

2021

FORENSIC PATHOLOGY DIVISION ANNUAL REPORT

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REGIONAL FORENSIC SCIENCE CENTER
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TABLE OF CONTENTS

TABLE OF CONTENTS..... 1

HISTORY/OVERVIEW.....2

MISSION2

PATHOLOGY LEADERSHIP.....3

PATHOLOGY ORGANIZATION.....3

COUNTIES SERVED4

DISTRIBUTION OF CASES: IN-COUNTY VS OUT-OF-COUNTY.....4

MEDICAL INVESTIGATIONS6

CASE EXAMINATIONS.....8

AUTOPSY REPORTS.....9

INDIGENT BURIALS AND CREMATIONS.....10

 Cremation Permits 11

TISSUE DONATIONS..... 11

CAUSE AND MANNER OF DEATH..... 12

 Cause of Death..... 12

 Manner of Death 12

 Accidents..... 14

 Motor Vehicle Deaths 14

 Homicides 15

 Suicides..... 19

TOXICOLOGY22

 Drivers.....22

 Overdoses.....23

 Opioid Related Deaths25

 Methamphetamine Related Deaths27

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.

Since 2011, the number of cases reported annually to the office has averaged 3,416, with a 44.1% increase in deaths reported and a 54.4% increase in cases falling under Coroner jurisdiction (cases accepted). While no significant increase in cases occurred compared to the year prior, a fairly significant increase has occurred since 2019.

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 medicolegal 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

Shelly Steadman, PhD

District Coroner-Chief Medical Examiner

Timothy S. Gorrill, MD, PhD

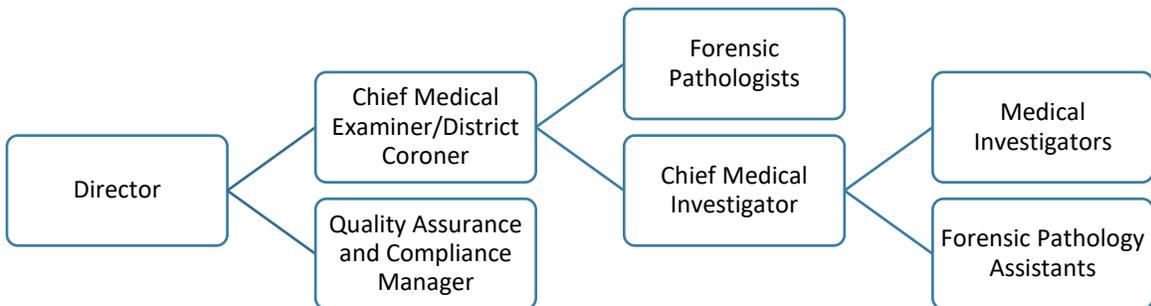
Chief Medical Investigator

Shari L. Beck, F-ABMDI

Quality Assurance and Compliance Manager

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

PATHOLOGY ORGANIZATION



COUNTIES SERVED

In 2021, 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 21 counties in 2021 [Figure 1].

According to the latest census data, the approximate population living in Sedgwick County is 523,828 and the approximate metropolitan population including the contiguous counties is 751,221.

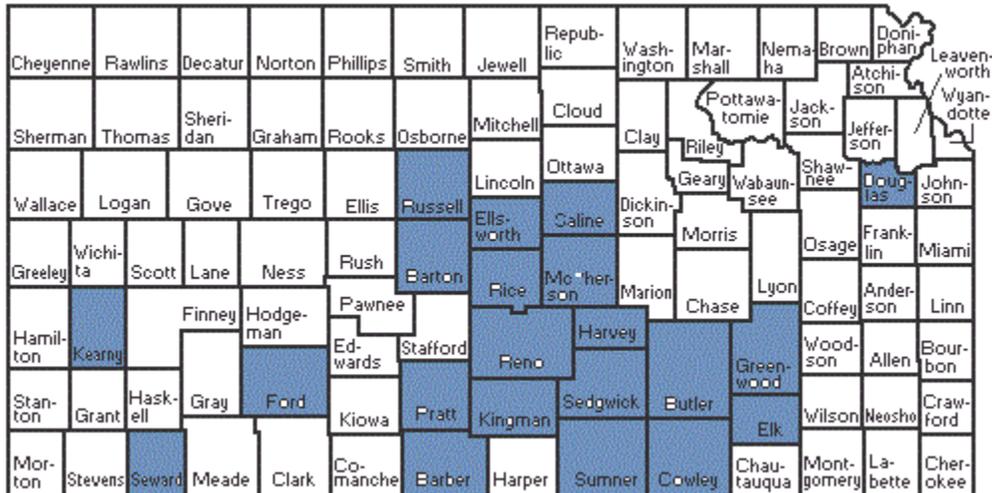


Figure 1: Counties the Pathology Division provided service for in 2021.

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 2021, approximately 19% of the examinations were performed for other counties [Figure 2]. Overall there has been an approximate 61% [Figure 3] increase in case examinations since 2011, with Sedgwick County cases increasing by 99.6% [Figure 5]. Figure 4 illustrates that there has been a 13.5% increase in cases originating within Sedgwick County and a 7.1% increase in cases originating outside of Sedgwick County in 2021 when compared to 2020.

