

2019

FORENSIC PATHOLOGY DIVISION ANNUAL REPORT

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TABLE OF CONTENTS

TABLE OF CONTENTS	1
HISTORY/OVERVIEW.....	2
MISSION	2
PATHOLOGY LEADERSHIP	3
PATHOLOGY ORGANIZATION.....	3
COUNTIES SERVED.....	4
DISTRIBUTION OF CASES: IN-COUNTY VS OUT-OF-COUNTY	4
MEDICAL INVESTIGATIONS.....	5
CASE SUBMISSIONS	6
AUTOPSY REPORTS.....	6
INDIGENT BURIALS AND CREMATIONS	7
Cremation Permits.....	8
TISSUE DONATIONS.....	8
CAUSE AND MANNER OF DEATH	9
Cause of Death	9
Manner of Death	9
Accidents.....	11
Motor Vehicle Deaths	12
Homicides.....	13
Suicides	16
TOXICOLOGY	19
Drivers.....	20
Overdoses	21
Opioid Related Deaths	21
Methamphetamine Related Deaths	22

HISTORY/OVERVIEW

The Regional Forensic Science Center officially opened on December 21st, 1995. The Center houses the Pathology Division (including the Office of the District Coroner) and the Forensic Science Laboratories. The Pathology Division is organized into two sections: Medical Investigations and Autopsy Services.

As mandated by law [KSA 22a-231], the District Coroner has the responsibility for investigating deaths within Sedgwick County that are a result of violence, unlawful means, suddenly when in apparent health, not regularly attended by a physician, any suspicious or unusual manner, when in police custody, or when the determination of the cause of death is held to be in the public interest. The primary goal of investigation and the postmortem examination is to determine cause and manner of death in order to generate a death certificate.

Cause of death is the injury or disease that results in death. Manner of death is determined by circumstances in which the death occurred and includes natural, accident, homicide, suicide, and undetermined. Undetermined manner of death is used when circumstances are unknown or are unclear.

Over the last decade, the number of cases reported annually to the office has averaged 3,219, with generally a steady increase year after year. There has been greater than a one and half fold increase in the number of reported cases and approximately a two and half fold increase in the number of required examinations and medical records review since 1998.

The Pathology Division has been accredited by the National Association of Medical Examiners (NAME) since 2001.

MISSION

The Forensic Science Center strives to provide the highest quality medico legal and advanced forensic laboratory services to Sedgwick County. Death Investigation and Forensic Autopsy services are conducted in a compassionate and objective manner to achieve accurate certification of cause and manner of death. The Forensic Laboratory services provide unbiased and accurate analytical testing to support the resolution of criminal cases. As an independent agency operating under the Division of Public Safety, the Forensic Science Center collaborates with public health and criminal justice stakeholders to reduce crime and prevent deaths.

PATHOLOGY LEADERSHIP

Director-Interim

Shelly Steadman, PhD

District Coroner-Chief Medical Examiner

Timothy S. Gorrill, MD, PhD

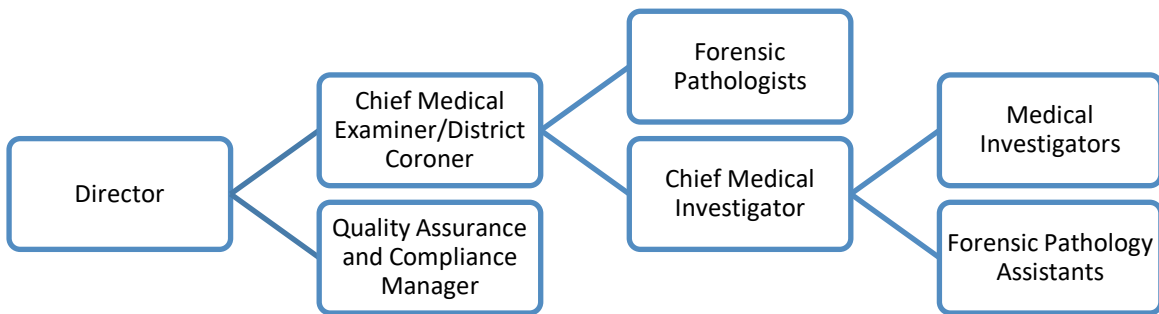
Chief Medical Investigator

Shari L. Beck, F-ABMDI

Quality Assurance and Compliance Manager

Robert C. Hansen II, M.S.F.S.

PATHOLOGY ORGANIZATION



COUNTIES SERVED

In 2019 [Figure 1], the majority of service provided was for Sedgwick County; however, the Center does provide on a fee for service basis, autopsy examinations for many of the counties in the southcentral region of the state. In total, pathology examinations were performed on cases from 20 counties in 2019.

According to the 2010 census, the approximate population living in Sedgwick County is 498,365 and the approximate metropolitan population including the continuous counties is 731,732.

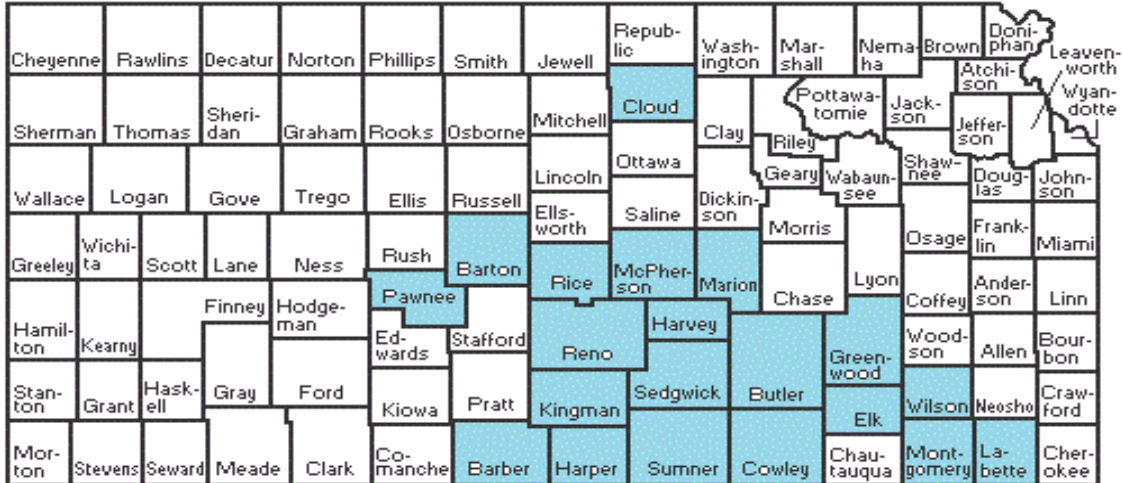


Figure 1: Counties the Pathology Division provided service for in 2019.

DISTRIBUTION OF CASES: IN-COUNTY VS OUT-OF-COUNTY

The Pathology Division serves as a resource to other counties in the state of Kansas. In 2019, approximately 20% of the examinations were performed for other counties [Figure 2]. Overall, Sedgwick County cases have increased over the last 10 years.

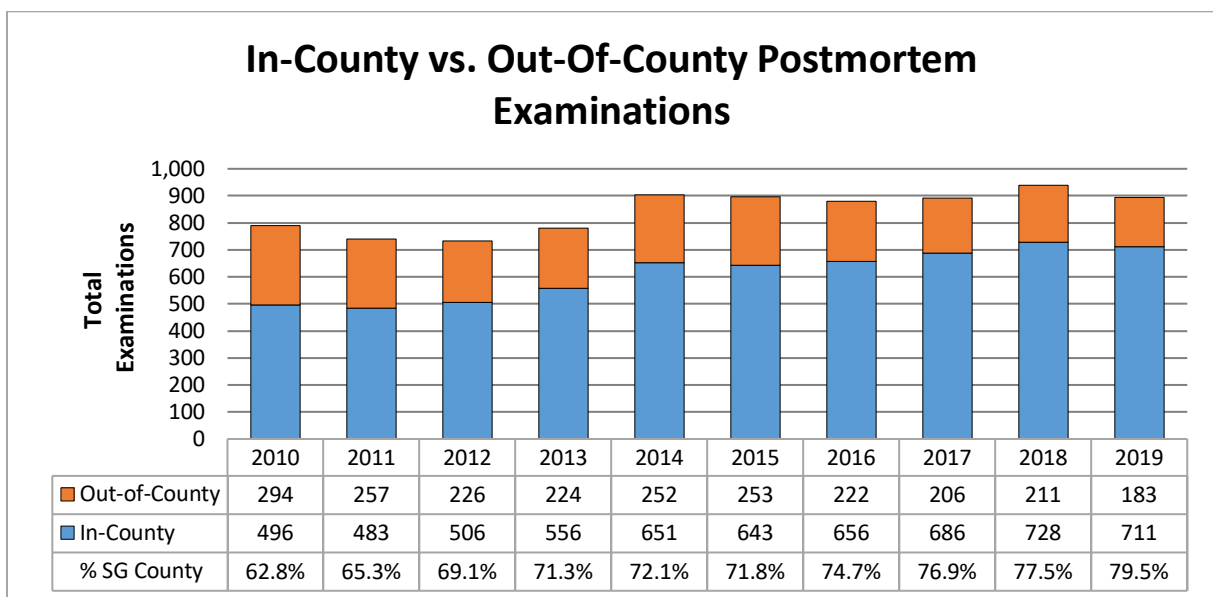


Figure 2: Examinations include Full and Partial Autopsies, External Examinations, Non-human Skeletal Remains, and Records Reviews.

MEDICAL INVESTIGATIONS

The Pathology division has a Chief Medical Investigator and five Medical Investigators. The Medical Investigators are on duty year round, twenty-four hours a day, seven days a week. The Medical Investigator serves as the “eyes” and “ears” of the Coroner. The investigators triaged 3345 reported deaths in 2019.

The District Coroner accepted jurisdiction or assisted in 894 cases [Figure 3] of the reported deaths. On average, over the last 10 years, accepted cases constitute 26.5% of the total number reported to the office.

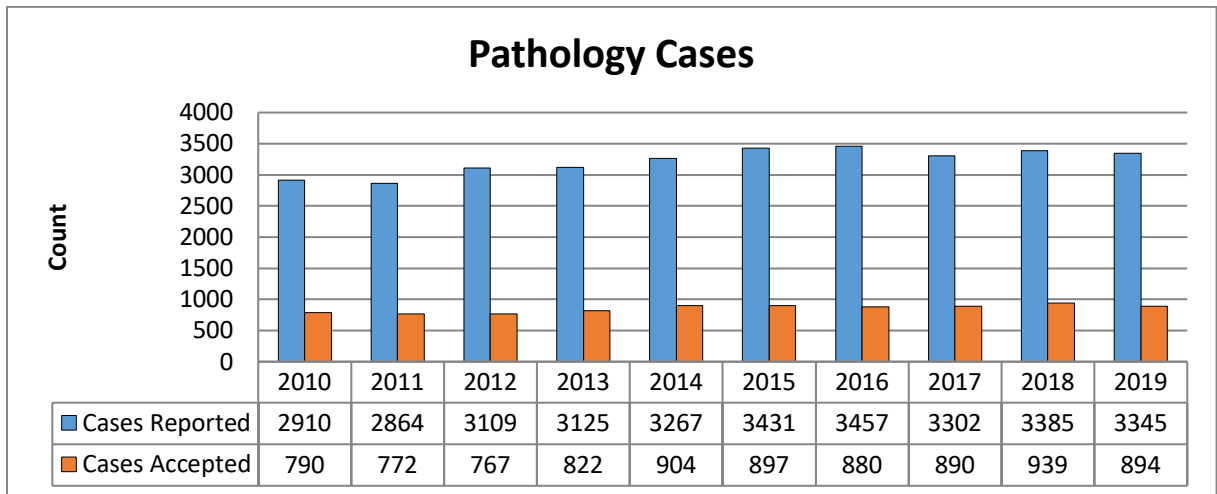


Figure 3: Pathology cases reported include all deaths that were reported to the Center. Pathology cases accepted include Records Reviews, Autopsies, Partial Autopsies, External Examinations, and Nonhuman Skeletal Remains.

