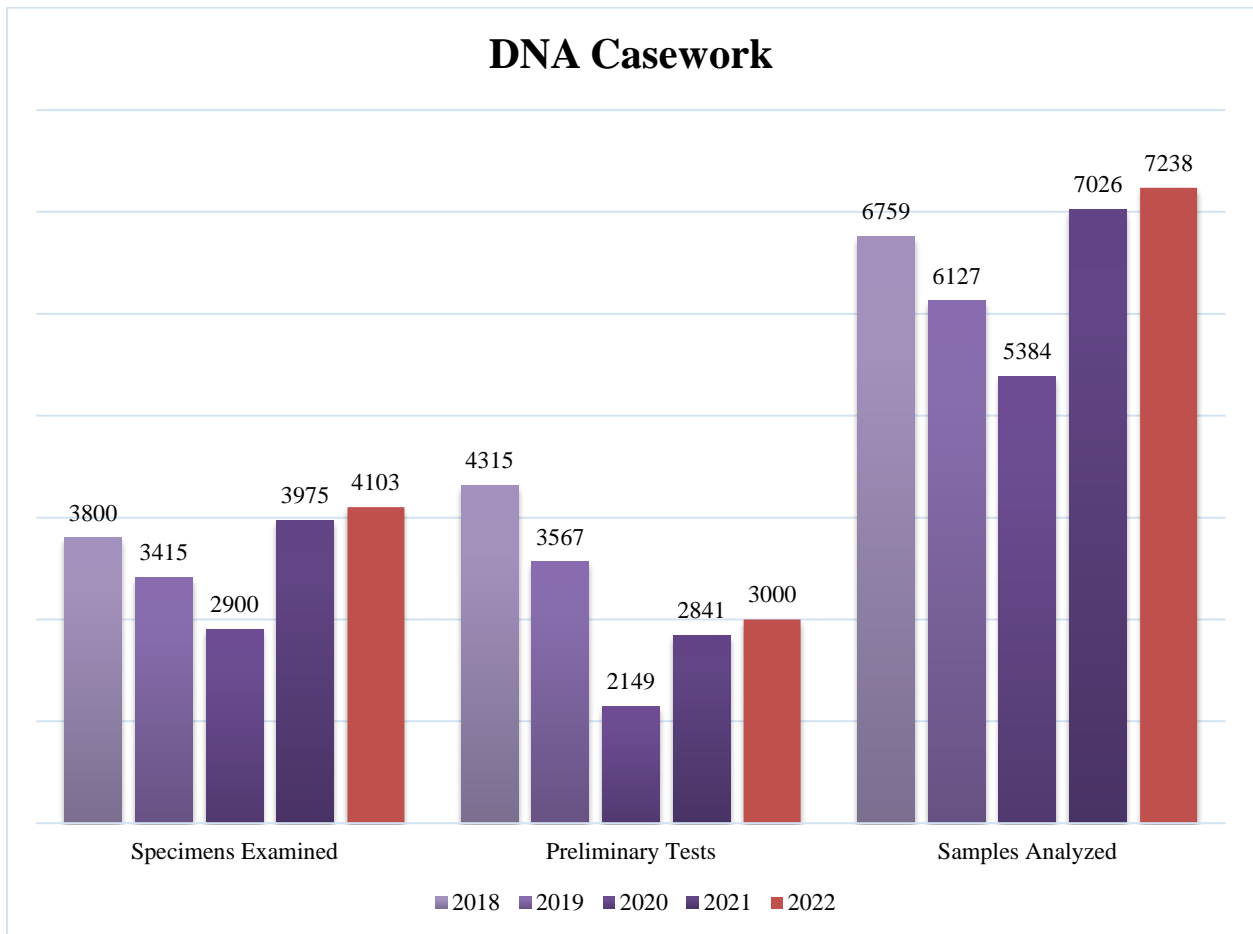
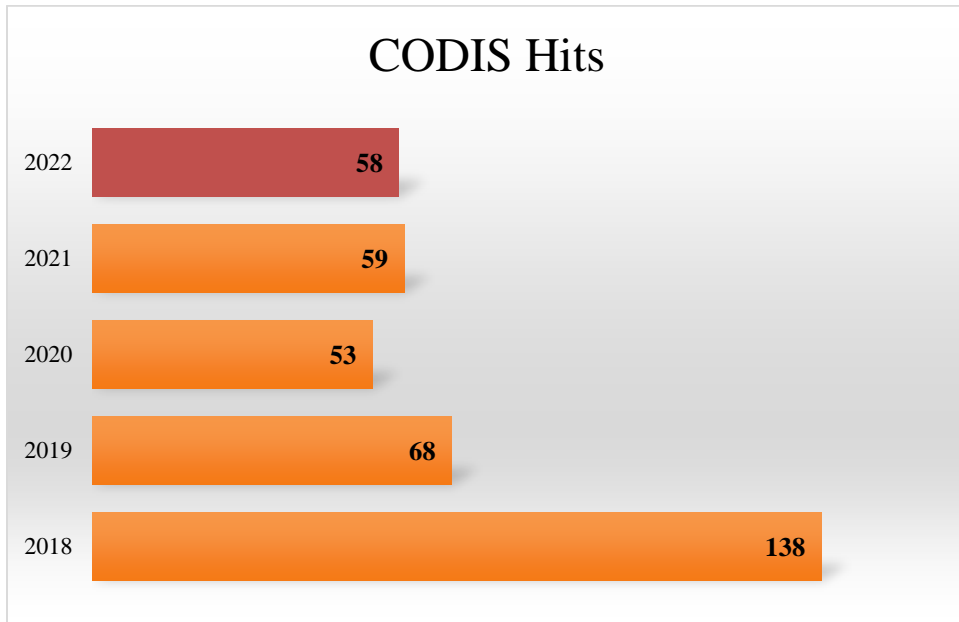
The DNA laboratory underwent on-site external audits for casework and databasing based on the FBI's Quality Assurance Standards. We were notified by the FBI in September 2022 to be in compliance with the FBI's Quality Assurance Standards. These Quality Assurance Standards were effective as of July 1, 2020. The DNA laboratory had zero non-conformities, meaning we met or exceeded each standard.