In-County vs. Out-Of-County Postmortem Examinations

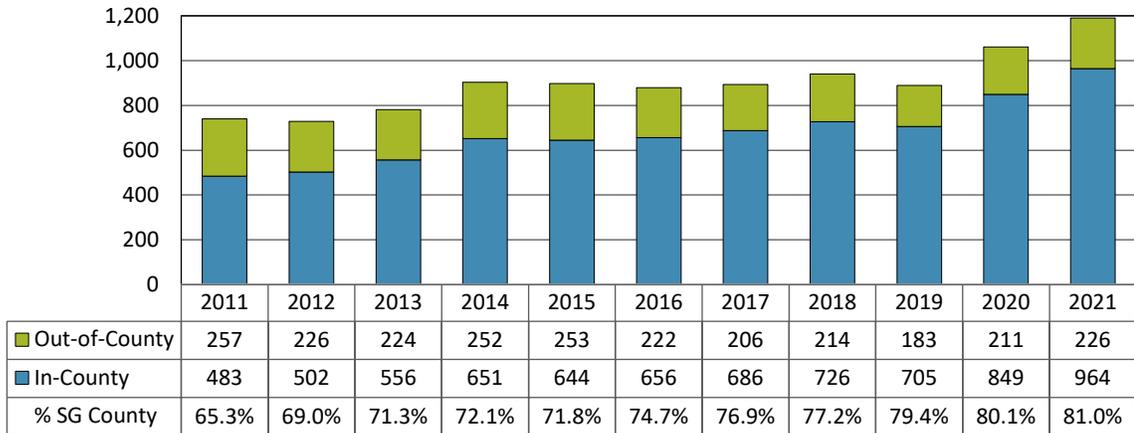


Figure 2: Eleven (11) year comparison of the number of postmortem examinations. Examinations include Full and Partial Autopsies, External Examinations, Non-human Skeletal Remains, and Records Reviews.

% Change of Postmortem Examinations

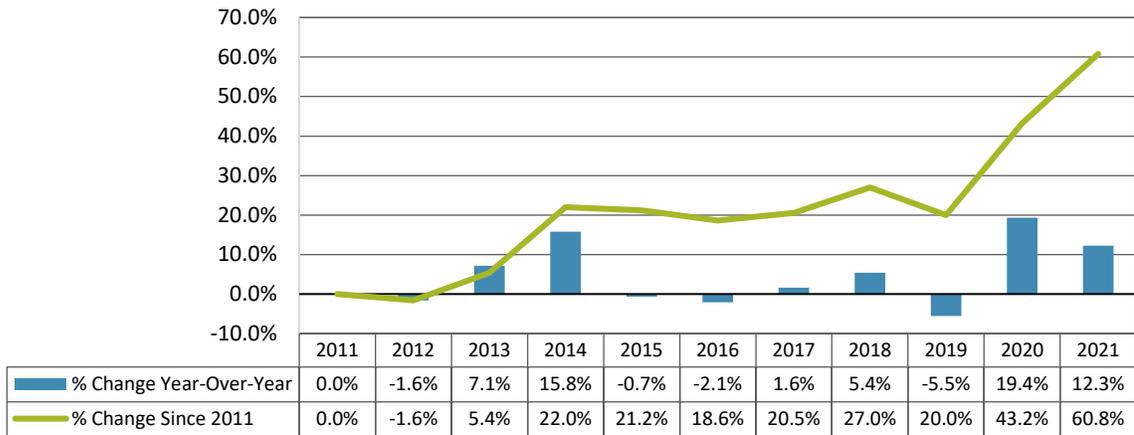


Figure 3: Percent change in the number of postmortem examinations year-over-year and cumulative percent change since 2011.

% Change in Sedgwick County and Out of County Cases Year-Over-Year

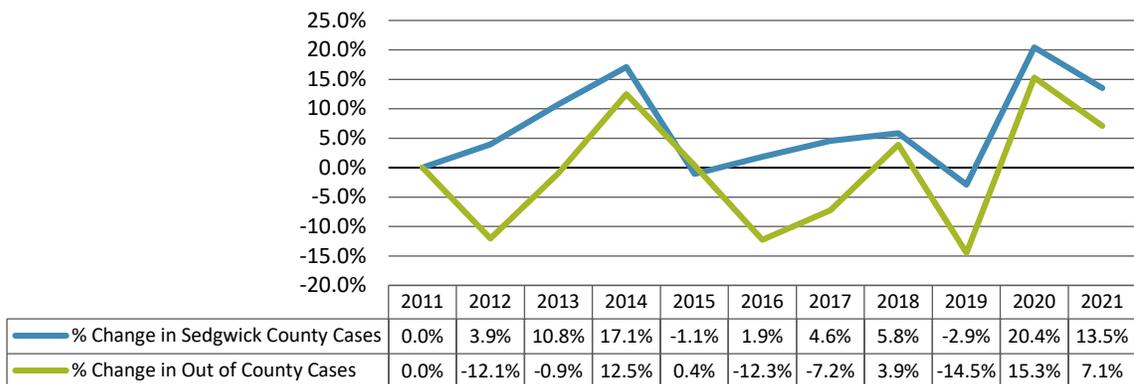


Figure 4: Illustrates the percent change of coroner cases accepted for examination year-over-year for Sedgwick County and out of county cases since 2011. The values are broken out to illustrate the percent change of cases that originated within Sedgwick County and those that originated outside of Sedgwick County.