Medical Investigators may attend the scene of a death when it occurs outside of a hospital setting. Pertinent circumstantial and physical observations are documented and photographed, and items of evidence are collected in accordance with state law, good forensic principles and accreditation requirements established by the National Association of Medical Examiners [NAME]. The number of scene investigations by Medical Investigators per year [Figure 4] has shown a steady increase over the last 10 years.

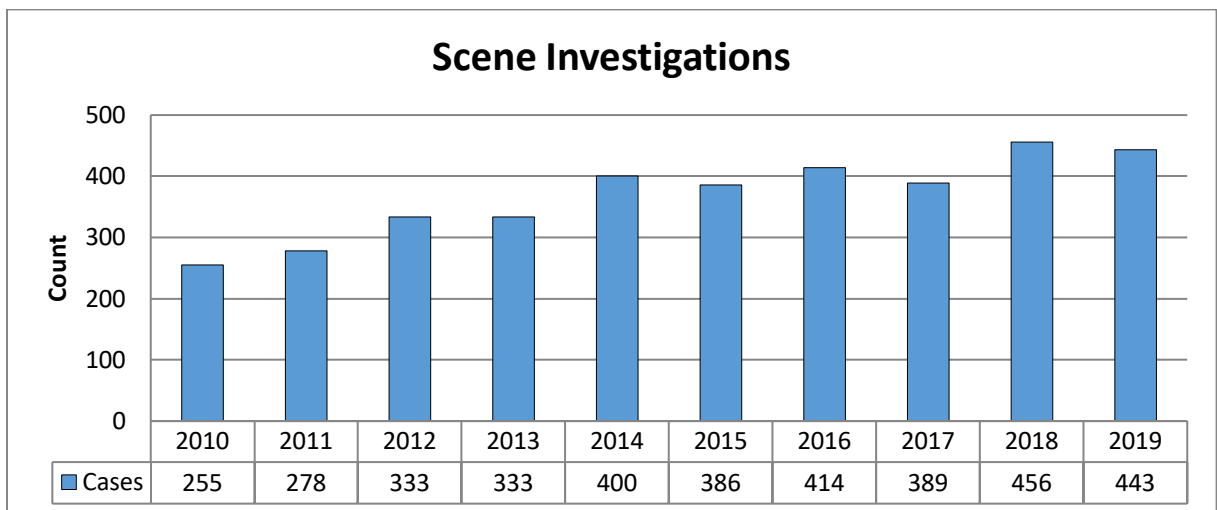


Figure 4: Number of scenes that Medical Investigators worked.

CASE SUBMISSIONS

In 2019, 3345 deaths from Sedgwick County and referring counties were reported. For Sedgwick County deaths, analysis of the scene, circumstances of the death and the decedent’s medical history were key factors in determining coroner’s jurisdiction. Coroner’s jurisdiction for the referring counties was determined by the referring county Coroner. Jurisdiction was assumed or assistance was provided in 894 cases, of which 506 were complete autopsies.

Figure 5 shows the number of postmortem exams, that includes full autopsies, partial autopsies, and external examinations. External examinations are performed in cases where scene investigation, circumstances, medical history, and the exam are sufficient to certify the death.

The average over the past 10 years for full autopsies, external examinations, and partial examinations are 563, 177, and 40, respectively. Overall, approximately 70% of the examinations were full autopsies, 24% were externals examinations, and 9% were partial examinations.

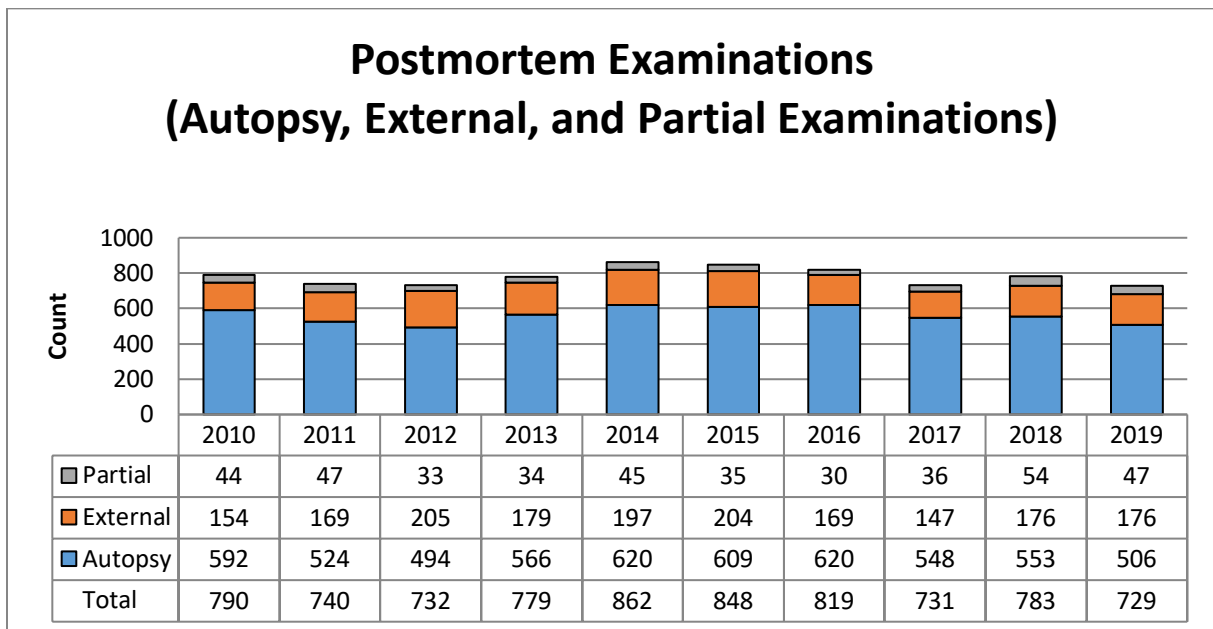


Figure 5: Postmortem examination type excluding records reviews and non-human skeletal remains.

AUTOPSY REPORTS

One important metric to monitor the work efficiency of the Pathology Division is the percentage of autopsy reports completed within 90 days of the examination. In general, the percentage of cases that meet this mark is dependent upon how quickly the Toxicology Laboratory can complete testing and how quickly the case pathologist can complete his/her autopsy reports following the toxicology report being issued. In 2019, the pathology division saw a decrease in the percentage of cases that meet the goal of 90% cases completed within 90 days from examination [**Figure 6**]. There are several reasons why this occurred, including the Toxicology Laboratory being down two full time scientists and other staffing issues in the Pathology Division.

Percent of Autopsy Reports Issued Within 90 Days per Examination Year and Percent of Toxicology Post-mortem Reports Issued Within 60 and 90 Days per Submission Year

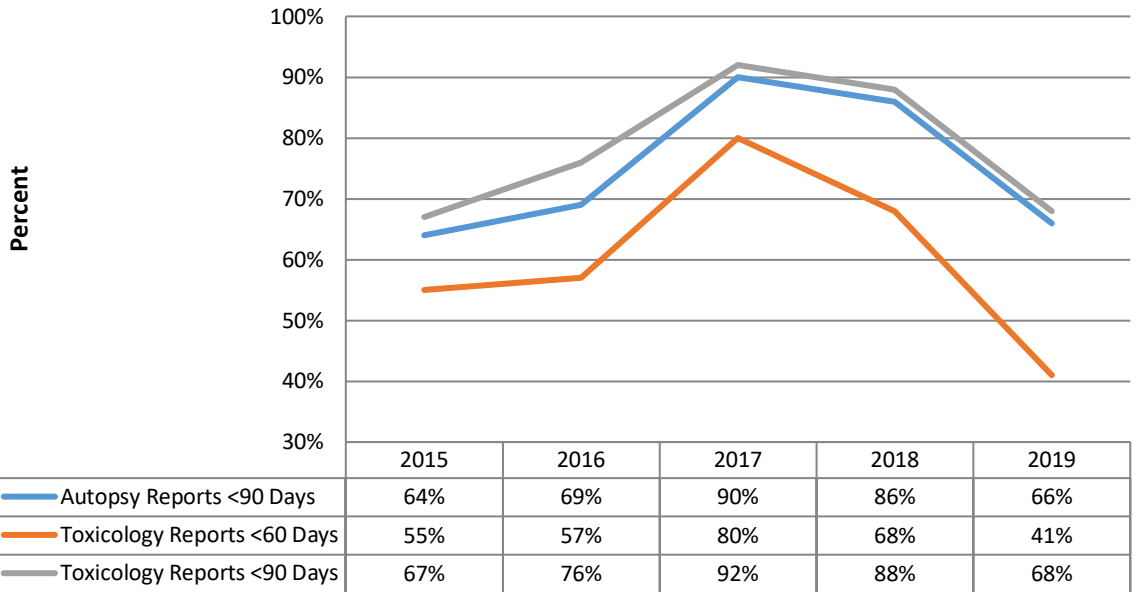


Figure 6: Percentage of autopsy reports being issued within 90 days from examination per examination year and the percentage of Toxicology Post-mortem reports issued within 60 days of submission per submission year. The goal for the autopsy reports is to have 90% of reports issued within 90 days from examination and the goal of the Toxicology Laboratory is to complete 90% of cases within 60 days from submission.

INDIGENT BURIALS AND CREMATIONS

Bodies that are under the jurisdiction of the Coroner shall be delivered to the immediate family or the next of kin of the deceased. If after a diligent search, no family member or concerned party is found that is willing to claim the remains, pursuant to K.S.A. 22a-215, Sedgwick County is required to decently bury/cremate the bodies of unclaimed deceased persons. In accordance with this statute, a procedure has been established by the Center to facilitate the necessary arrangements regarding indigent burials/cremations. The Center maintains a contract with a local mortuary service to handle the disposition of the remains.

However, Sedgwick County will not be a guarantor of burial/cremation expenses for any claimed body. As of 2016, the Center will cremate all unclaimed bodies under its jurisdiction [Figure 7]. The cremains are retained indefinitely and in a respectful manner until final disposition.

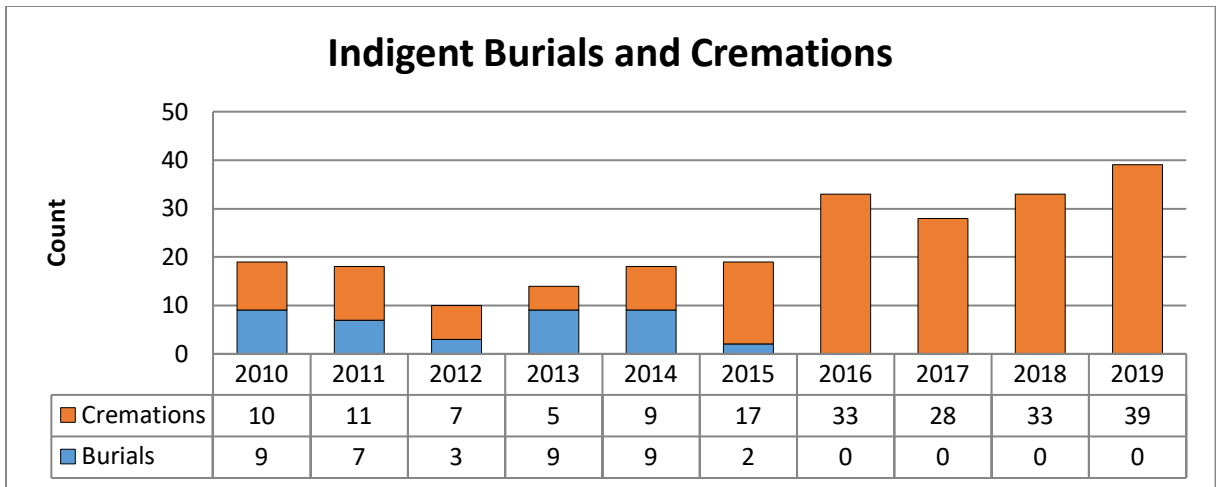


Figure 7: Number of Indigent Burials/Cremations for which the Center took responsibility. In 2016, the County changed policy to allow for cremation only for final disposition.