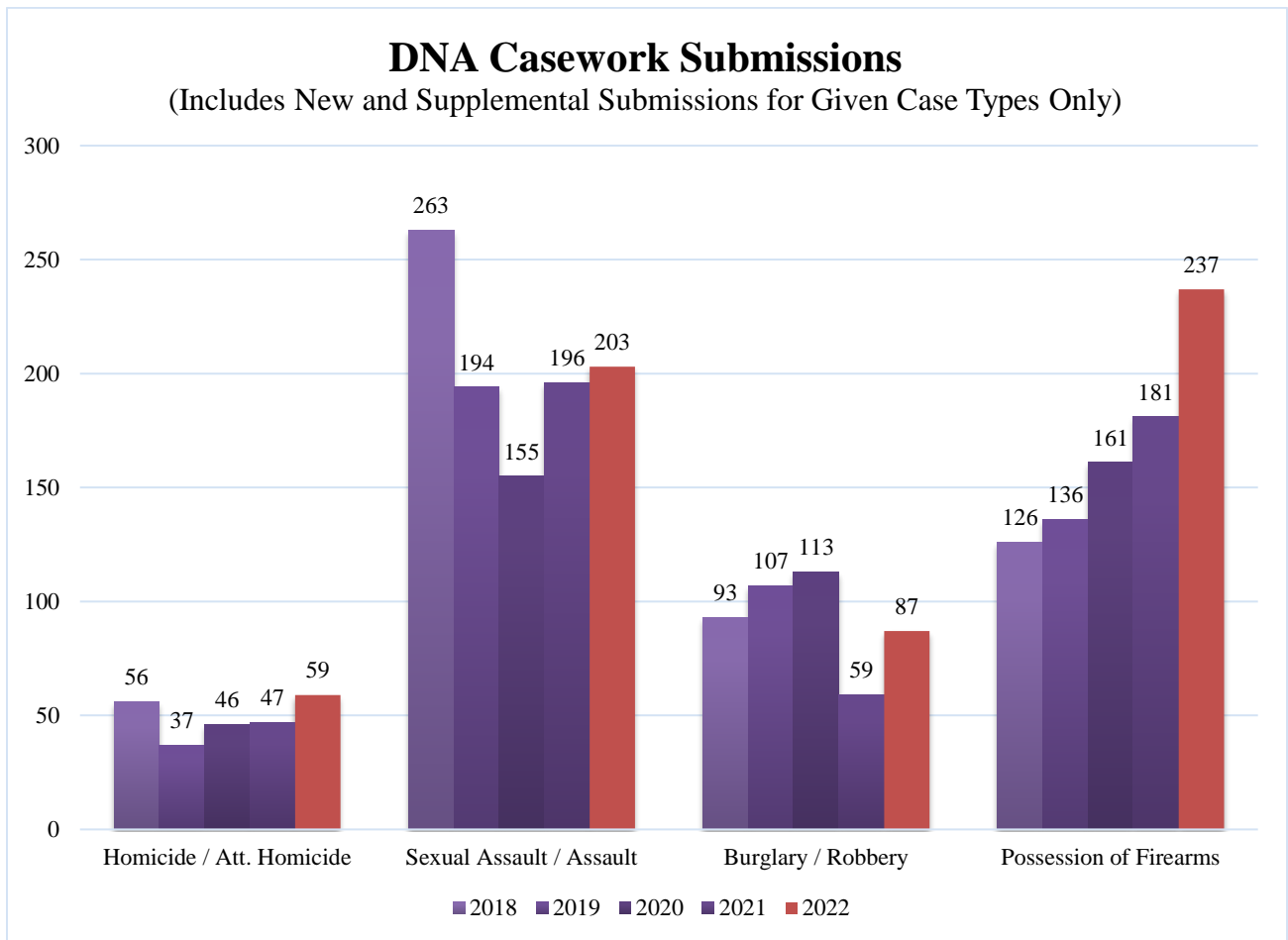
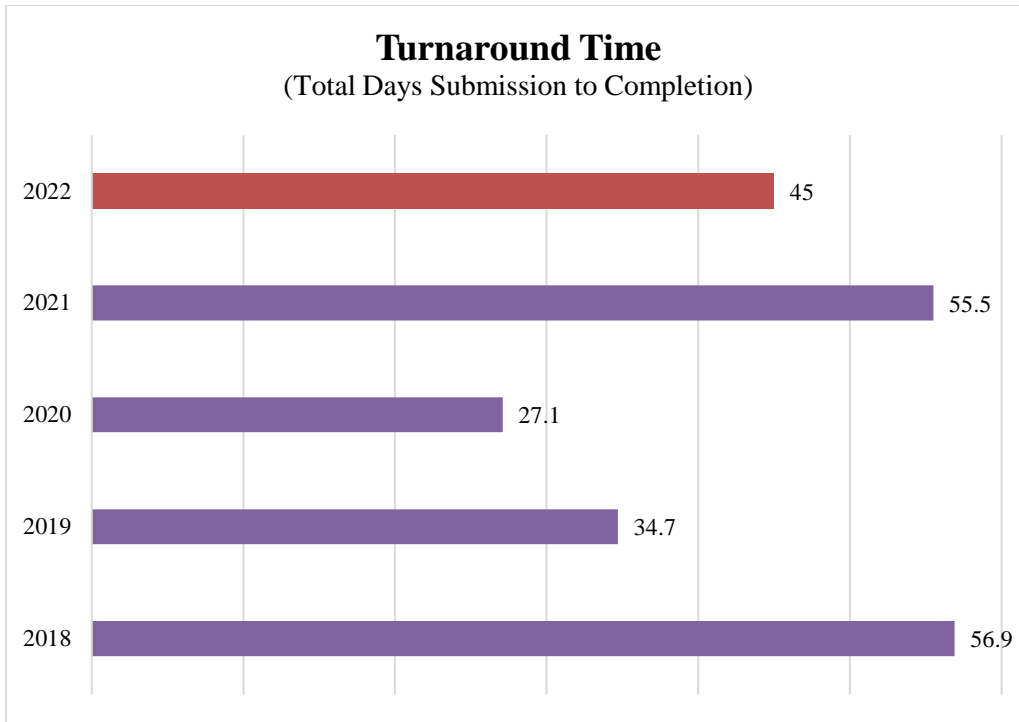
The following chart provides a comparative analysis of casework for 2018 through 2022 (the percentages in parenthesis show year-over-year changes):