% Change in Sedgwick County and Out of County Cases Since 2011

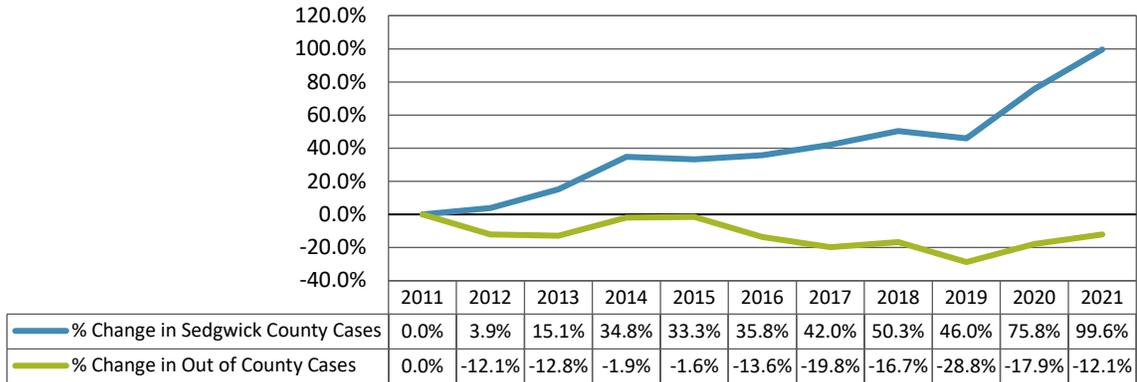


Figure 5: Illustrates the cumulative percent change in coroner cases accepted for examinations each year since 2011. The values are broken out to illustrate the percent change of cases that originated within Sedgwick County and those that originated outside of Sedgwick County.

MEDICAL INVESTIGATIONS

The Pathology division has a Chief Medical Investigator and five Medical Investigators. The Medical Investigators are on duty every day, twenty-four hours a day, and seven days a week. The Medical Investigator serves as the “eyes” and “ears” of the Coroner. The investigators triaged 4126 reported deaths in 2021.

The District Coroner accepted jurisdiction or assisted in 1192 [Figure 6] of the deaths reported. On average, over the last 11 years, coroner accepted cases constitute 26.6% of the total number reported to the office. Also, between 2011 and 2021 there has been a 44.1% increase in the number of reported deaths [Figure 7] and a 54.4% increase in the number of coroner cases accepted for examination [Figure 8].

Pathology Cases Reported and Accepted

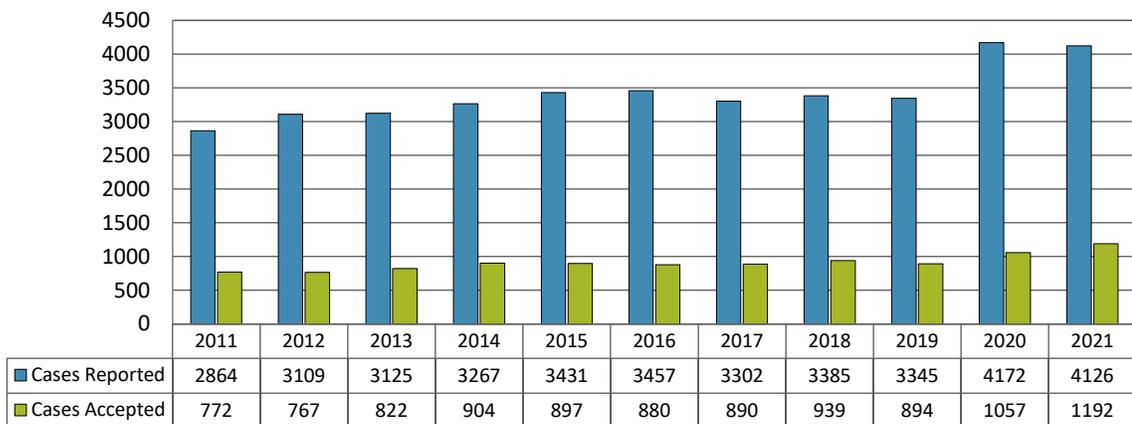


Figure 6: Pathology cases reported include all deaths that were reported to the Center. Pathology cases accepted include Records Reviews, Autopsies, Partial Autopsies, External Examinations, and Non-human Skeletal Remains.