Cremation Permits

In the state of Kansas, the Coroner is also charged with the investigation of death if the body is to be cremated. The investigation involves confirmation that the death certificate is appropriately executed, and that no further circumstances exist which may have contributed to the death. This may involve interviews with medical personnel, families or other interested parties, and/or a review of medical records. If the cause of death is unclear or falls under the jurisdiction of the Coroner, a postmortem examination and issuance of a revised death certificate may be required prior to cremation. **Figure 8** illustrates the steady annual increase of cremation permits signed by the Coroner over the past 10 years.

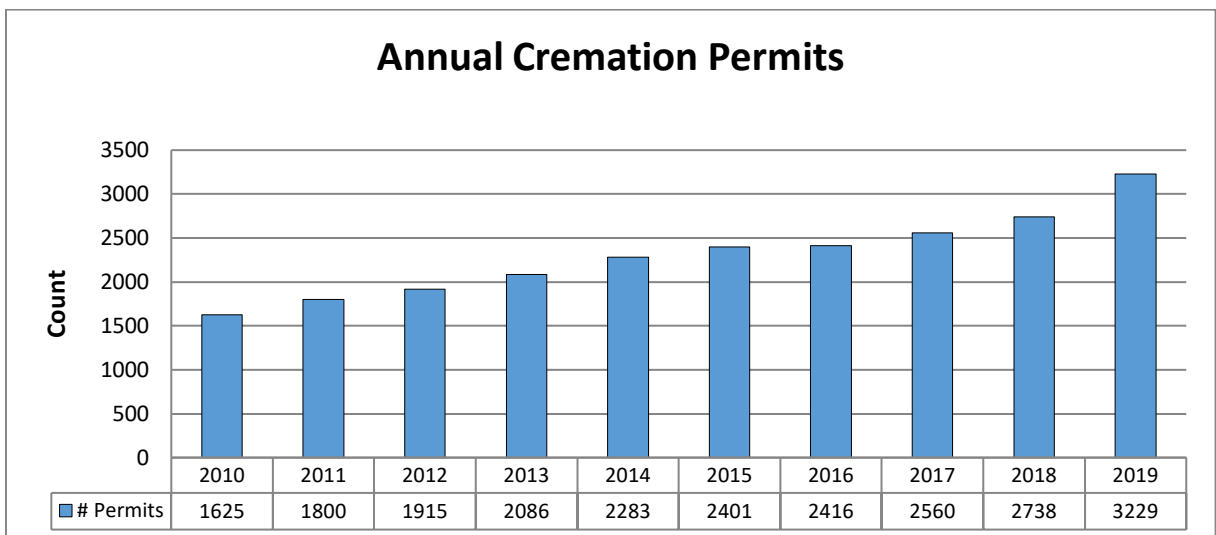


Figure 8: The number of cremation permits per year over a 10 year period.

TISSUE DONATIONS

The Pathology Division works in cooperation with procurement agencies [Kansas Eye Bank, Midwest Transplant Network, and Heartland Lions Eye Bank] to facilitate organ and tissue donation in cases where the death falls under the jurisdiction of the Coroner. **Figure 9** provides the annual count of eye, organ, and/or tissues donations over a 10-year period.

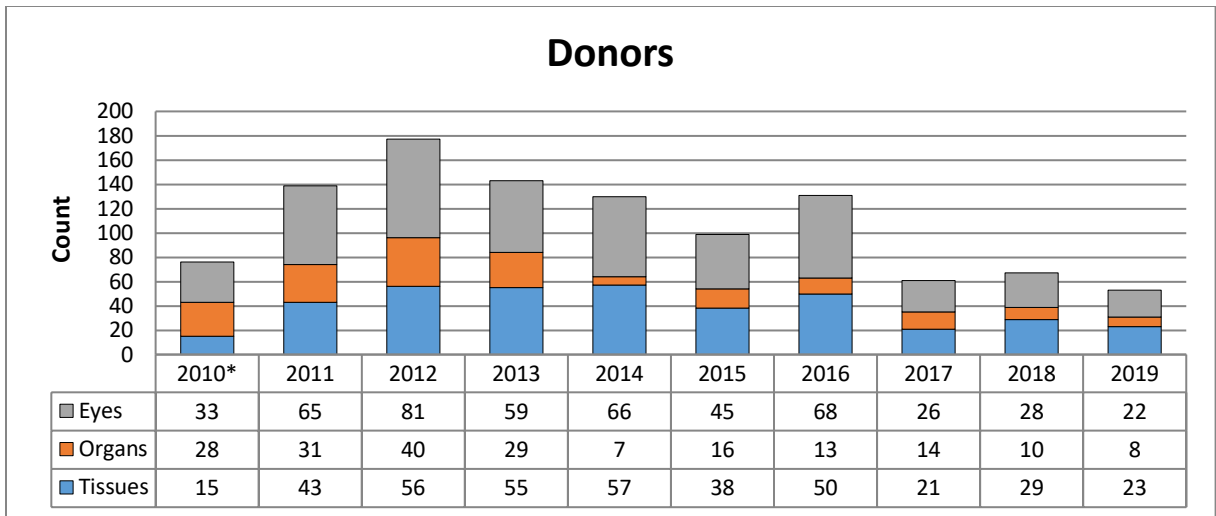


Figure 9: Annual count of eye, organ, and/or tissues donations. *The numbers for 2010 is a reflection of inability to track numbers due to lack of in-house procurement associated with remodeling of the tissue suite.

CAUSE AND MANNER OF DEATH

Cause of Death

The cause of death is a term used to indicate the medical cause of death. It lists the disease(s) or injuries that caused death. Specific cause of death information is recorded on the death certificate and is entered into the Vital Statistics System of the State of Kansas.

The reason(s) why an accident occurred, a person took their own life, or why one person killed another person are not investigated by the medical examiner for the purpose of death certification.

Manner of Death

The District Coroner’s Office is responsible for determining the manner of death, which is a way to categorize death as required by the Kansas Department of Health and Environment. The classifications of manner of death are natural, accidental, suicide, homicide, and undetermined.

Figure 10 shows the breakdown of the deaths by manner. Homicides are deaths that result from injuries caused by the actions by another person. Homicides constituted 5.6% [**Figure 10**] of the cases for 2019. The majority (70%) of these deaths resulted from gunshot wounds.

Suicides are defined as deaths that result from a purposeful action to end one’s own life. In 2019, approximately 14% of the cases were certified as suicides.

Approximately, 45% of deaths were certified as accidents, which are those that resulted from an unintentional event or chain of events. This category includes most motor vehicle accidents, falls, and accidental drug overdoses.

Natural deaths are those that are solely caused by natural disease and constituted approximately 29% of the cases. The most common cause of death in cases of sudden, unexpected natural death is coronary artery disease.

Cases that were classified as an undetermined manner of death constituted approximately 5% of the total caseload.

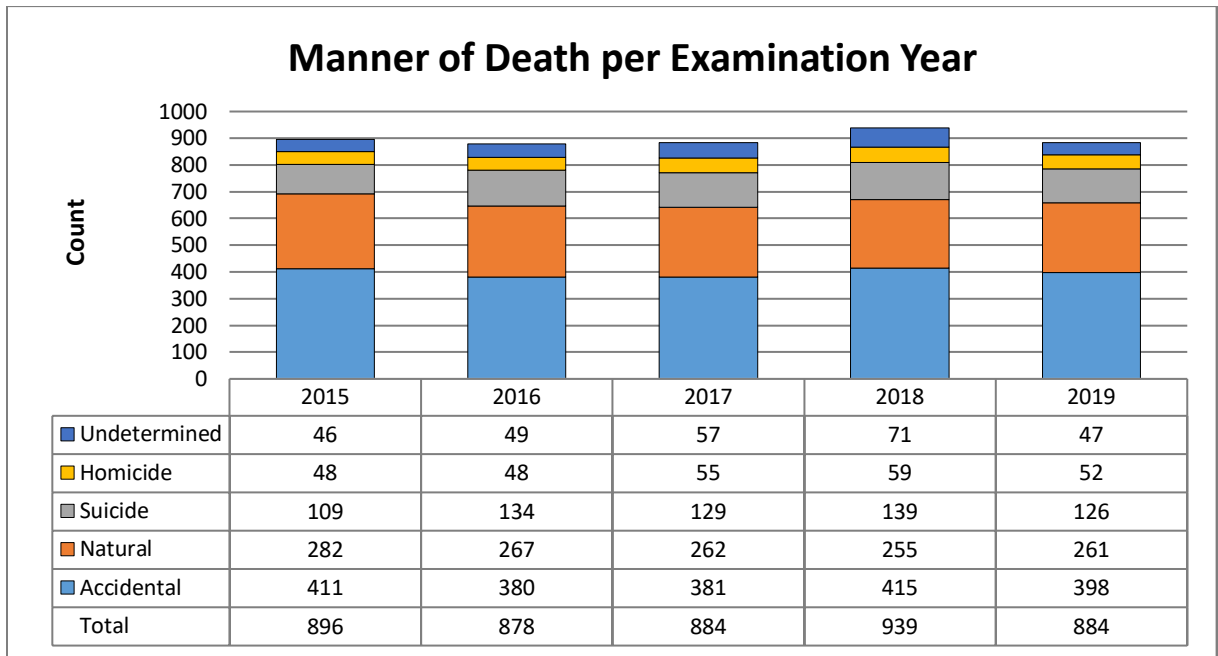


Figure 10: Percentages of each manner of death per examination year.

The manner of death (MOD) can be placed into two general categories, determined or undetermined. **Figure 11** illustrates the percentages of these two categories for cases with a cause of death that is non-natural.

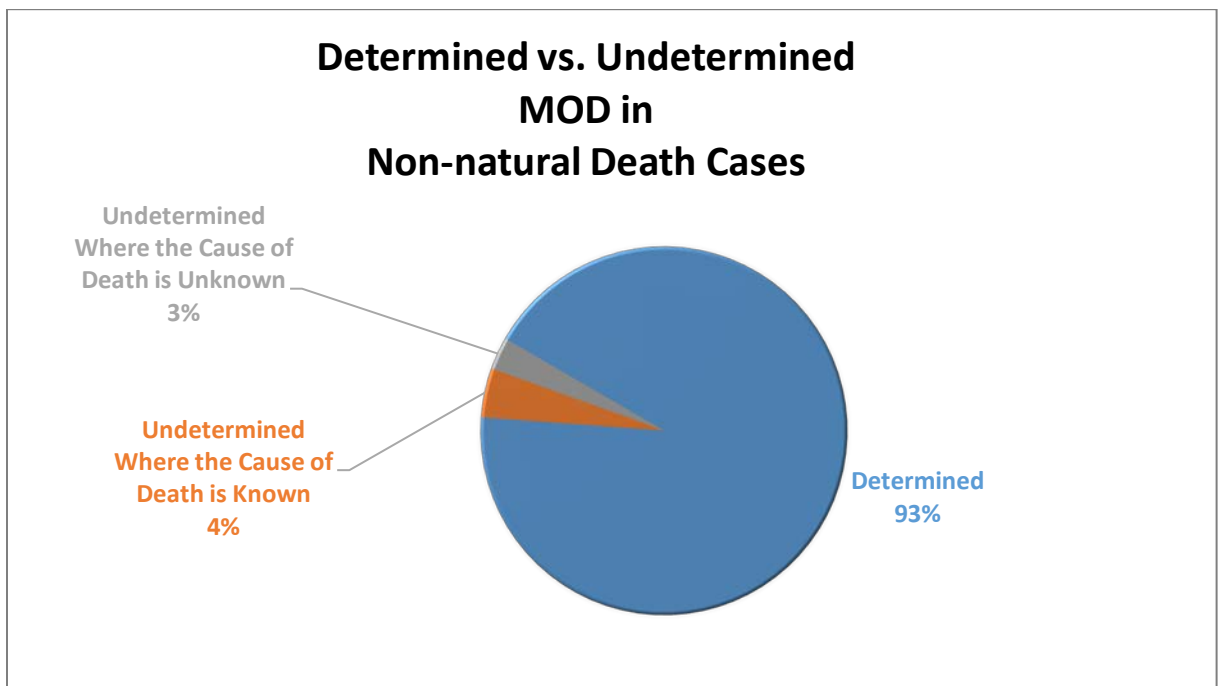


Figure 11: Percentage of determined versus undetermined manners of death.