	2018	2019	2020	2021	2022
Total Case completions	646 (+23%)	621 (-4%)	548 (-12%)	627 (+14%)	665 (+6%)
Turnaround Time (Total days submission to completion)	56.9 (-14%)	34.7 (-39%)	27.1 (-22%)	55.5 (+104%)	45 (-18%)
Case submissions	622 (+13%)	592 (-5%)	561 (-5%)	612 (+9%)	726 (+19%)
Staffing (Full-time casework)	6 (+20%)	5.6 (-3%)	4.8 (-14%)	5 (+4%)	5.75 (+15%)

In summary, during 2022, the DNA laboratory received 19% more cases and examined more evidence than in 2021. Furthermore, the laboratory completed more cases in 2022 than in any other previous year. Any case that has not been started for over 30 days after being received by the laboratory is considered backlogged. In 2022, the DNA Unit operated with near zero backlog and is working to keep backlogs low in the coming year.

Data





Forensic Chemistry

Overview

The Forensic Chemistry Unit (FCU) is comprised of two distinct sections. The Controlled Substances Section analyzes evidence submitted by Delaware law enforcement agencies for the presence of controlled substances. These controlled substances may be present in substances such as powders, liquids, food products, oil, waxes, plant material, paper, mushrooms, commercially produced pharmaceuticals and clandestine tablets or capsules. This section follows the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) recommendations regarding analytical schemes for the identification of controlled substances, as well as an internationally accepted statistical sampling plan that allows the chemist to make an inference about populations by testing a set portion of exhibits with a 95% level of confidence; this sampling plan reduces the amount of time processing cases while providing scientifically valid results. The Fire Debris Section works directly with the Delaware State Fire Marshal's Office and other local offices to analyze evidence associated with arson investigations. Fire Debris case types include all fire-related deaths (including homicides), incendiary fires, and arson-related offenses. Evidentiary samples are prepared and analyzed according to ASTM International Standard Practice and Test Methods to determine the classification of any ignitable liquids present in the submitted evidence.

Staffing

The full complement of the Forensic Chemistry Unit starting in 2022 included a Laboratory Manager II, Laboratory Manager I, ten full-time analytical chemists, a vacant part-time analytical chemist, a vacant laboratory technician, and two vacant Forensic Evidence Specialist positions. However, due to greater staffing needs in the DFS, the laboratory technician position was transitioned to a Records Management Analyst position.

The FCU underwent significant staffing changes in 2022. Three chemists and the Laboratory Manager I resigned, and both Forensic Evidence Specialist positions remained vacant for the entirety of 2022. The FCU was able to hire and then promote a chemist from casual/seasonal to full time and hire a new full time analytical chemist who is currently in training for controlled substance analysis. Two controlled substance chemists completed training and started casework in Fire Debris analysis.

Despite the changes in staffing, the members of the FCU were able to continue to process cases from all law enforcement agencies without a significant increase in turnaround time.

Casework and Accomplishments

Controlled Substances

The Chemists in the FCU completed 1568 cases in 2022, which was greater than the 1524 cases submitted in 2021. In the cases analyzed in 2022, there were 126067 exhibits submitted, and of those, 21954 were tested.

The turn-around-time for the cases was 60 days from submission to completion, however a bench turn-around-time starting from assignment to completion was 14 days across the unit.

Fire Debris

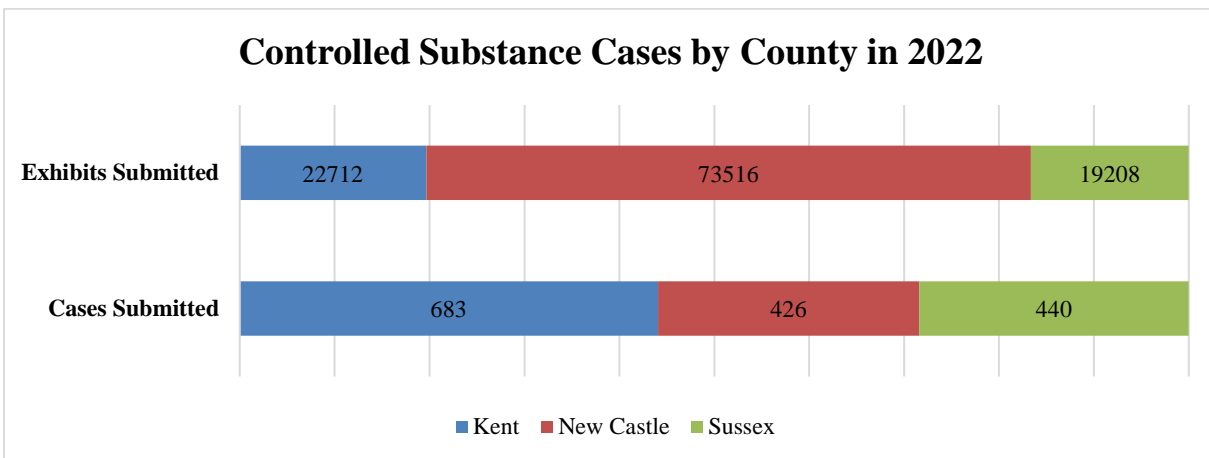
Since being accredited in 2019, the number of fire debris cases has tripled. In the 43 cases submitted in 2022, there were 134 items to be analyzed. Due to the complexity of the fire debris evidence, analysis of this evidence takes a considerable amount of time as compared to controlled substance evidence. The average fire debris case takes 26 days to analyze the data.