% Change of Reported Deaths

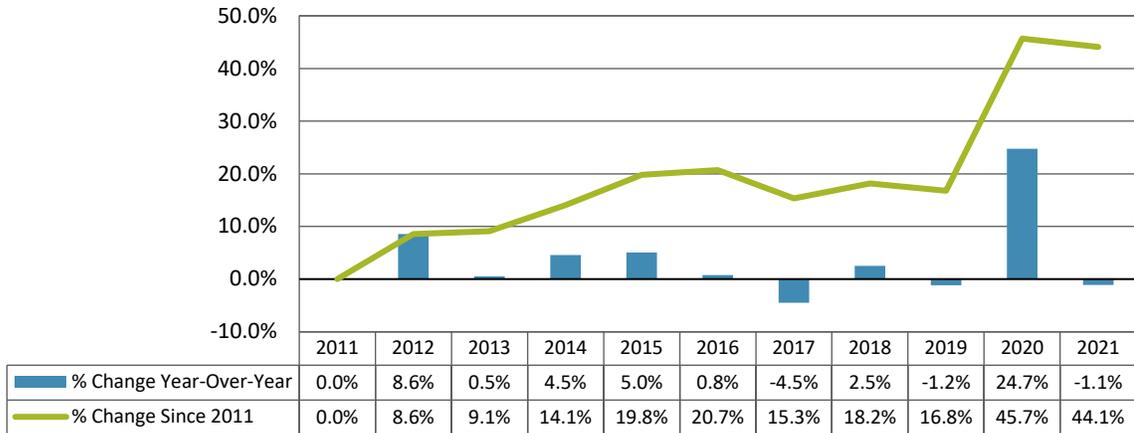


Figure 7: Percent change of reported deaths year-over-year and the cumulative percent change since 2011.

% Change of Coroner Cases Accepted for Examination

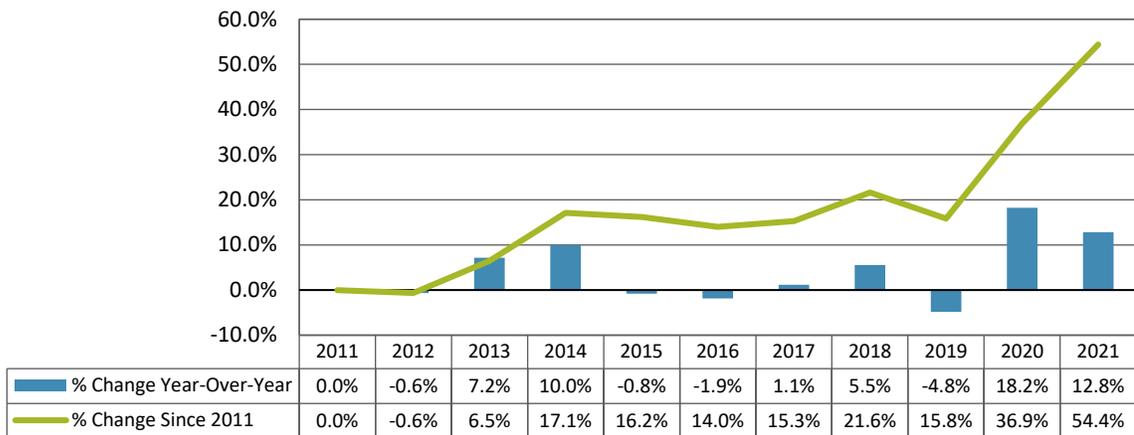


Figure 8: Illustrates the percent change in coroner cases accepted for examinations year-over-year and the cumulative percent change since 2011.

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 9] has shown a steady increase over the last 10 years. Also, between 2011 and 2021 there has been a 116.5% increase in the number of death scenes attended by medical investigators [Figure 10].

Scene Investigations

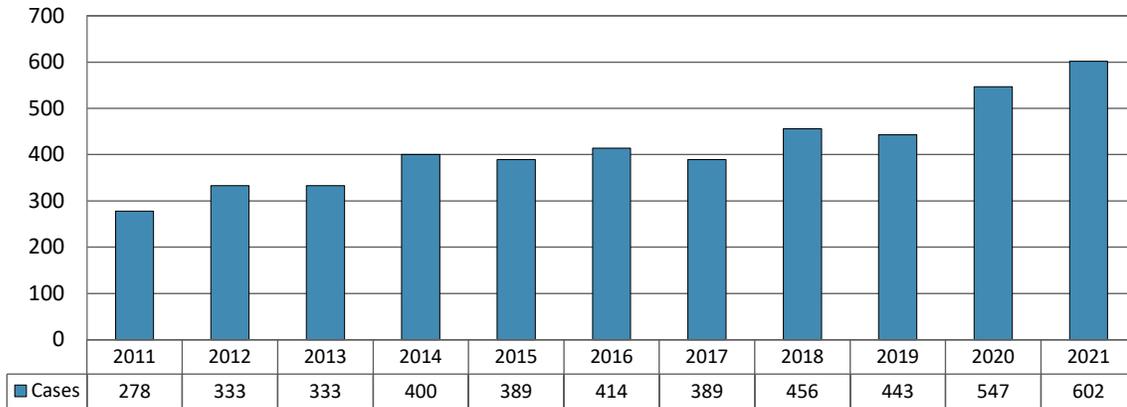


Figure 9: Number of scenes attended by Medical Investigators.