Table 1 illustrates the cause of death for cases where the manner was ruled non-natural. In 2019, blunt force injuries were the leading cause of non-natural deaths.

<i>Non-natural Cause of Death</i>	Number of Deaths	Percentage of Total
<i>Blunt Force Injuries</i>	155	25.0
<i>Toxicity (Ethanol and/or Drug)</i>	148	23.8
<i>Other</i>	119	19.1
<i>Firearms Injuries</i>	109	17.5
<i>Hanging</i>	36	5.8
<i>Smoke Inhalation and/or Thermal Injuries</i>	13	2.1
<i>Drowning</i>	10	1.6
<i>Sharp Force Injuries</i>	10	1.6
<i>Asphyxia (Strangulation or Suffocation)</i>	10	1.6
<i>Hypothermia or Hyperthermia</i>	6	0.9
<i>Electrocution</i>	2	0.3
<i>Carbon Monoxide Poisoning</i>	2	0.3

Table 1: Number of causes of non-natural deaths and the respective percentage of the non-natural deaths total.

Accidents

Table 2 illustrates that approximately 22% of all accidental deaths were related to motor vehicle accidents (MVA) and nearly 29% were overdoses.

<i>Mechanism of Injury</i>	Number of Deaths	Percentage of Total
<i>Overdose</i>	114	28.6
<i>Fall</i>	98	24.6
<i>Motor Vehicle</i>	91	22.8
<i>Medical Miscellaneous</i>	45	11.3
<i>Other</i>	22	5.5
<i>Fire Exposure</i>	10	2.5
<i>Submersion</i>	9	2.2
<i>Environmental Exposure</i>	3	0.7
<i>Train</i>	3	0.7
<i>Electrocution</i>	2	0.5
<i>Mechanical Restraint</i>	1	0.2

Table 2: Number of accidental deaths and the respective percentage of each mechanism of injury for all accidental deaths. Note that motor vehicle has 91 accidental deaths because the manner of death for 1 case involving a motor vehicle was declared undetermined.

Motor Vehicle Deaths

Figure 12 illustrates the percentage of motor vehicle deaths categorized by what is known about the restraint of the occupier, if the decedent was a cyclist or a pedestrian. There were 92 motor vehicle deaths (MVA), 91 of which were ruled accidental and 1 was ruled undetermined. As illustrated, drivers that the restraint is unknown to the Coroner had the greatest percentage of deaths in 2019.

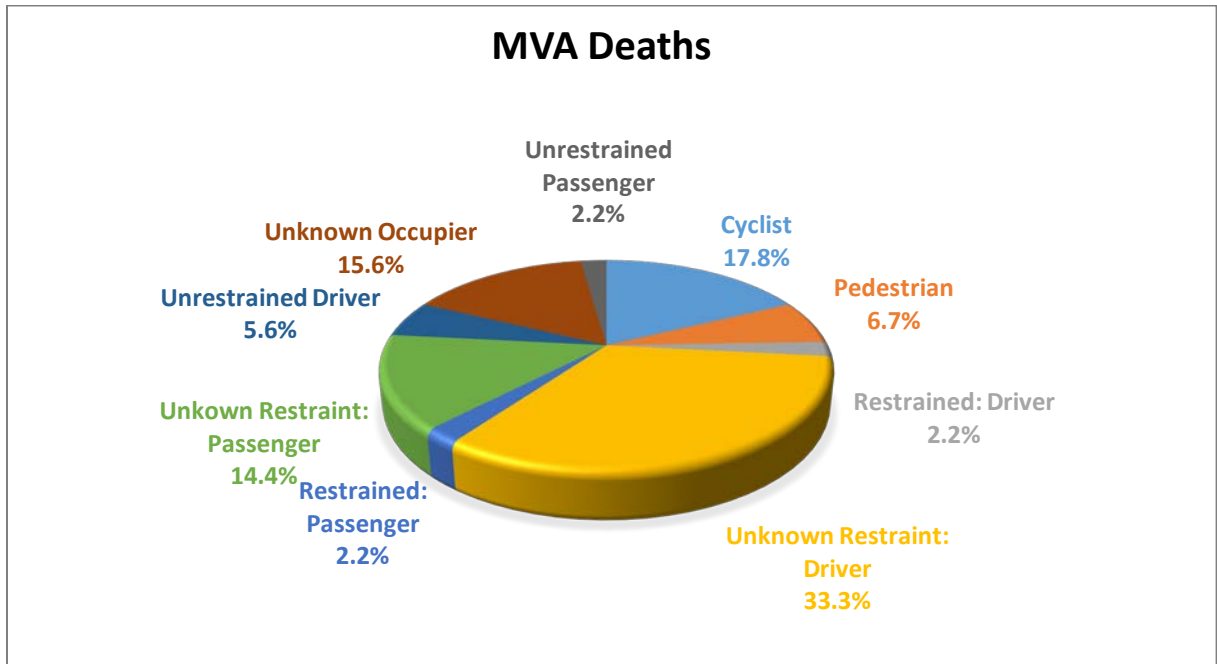


Figure 12: Motor vehicle deaths (MVA) per decedent restraint category.

In **Figure 13** is the number of motor vehicle fatalities per the weekday the death occurred.

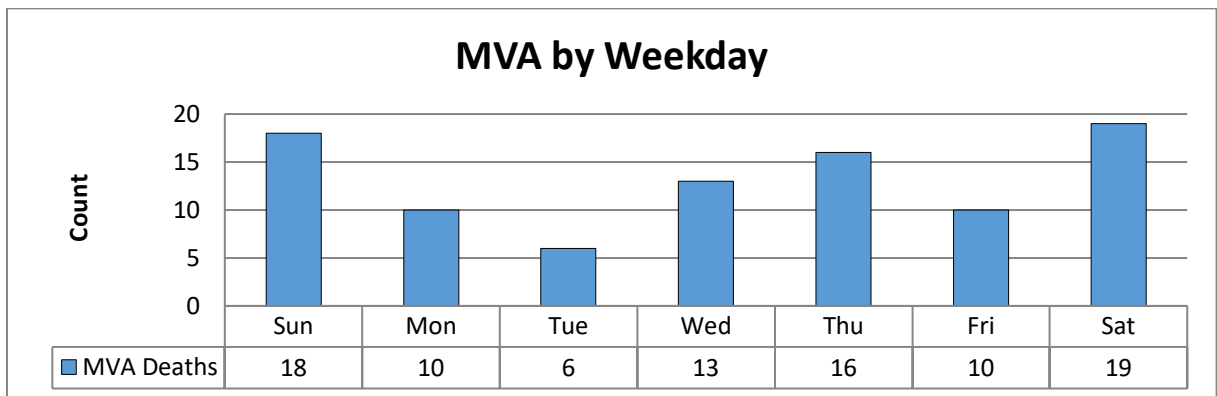


Figure 13: The number of motor vehicle fatalities per the weekday the death occurred.

Homicides

In 2019 there were 52 homicides that were examined by the District Coroner's Office. As illustrated in **Figure 14**, most homicides originated within Sedgwick County.

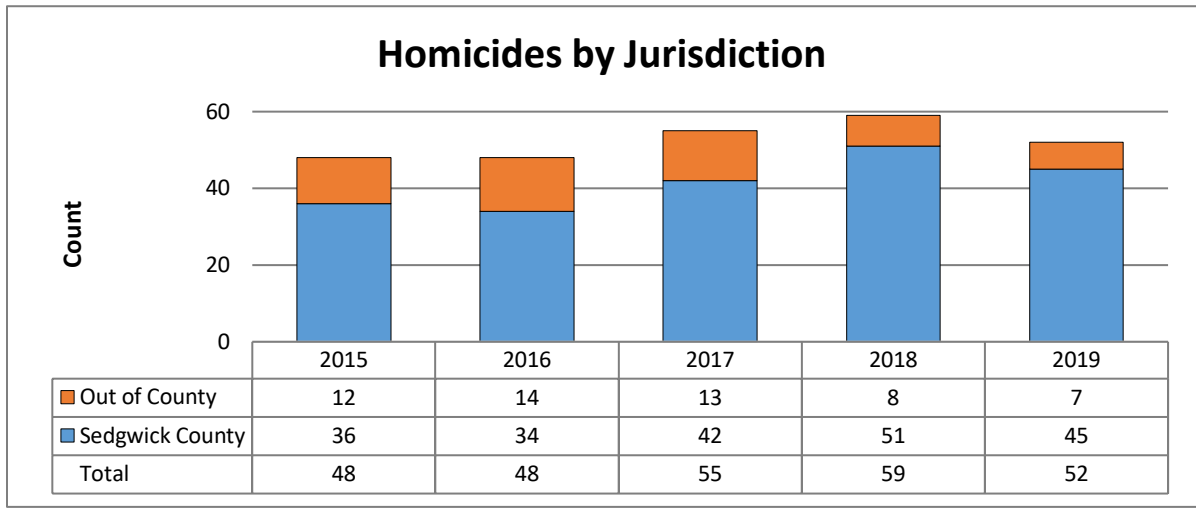


Figure 14: The number of homicides that were determined by the RFSC categorized as originating in Sedgwick County versus all other counties.

Figure 15 illustrates the percentage of homicides by the decedent's gender.

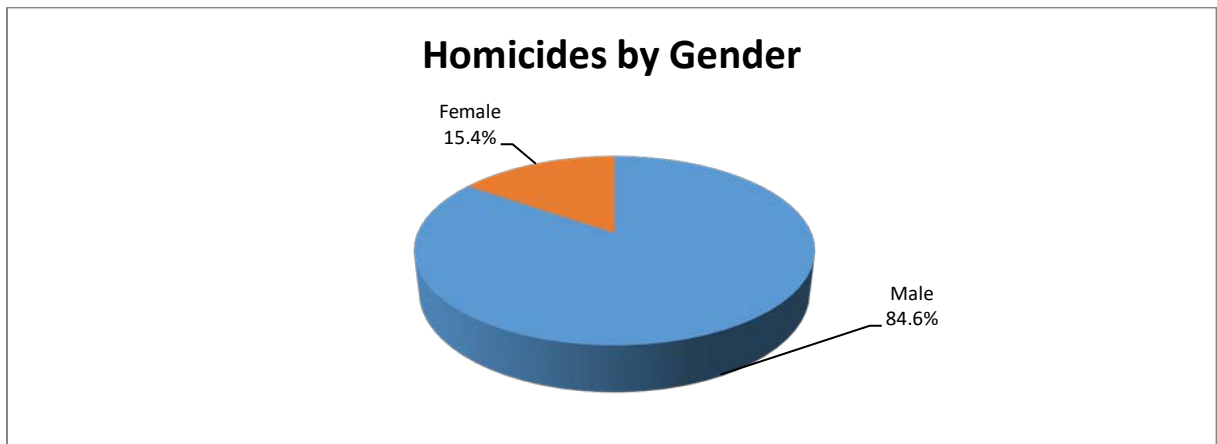


Figure 15: Percentage of homicides per decedent gender.

Figure 16 illustrates the percentage of homicides by race.