In addition to timely and efficient case processing, the FCU remained committed to community outreach, and participated in presentations to local high schools, law clerks, undergraduate research students and a chemist alumni college.

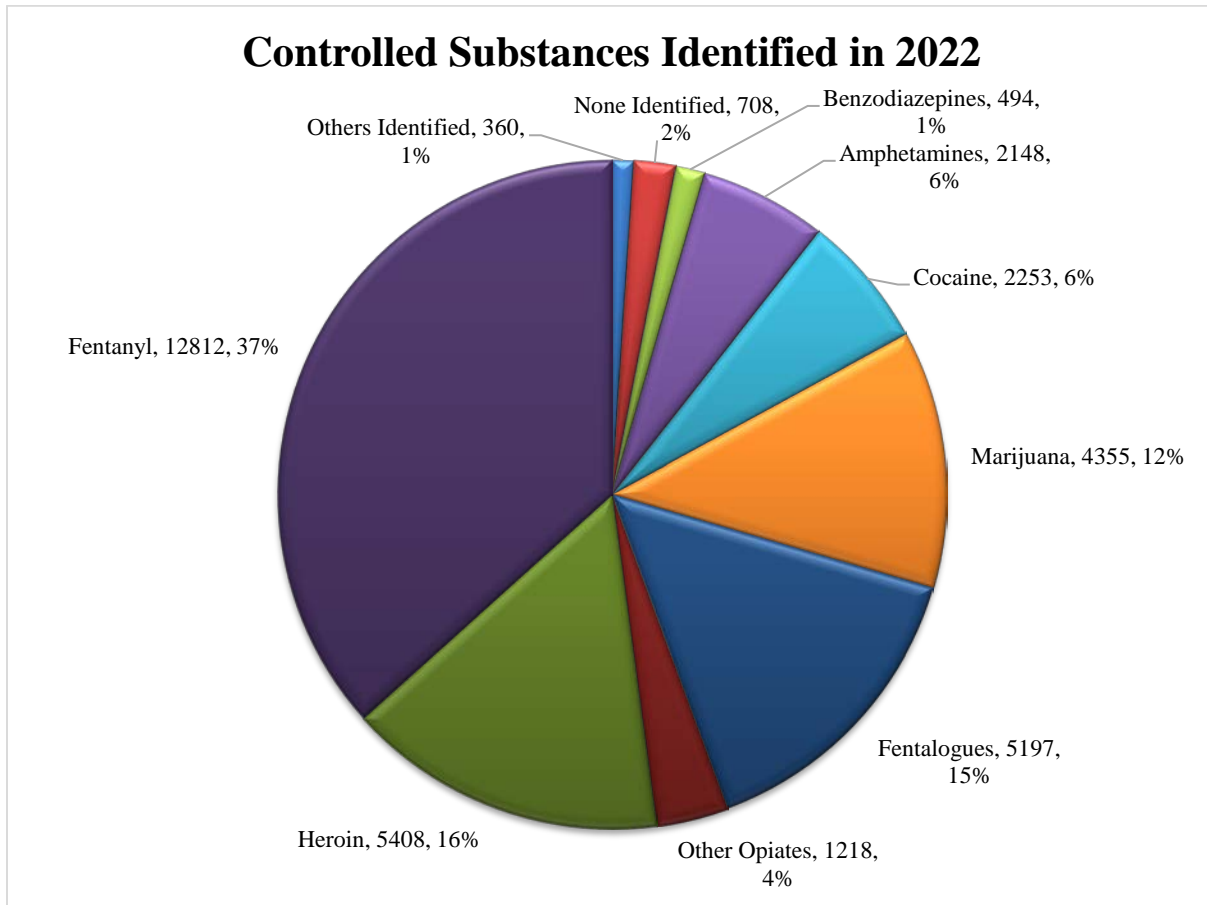
Data

Controlled Substances

The chart below illustrates the breakdown, by county, of the cases submitted to the DFS Controlled Substances Section. Although Kent County submitted the most cases, their cases only accounted for 20% of the exhibits submitted, whereas New Castle County, who submitted the least number of cases in 2022, accounted for over 63% of the exhibits submitted. This means cases submitted by New Castle County agencies were likely to contain a higher volume of evidence.