% Change of Death Scene Investigations

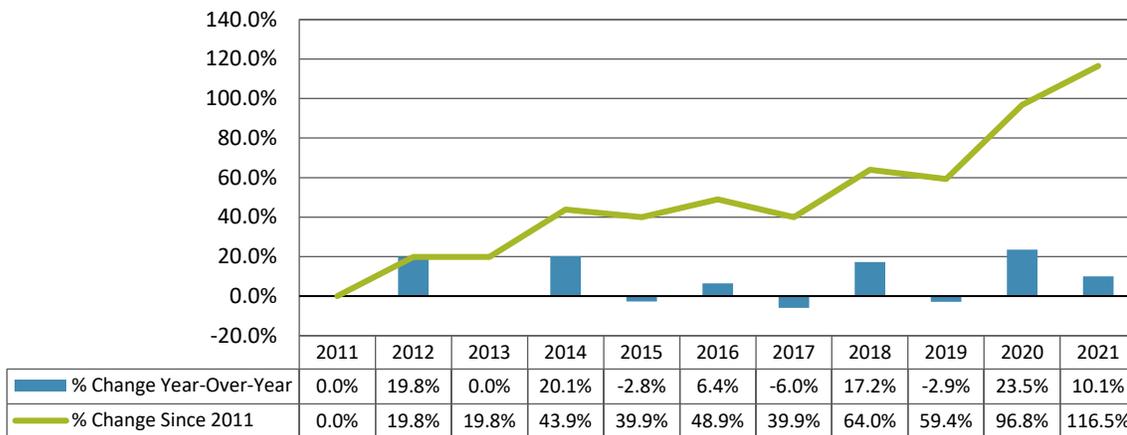


Figure 10: Percent change of death scenes that the medical investigators attended year-over-year and the cumulative percent change since 2011.

CASE EXAMINATIONS

Figure 11 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.

Since 2011, the average for full autopsies, external examinations, and partial examinations are 585, 193, and 40, respectively. In 2021, approximately 70% of the examinations were full autopsies, 25% were external examinations, and 5% were partial examinations.

Autopsy, External, and Partial Examinations

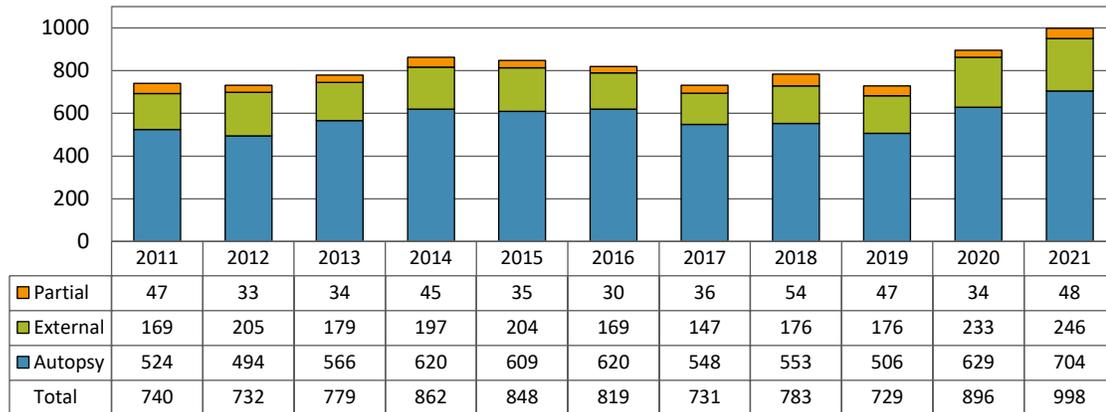


Figure 11: Postmortem examination type excluding records reviews and non-human skeletal remains.

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. Usually, 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 2021, 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 12**]. There are several reasons why this occurred, including case volume increases for both Pathology and Toxicology, and continued staffing issues within the Toxicology Laboratory and 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