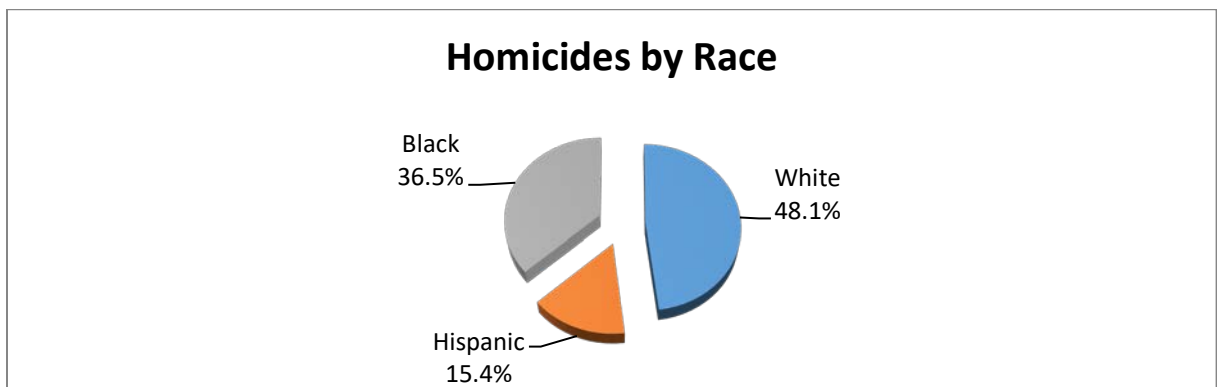


Figure 16: Percentage of homicides per decedent race.

Figures 17 and 18 illustrate the number of homicides categorized by decedent gender and race over the past 5 years.

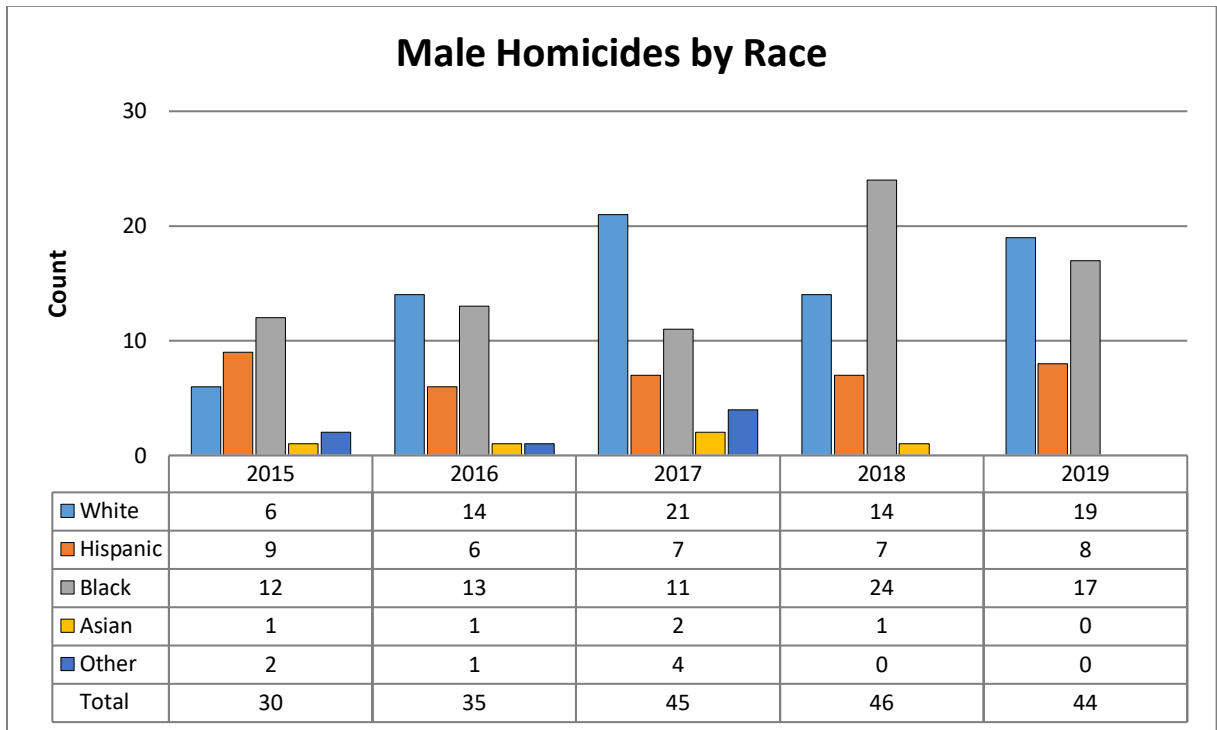


Figure 17: The number of males that died by homicide categorized by race over the past 5 years.

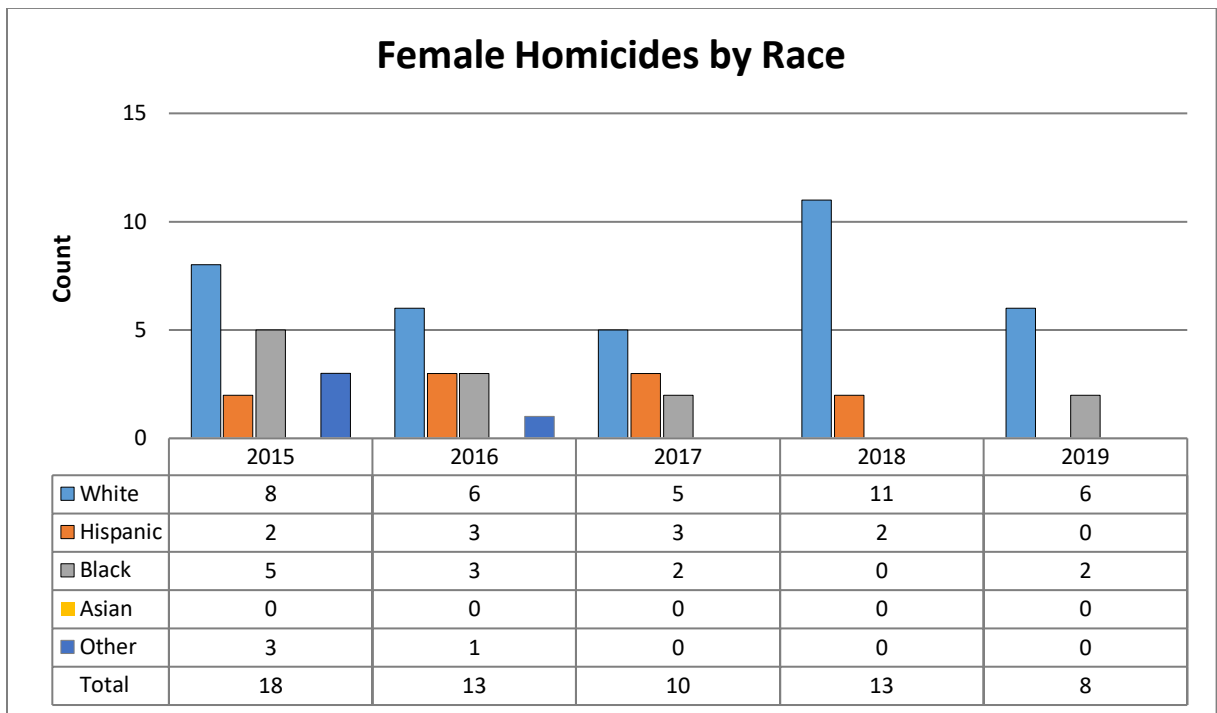


Figure 18: The number of females that died by homicide categorized by race over the past 5 years.

Figure 19 illustrates that number of cases determined to be homicides in 2019 categorized by age group. As depicted, most homicides occurred within the age group of 19-29 years old.

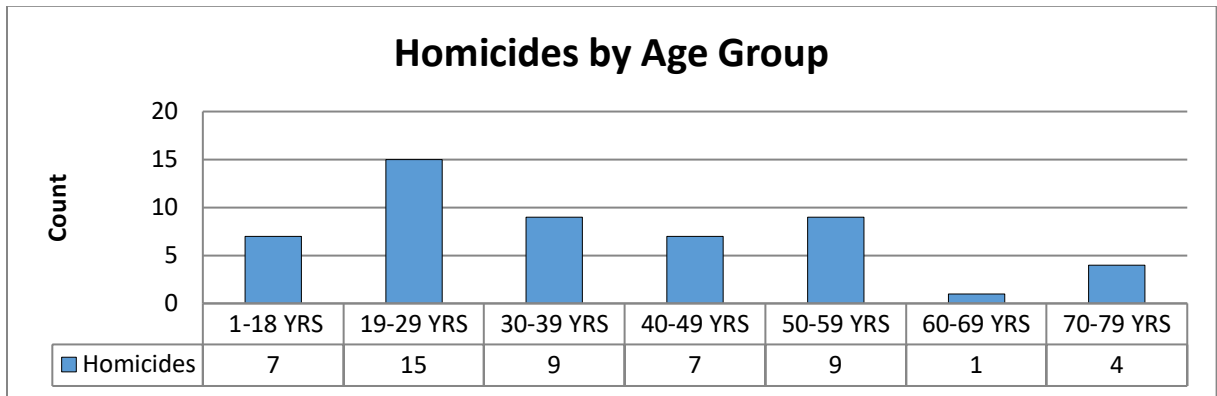


Figure 19: The number of homicides categorized by the decedent age that have been grouped.

Figure 20 illustrates the number of cases that were determined to be homicides in 2019 categorized by the month of occurrence. The chart shows that most homicides occurred in November and December.

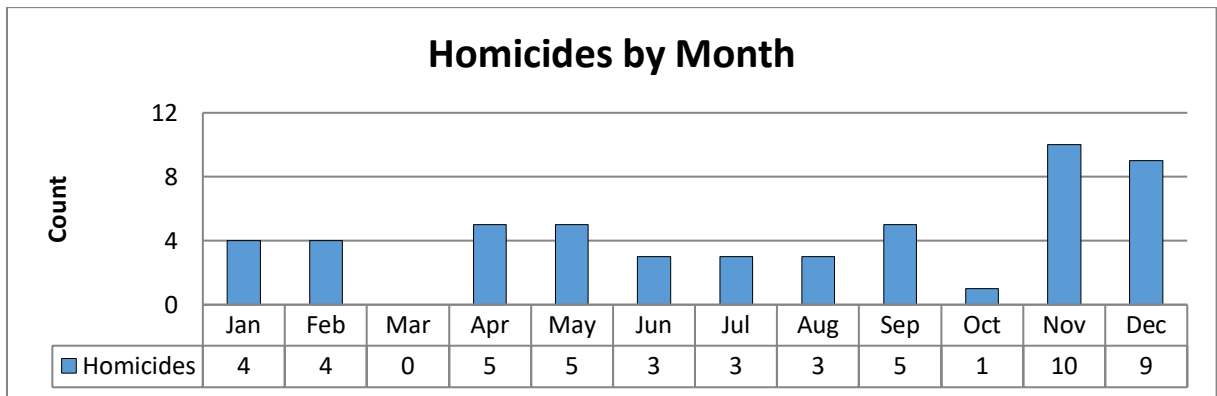


Figure 20: The number of cases determined to be homicides per month they occurred.

Figure 21 illustrates the number of cases that were determined to be homicides in 2019 categorized by the weekday of occurrence. The chart shows that most homicides occurred on Sunday.

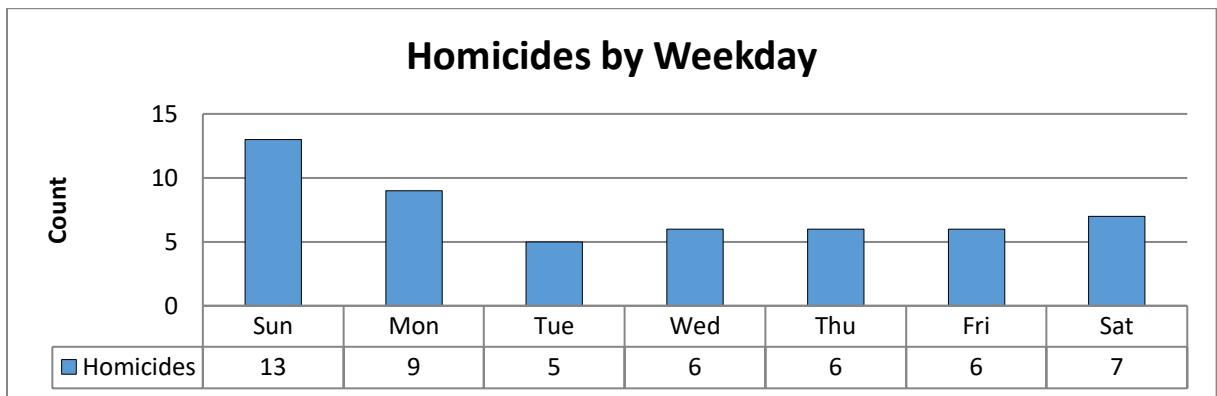


Figure 21: Number of cases determined to homicides per day of the week they occurred.