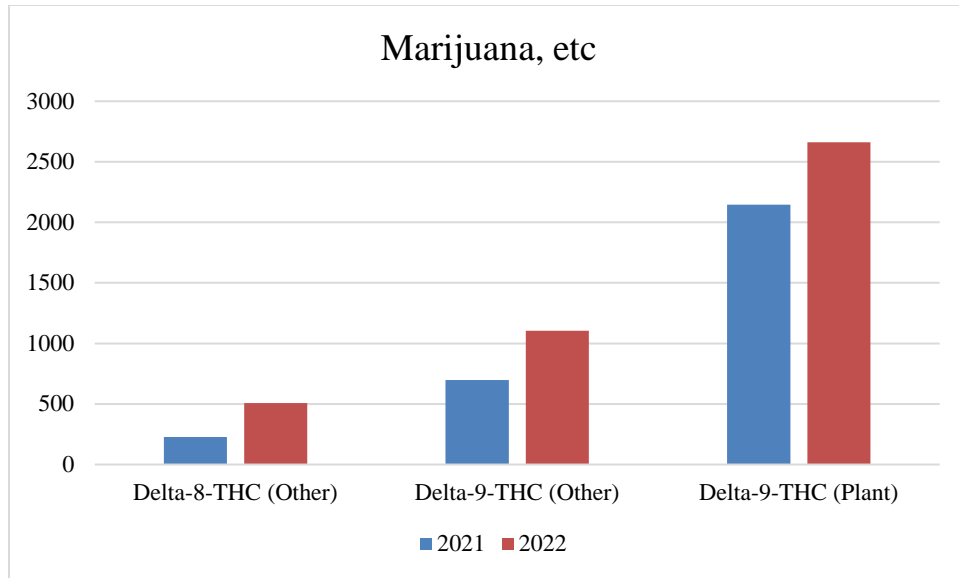


The following chart displays the substances identified by drug category. Percentages were calculated by the total number of exhibits analyzed and, because the unit reports multiple controlled substances present, each exhibit may contain more than one.



Compared to identifications made in 2021, numerous categories of substances increased or decreased in frequency in 2022. Synthetic cannabinoids, synthetic cathinones, other opiates, and heroin all had significant decreases compared to 2021. This continues to be the trend for heroin, which has declined by 62% since 2018. Methamphetamine, Marijuana and products containing tetrahydrocannabinoids, and fentalogues showed 48%, 39%, and 7% increases.

An in-depth look at cases involving Marijuana and other cannabinol-related compounds shows an increase across the board for Delta-8-THC and Delta-9-THC, to include plant and other products. Delta-8-THC identifications increased by 123%, while Delta-9-THC (other products) increased by 58%, and Delta-9-THC (plant) identifications increased by 24% from 2021 to 2022.