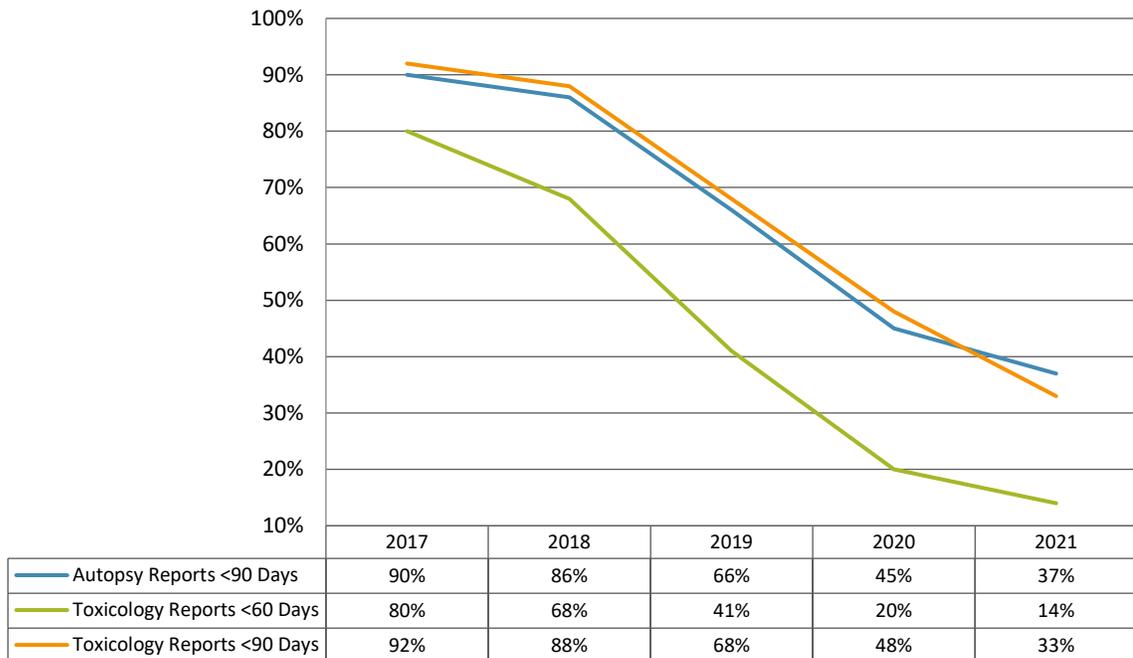


Figure 12: Percentage of autopsy reports being issued within 90 days from examination per examination year and the percentage of Toxicology Post-mortem reports issued within 60 days of submission per submission year. The goal for the autopsy reports is to have 90% of reports issued within 90 days from 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 KSA 22a-215, Sedgwick County is required to provide final disposition for 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 cremations. The Center maintains a contract with a local mortuary service to handle the disposition of the remains.

As of 2016, the Center cremates all unclaimed bodies under its jurisdiction [Figure 13]. The cremains are retained indefinitely in a respectful manner.

Indigent Burials and Cremations

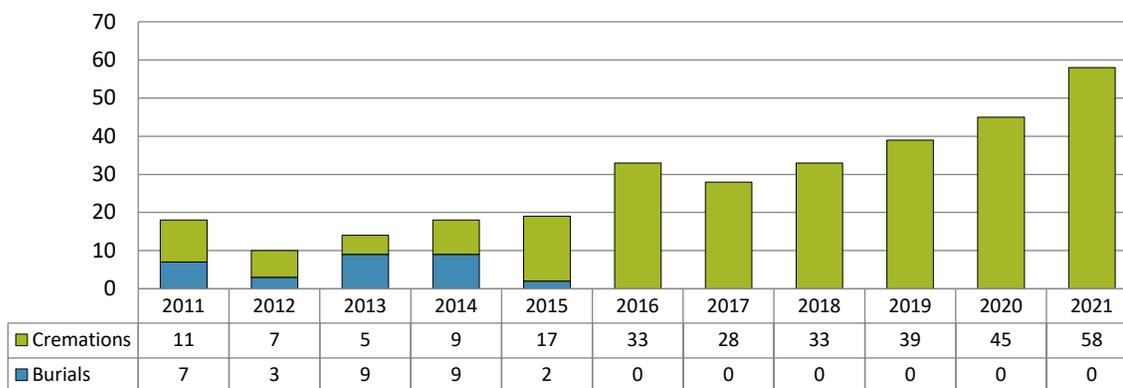


Figure 13: Number of Indigent Burials/Cremations for which the Center was responsible. In 2016, the County changed policy to allow for cremation only for final disposition.

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 14** illustrates the steady increase of cremation permits signed by the Coroner's Office since 2011.

Annual Cremation Permits

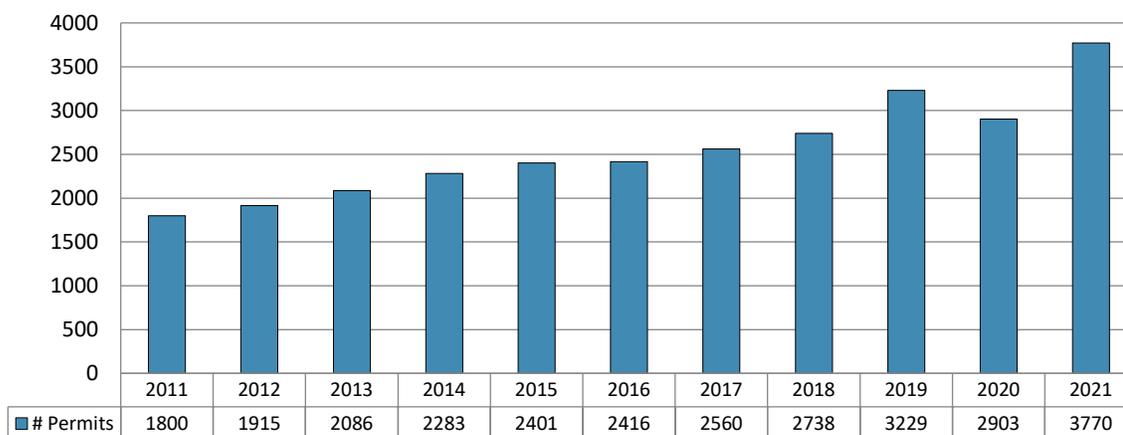


Figure 14: The number of cremation permits per year over a 10 year period.