Figure 22 illustrates the percentage of homicides categorized by what was determined to be the cause of death. As depicted, most homicides were caused by firearms.

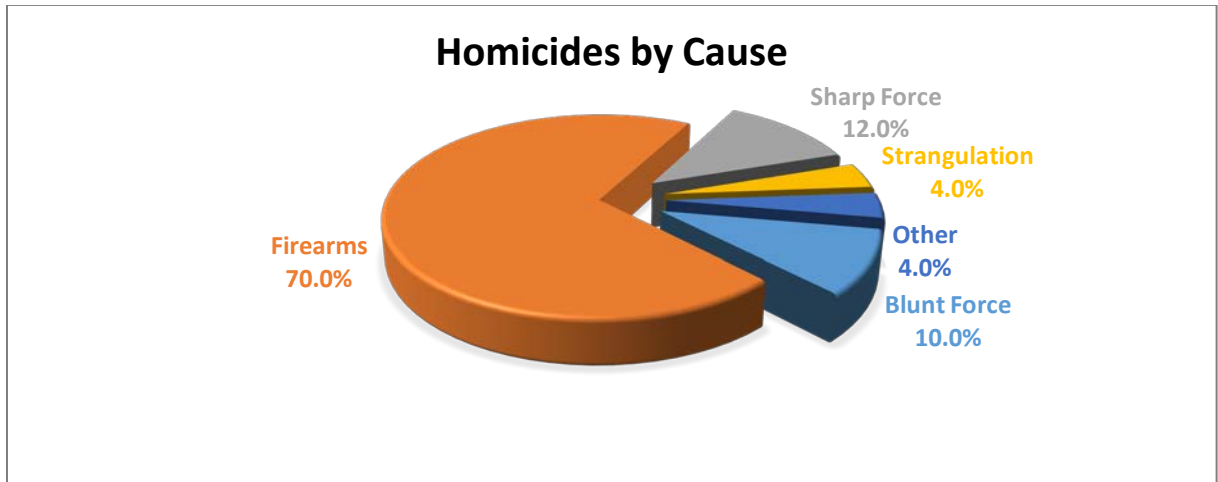


Figure 22: Homicides by cause.

Suicides

There were 126 cases were certified as suicide in 2019, the vast majority (~75%) of which were committed in Sedgwick County. **Figure 23** shows a range of 109 to 139 suicides over the past five years.

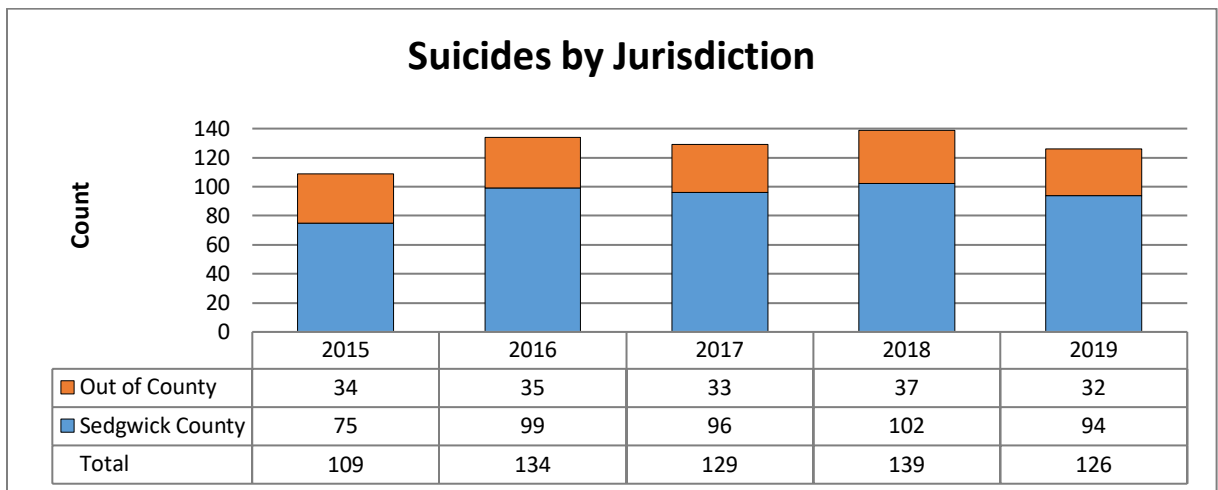


Figure 23: Suicides by county jurisdiction (Sedgwick County vs. out of county).

Figure 24 provides the percentage of suicides by gender. In 2019, males committed 73.8% of suicides and females committed 26.2%.

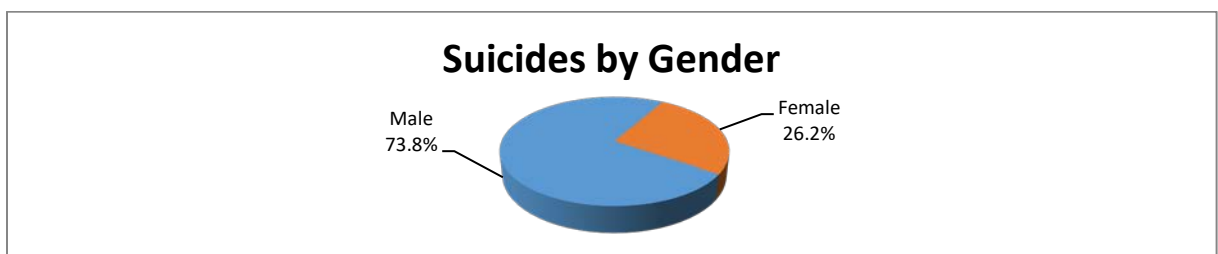


Figure 24: Percentage of suicides by gender.

Figure 25 provides the percentage of suicides by race. The race that committed the greatest percentage of suicides is white (83.3%), with asians (0.8%) being the lowest percentage reported.

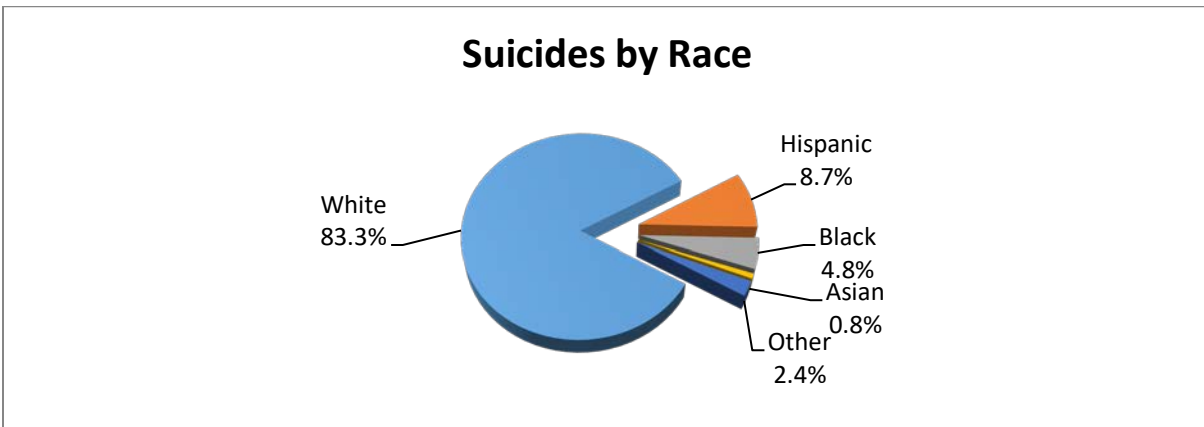


Figure 25: Suicide percentages categorized by race.

Figures 26 and 27 provide the number of suicides by gender broken down by race. As illustrated, predominantly the gender that commits the most suicides are males and the most predominant race is white.

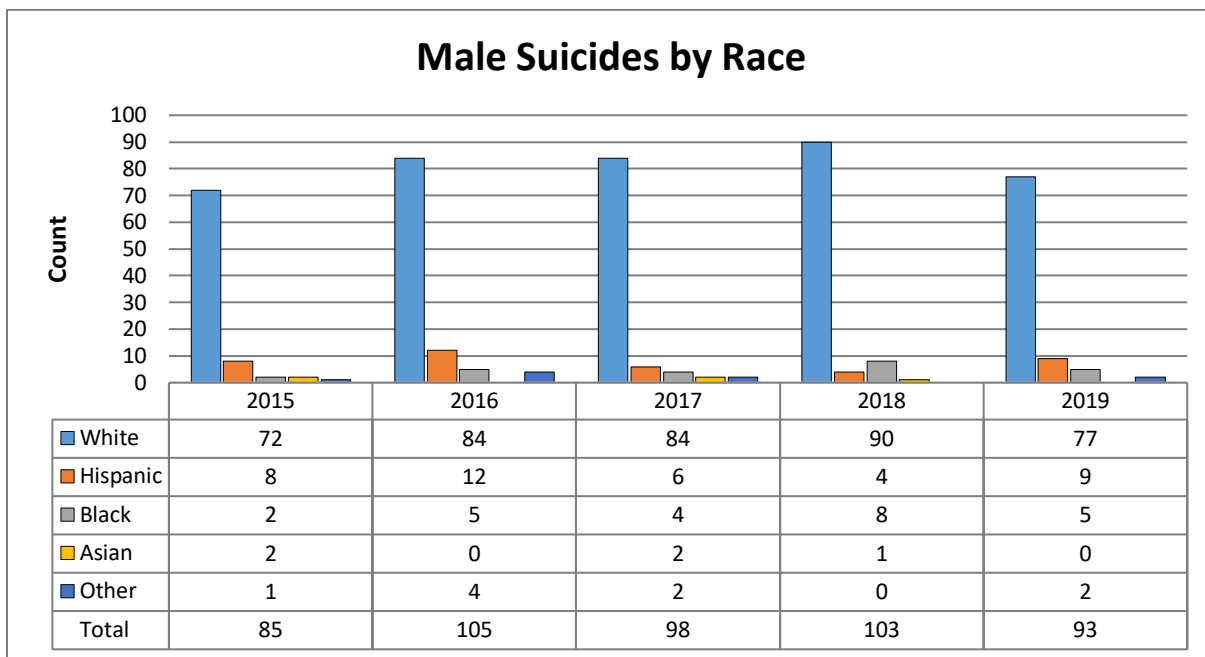


Figure 26: Number of suicides committed by males per race.

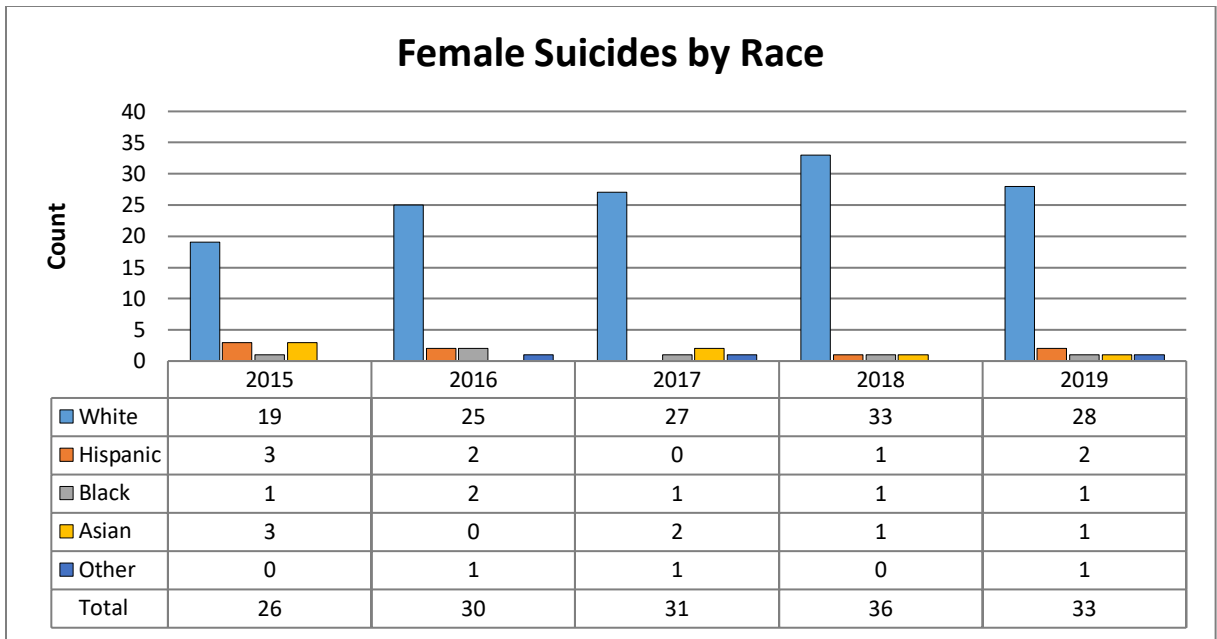


Figure 27: Number of suicides committed by females per race.