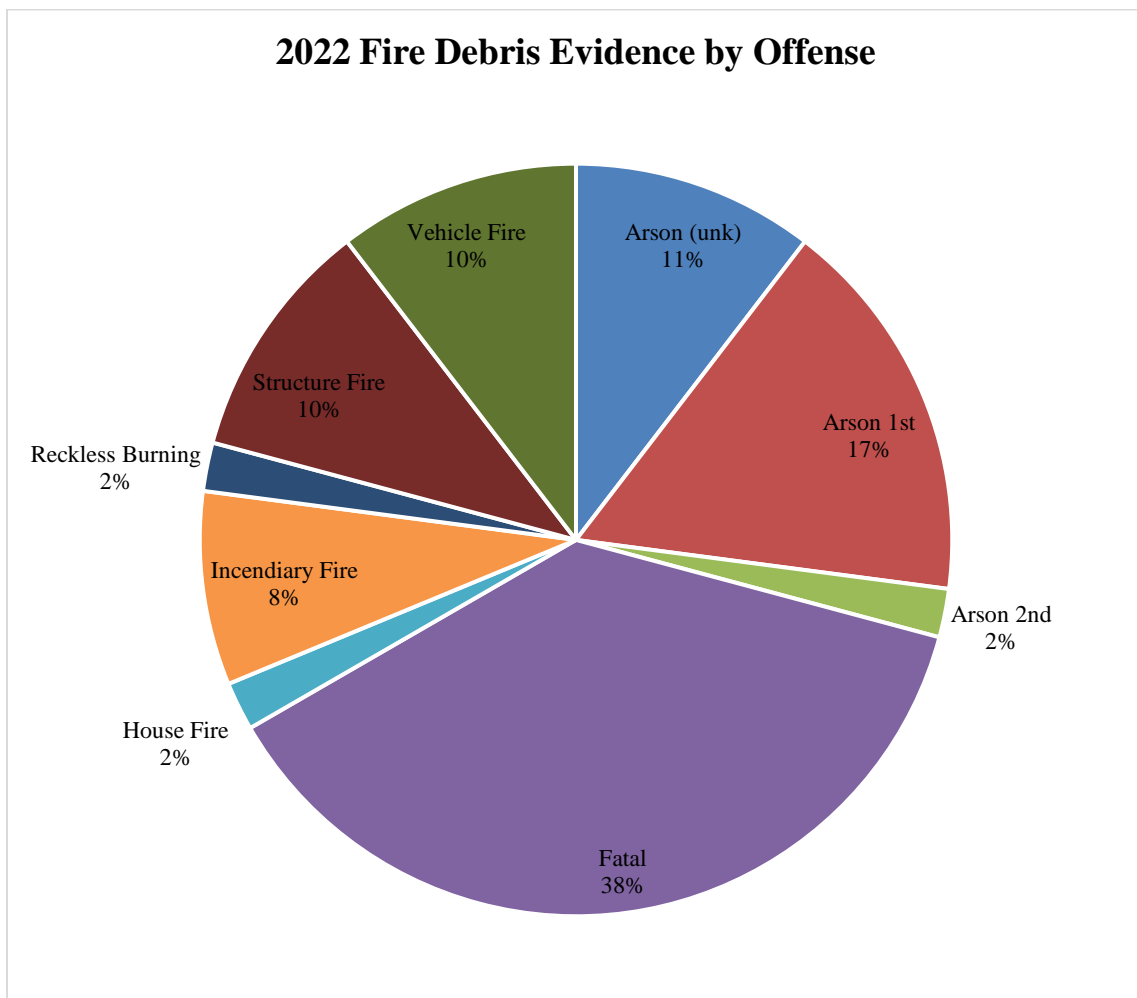
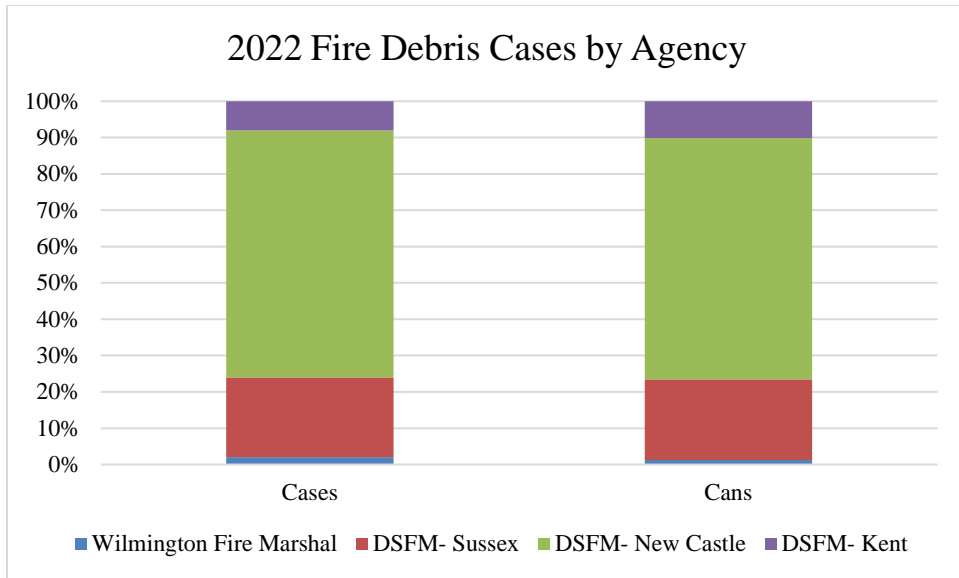