TISSUE DONATIONS

The Pathology Division works in cooperation with procurement agencies to facilitate organ and tissue donation in cases where the death falls under the jurisdiction of the Coroner. **Figure 15** provides the annual count of eye, organ, and/or tissues donations since 2011.

Donors

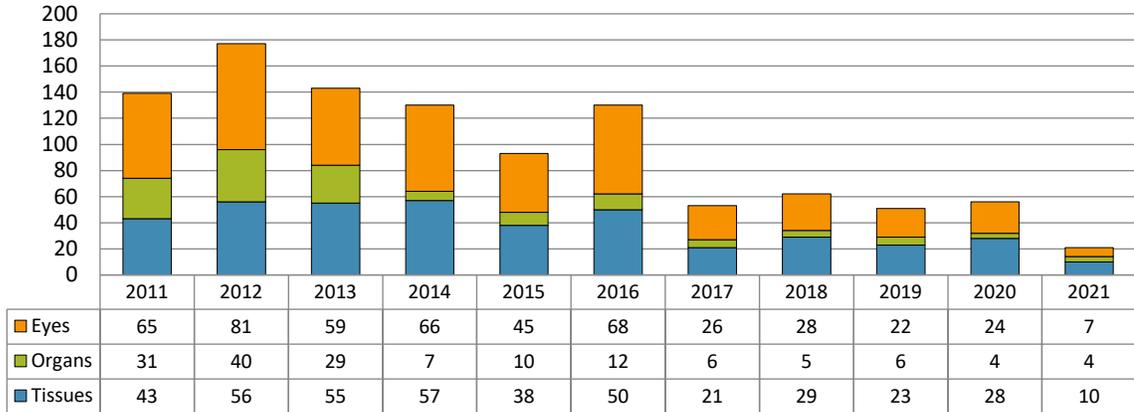


Figure 15: Annual count of eye, organ, and/or tissues donations.

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 16 shows the breakdown of the deaths by manner. Homicides are deaths that result from injuries caused by the actions by another person. Homicides constituted 7% **[Figure 16]** of the cases for 2021. The majority (80%) 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 2021, approximately 11% of the cases were certified as suicides.

Approximately, 50% 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 4% of the total caseload.

Manner of Death Per Examination Year

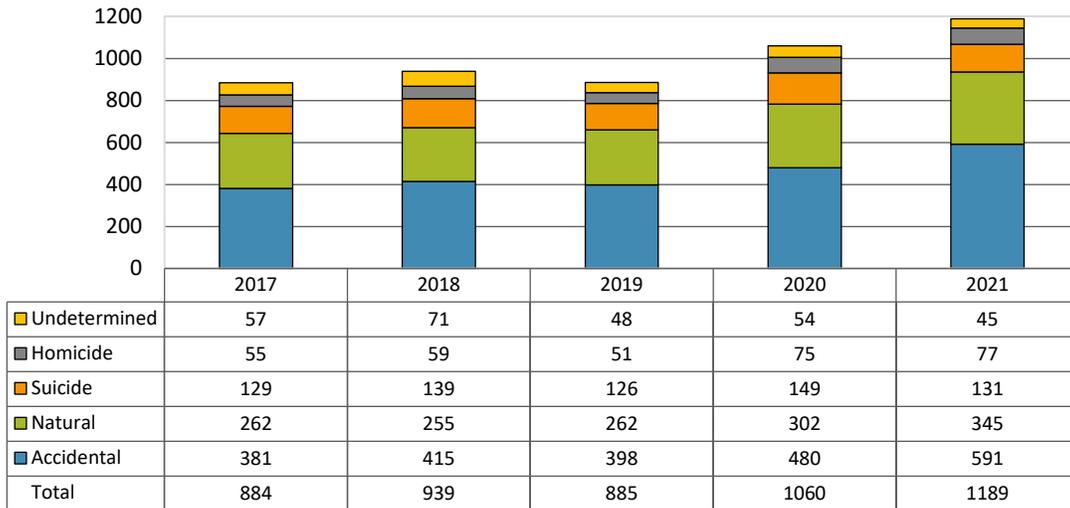


Figure 16: Count of each manner of death per examination year.

The manner of death (MOD) can be placed into two general categories, determined or undetermined. Figure 17 illustrates the percentages of these two categories for cases with a cause of death that is non-natural.

Determined vs. Undetermined MOD in Non-natural Death Cases

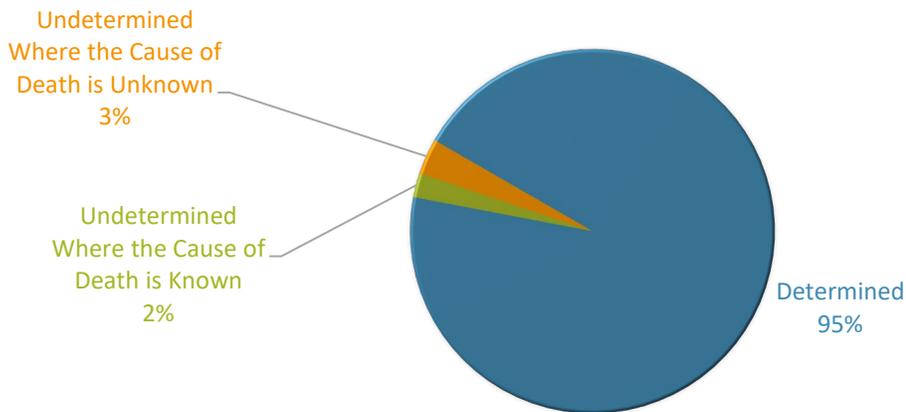


Figure 17: Percentage of determined versus undetermined manners of death.