As shown in **Figure 28**, most suicides were committed by people between the ages of 30 and 39.

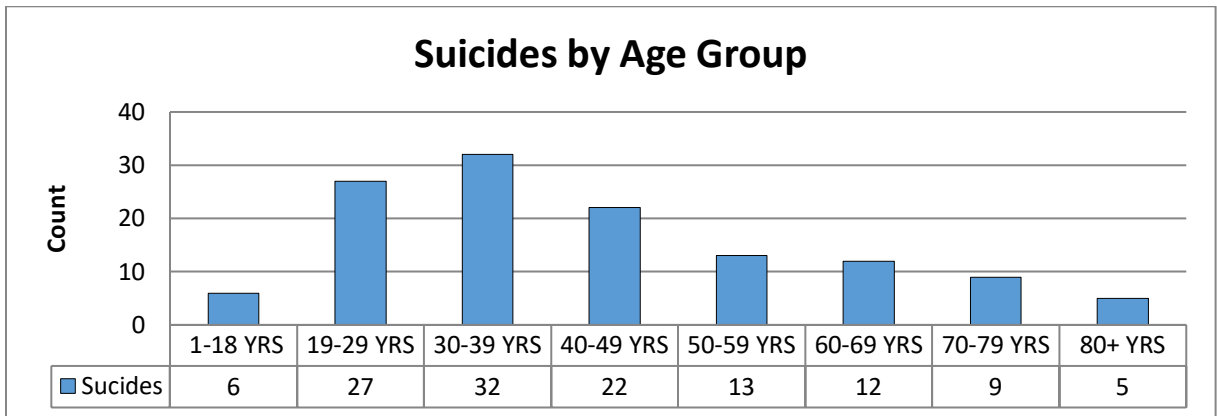


Figure 28: The number of suicides categorized by the decedent age that have been grouped.

Figure 29 illustrates the number of cases that were determined to be suicides in 2019 categorized by the month of occurrence. The chart shows that most suicides occurred in July and September.

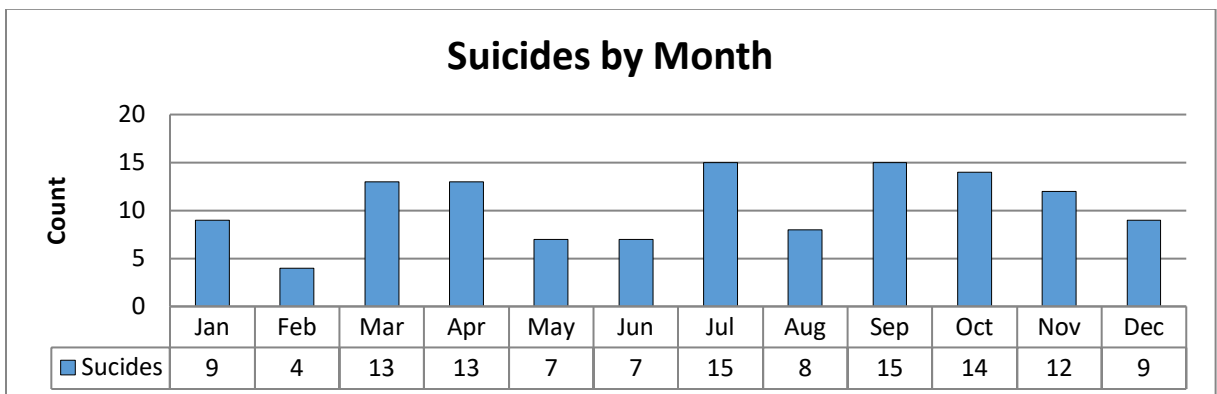


Figure 29: The number of cases determined to be suicides per month they occurred.

Figure 30 illustrates the number of cases that were determined to be suicides in 2019 categorized by the weekday of occurrence. The chart shows that most suicides occurred on Monday and Friday.

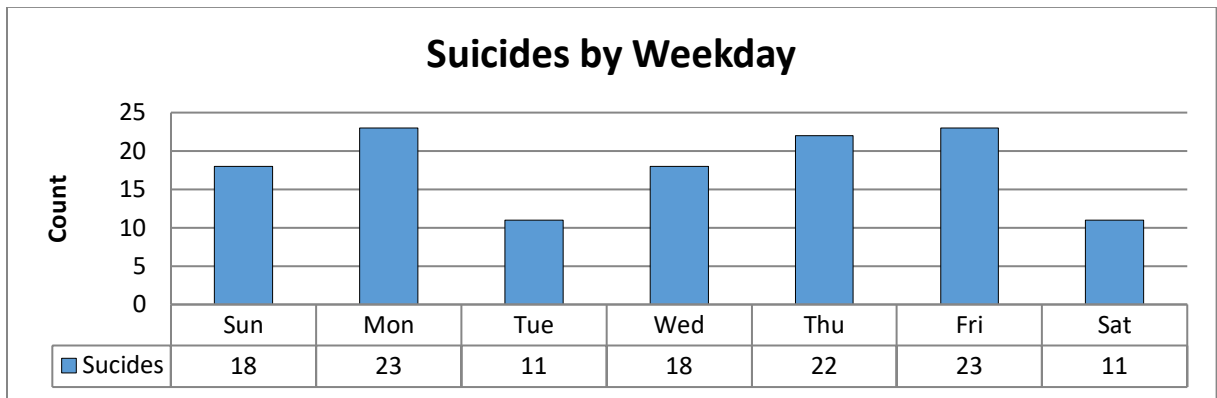


Figure 30: Number of suicides committed per weekday.

In 2019, the predominate suicide methods were firearms (71), strangulation asphyxia (36), and drug toxicity (15) [Figure 31].

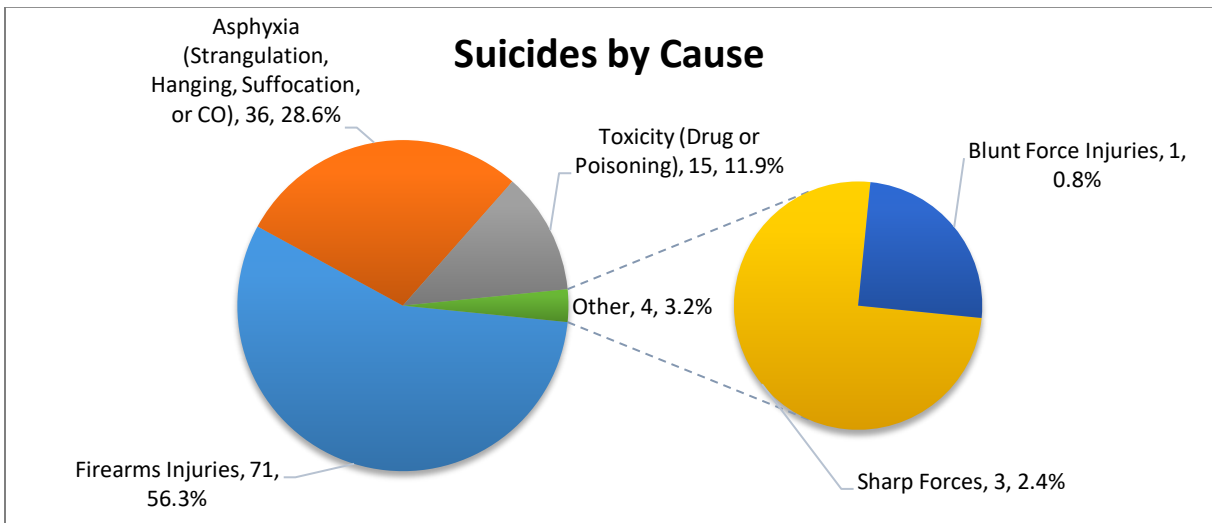


Figure 31: Suicides by cause.

TOXICOLOGY

In 2019, there were 736 pathology cases submitted to the toxicology laboratory. Not all cases require toxicological analyses [Figure 32]; the majority of these are associated with extended hospital stays following the initial event and no suitable specimens available for testing. As a result, 712 of the 736 pathology cases submitted to the toxicology laboratory were analyzed.

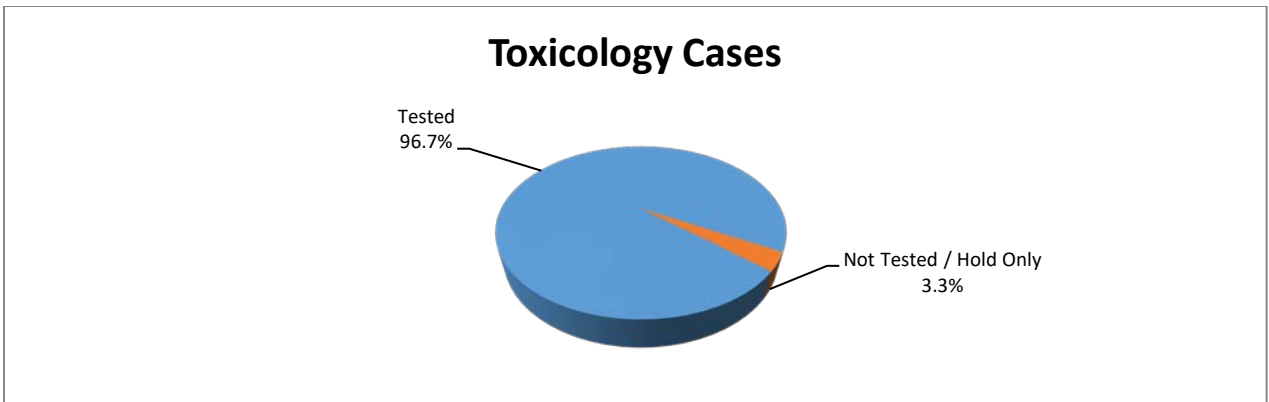


Figure 32: Percentages of cases submitted to the Toxicology Laboratory that were tested versus non tested.

Drivers

In 2019, there were specimens from 82 post-mortem cases submitted for testing to the toxicology laboratory from drivers of motor vehicle deaths. **[Figure 33]** depicts the results of testing for Ethanol (EtOH), Tetrahydrocannabinol (THC) / Carboxytetrahydrocannabinol (THCA), and other drugs.

Approximately 53% of fatally injured motor vehicle occupiers had alcohol and/or drugs in their system. Thirty-seven (37) motor vehicle occupiers tested negative for EtOH and negative for drugs, 11 were positive for EtOH and negative for drugs, 10 were positive for EtOH and positive for drugs, and 18 were negative for EtOH and positive for drugs. Two (2) cases were not tested due to delayed death and 1 tested negative for drugs only.

Of the EtOH positive blood specimens, 16 resulted in values of 0.24 gm% or higher range and 3 in the 0.16 to 0.23 gm% range, 1 in the 0.08 to 0.15 gm% range, and 2 tested below 0.08 gm%.