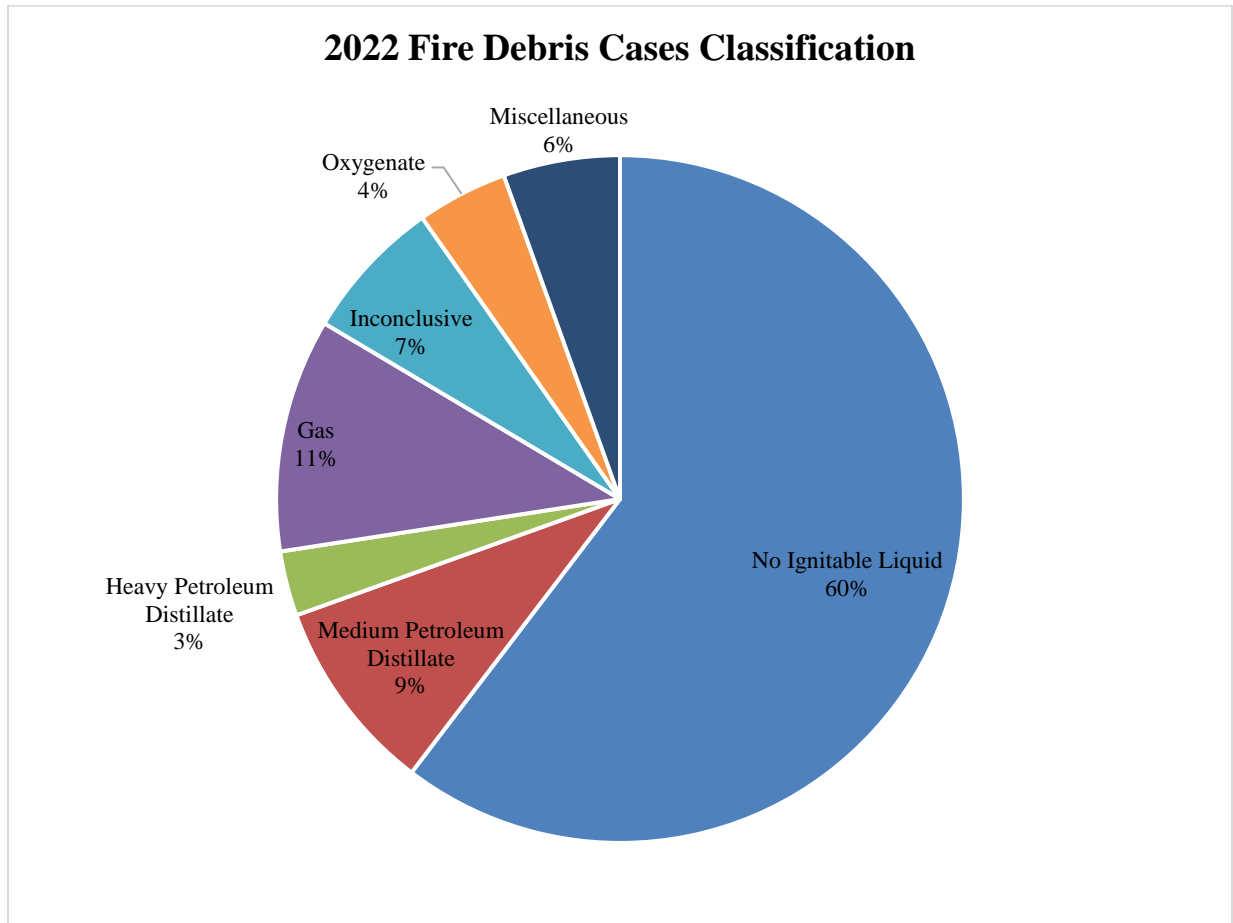
Most of the evidence containing Delta-8-THC was edible products manufactured and sold to resemble popular brands and also contained Delta-9-THC (see below).



Fire Debris

All fire debris evidence is submitted through the Office of the State Fire Marshal (OFSM) Headquarters in Kent County, regardless of the location where the incident occurred. The charts below illustrate the breakdown, by agency, of the cases submitted to the DFS Fire Debris Section, the type of offense associated with the evidence, and the ignitable liquid classifications identified.





Projects and Grants

The FCU received grant funding to purchase equipment and standards toward the quantification of THC potency in plant material by microextraction and High-Performance Liquid Chromatography-Photo Diode Array (HPLC-PDA). This extraction and instrument will allow chemists to determine the amount of Delta-9-THC present in potential marijuana samples. This testing is in anticipation of Delaware’s Title 16 update to reflect the federal government’s Hemp Farming Act of 2018, which removes low-THC cannabis from regulation under the Controlled Substances Act.

Conclusion

For answers to further questions, please see the DFS Website at <https://forensics.delaware.gov/>.