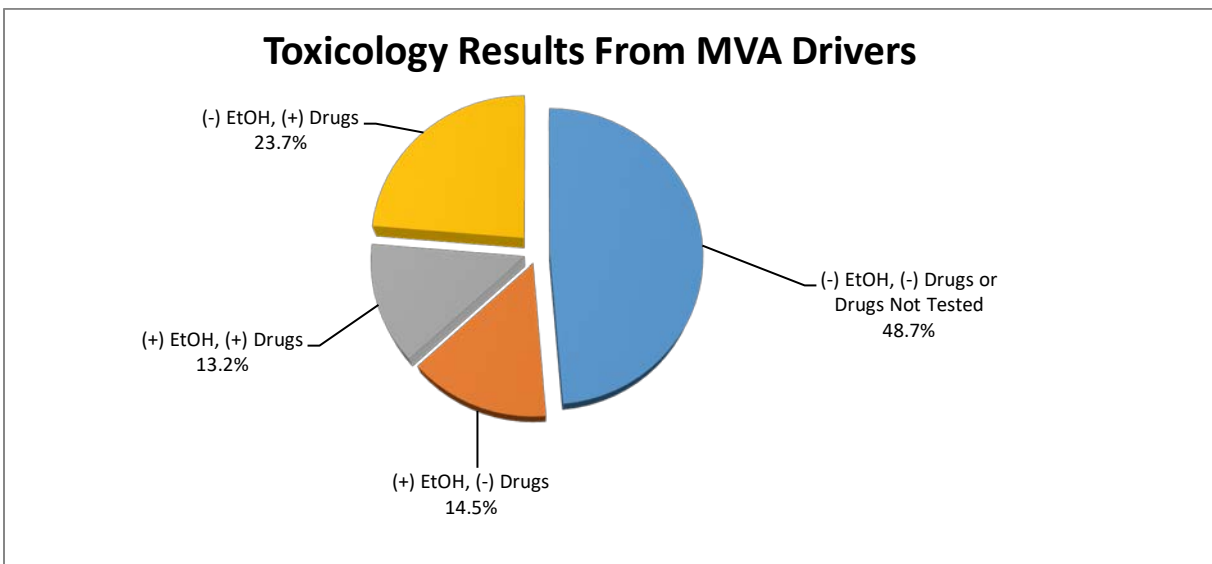


Figure 33: Alcohol and drug results from fatally injured drivers.

Overdoses

Overdose deaths can be either accidental or intentional. Methamphetamine or an opioid are very commonly detected by the Toxicology Laboratory in the specimens collected at autopsy. In 2019, there were a total of 139 overdose fatalities [Figure 34].

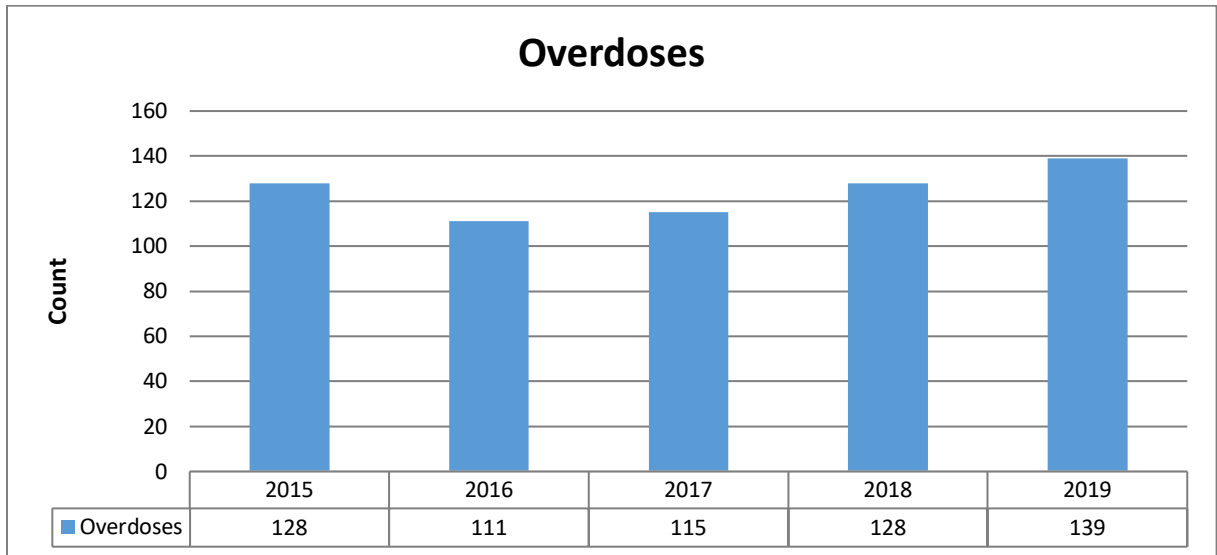


Figure 34: The number of certified overdose deaths for the past five years.

Opioid Related Deaths

Opioid deaths remained high for 2019 with a total of 143. The range of opioid related deaths over the past five years is 136 to 159 with an average of 144 deaths. Figure 35 provides the count of opioid related deaths broken down into four categories (Fentanyl, Heroin, Oxycodone, and Other Opioids).

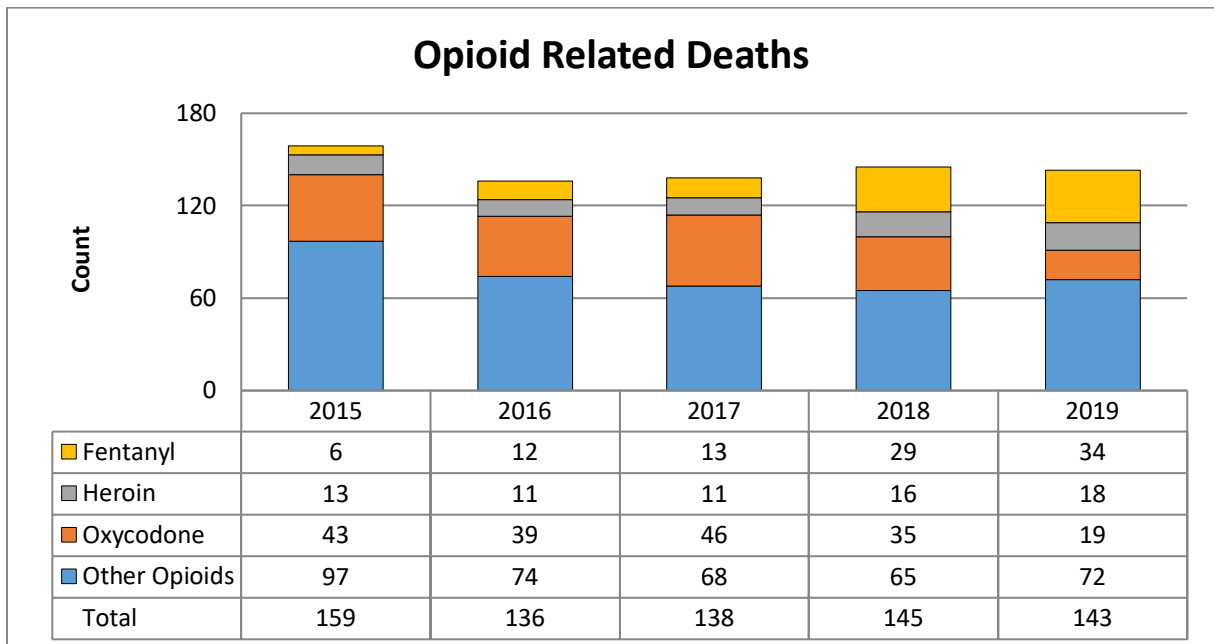


Figure 35: Opioid related deaths detected in Postmortem Toxicology cases.

Table 3 illustrates the count of opioid related deaths per non-natural manner and cause of death. Additionally, there were 26 cases determined to be natural that the decedent had an opioid detected in their toxicology specimens.

	Manner of Death	Cause of Death	Number of Deaths
2019	Accidental	OD Substance Toxicity	75
	Accidental	Blunt Force Injuries	6
	Accidental	Thermal Injuries	2
	Accidental	Ethanol Toxicity	1
	Accidental	Hyperthermia	1
	Accidental	Suffocation Asphyxia	1
	Accidental	Other	6
	Homicide	Firearms Injuries	2
	Suicide	OD Substance Toxicity	7
	Suicide	Firearms Injuries	4
	Suicide	Hanging Asphyxia	2
	Suicide	Sharp Force Injuries	1
	Undetermined	OD Substance Toxicity	5
	Undetermined	Other	4

Table 3: Number of non-natural opioid related deaths categorized by manner of death and cause of death.

Methamphetamine Related Deaths

Methamphetamine deaths have shown a steady increase over the last five years. In fact, methamphetamine was detected in the highest number of cases (114) ever recorded at the Center in 2018 and remained relatively flat (111) in 2019. The range of methamphetamine related deaths over the past five years is 71 to 114 with an average of 90 deaths. **Figure 36** provides the count of methamphetamine related deaths over the past five years.

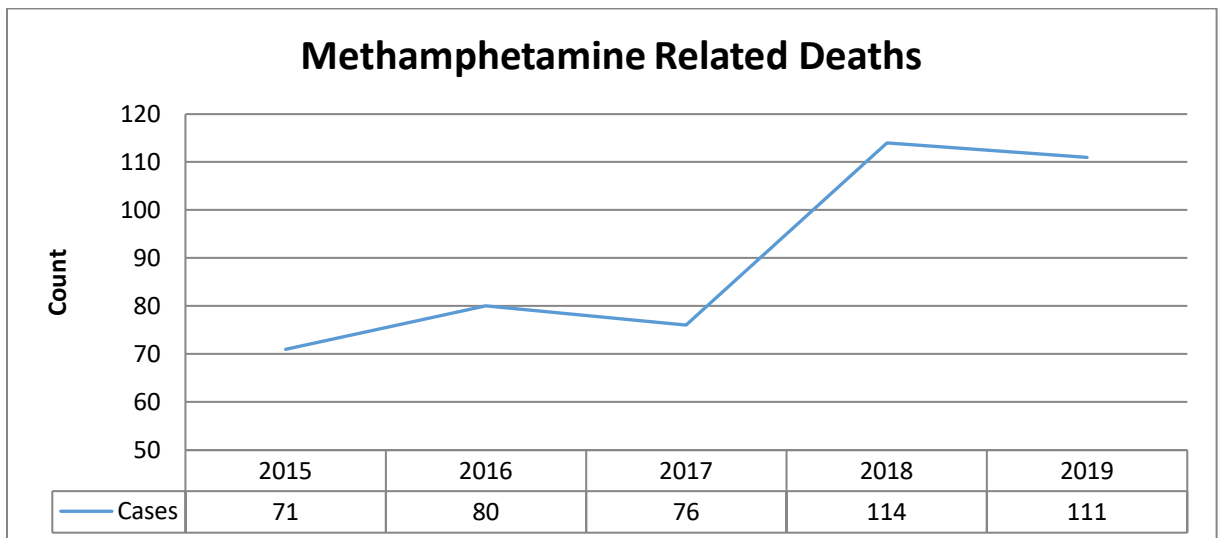


Figure 36: Methamphetamine related deaths detected in Postmortem Toxicology cases.

Table 4 illustrates the count of methamphetamine related deaths per non-natural manner and cause of death. Additionally, there were 2 cases determined to be natural that the decedent had methamphetamine detected in their toxicology specimens.

	Manner of Death	Cause of Death	Number of Deaths
<i>2019</i>	Accidental	OD Substance Toxicity	53
	Accidental	Blunt Force Injuries	8
	Accidental	Thermal Injuries	3
	Accidental	Hypothermia	1
	Accidental	Hyperthermia	1
	Accidental	Drowning	1
	Accidental	Other	6
	Homicide	Firearms Injuries	12
	Homicide	Strangulation Asphyxia	1
	Homicide	Sharp Force Injuries	1
	Homicide	Other	1
	Suicide	Hanging Asphyxia	8
	Suicide	OD Substance Toxicity	3
	Suicide	Firearms Injuries	3
	Suicide	Sharp Force Injuries	2
	Undetermined	OD Substance Toxicity	3
	Undetermined	Other	2

Table 4: The number of non-natural methamphetamine related deaths categorized by manner of death and cause of death.