Table 1 illustrates the cause of death for cases where the manner was ruled non-natural. In 2021, toxicity (ethanol and/or drug) was the leading cause of non-natural deaths.

Non-natural Cause of Death	Number of Deaths	Percentage of Total
<i>Toxicity (Ethanol and/or Drug)</i>	315	37.3
<i>Blunt Force Injuries</i>	212	25.1
<i>Firearms Injuries</i>	140	16.5
<i>Other</i>	94	11.1
<i>Hanging</i>	37	4.3
<i>Drowning</i>	12	1.4
<i>Hypothermia or Hyperthermia Asphyxia</i>	10	1.1
<i>Sharp Force Injuries</i>	8	0.9
<i>Smoke Inhalation and/or Thermal Injuries</i>	8	0.9
<i>Asphyxia (Strangulation or Suffocation)</i>	6	0.7
<i>Carbon Monoxide Poisoning</i>	2	0.2

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 18% of all accidental deaths were related to motor vehicle accidents (MVA) and over 48% were overdoses.

Mechanism of Injury	Number of Deaths	Percentage of Total
<i>Overdose</i>	286	48.4
<i>Motor Vehicle</i>	105	17.7
<i>Fall</i>	101	17.1
<i>Medical Miscellaneous</i>	44	7.4
<i>Other</i>	20	3.3
<i>Submersion</i>	15	2.5
<i>Fire Exposure</i>	8	1.3
<i>Environmental Exposure</i>	7	1.1
<i>Train</i>	2	0.3
<i>Plane Crash</i>	1	0.1
<i>Electrocution</i>	1	0.1

Table 2: Number of accidental deaths and the respective percentage of each mechanism of injury for all accidental deaths.

Motor Vehicle Deaths

Figure 18 illustrates the percentage of motor vehicle deaths categorized by what is known about the restraint of the occupier, or if the decedent was a cyclist or a pedestrian. There were 100 motor vehicle deaths (MVA) examined. As illustrated, unknown occupiers to the Coroner had the greatest percentage of deaths in 2021. An unknown occupier is a decedent that the Medical Investigators were unable to determine where the person was seated in the vehicle.

MVA Deaths Examined in 2021

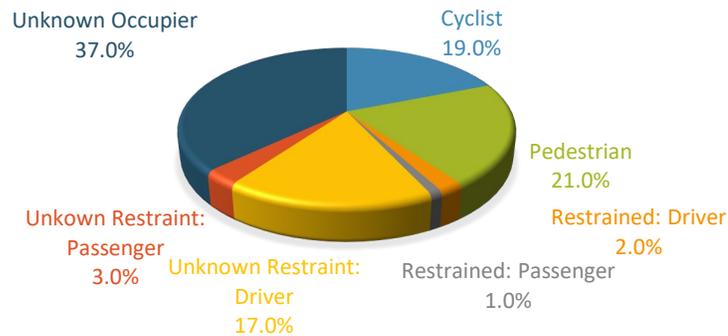


Figure 18: Motor vehicle deaths (MVA) per decendent restraint category.

In **Figure 19** is the number of motor vehicle fatalities per the weekday the death occurred.

MVA by Weekday

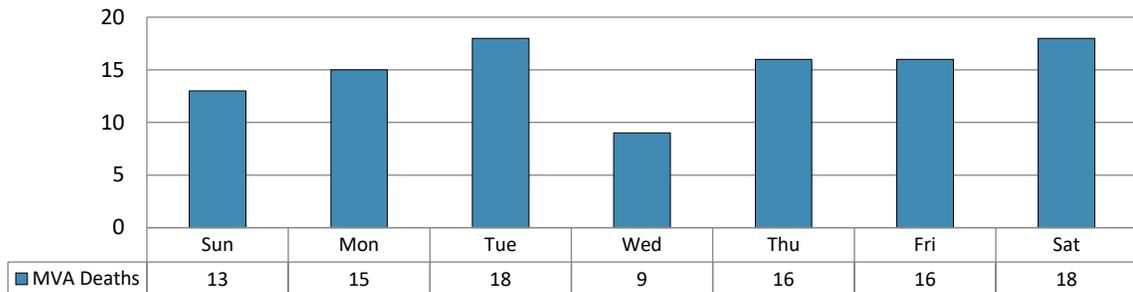


Figure 19: The number of motor vehicle fatalities per the weekday the death occurred.

Homicides

In 2021 there were 77 homicides that were examined by the District Coroner's Office. As illustrated in **Figure 20**, most homicides originated within Sedgwick County.

Homicides by Jurisdiction

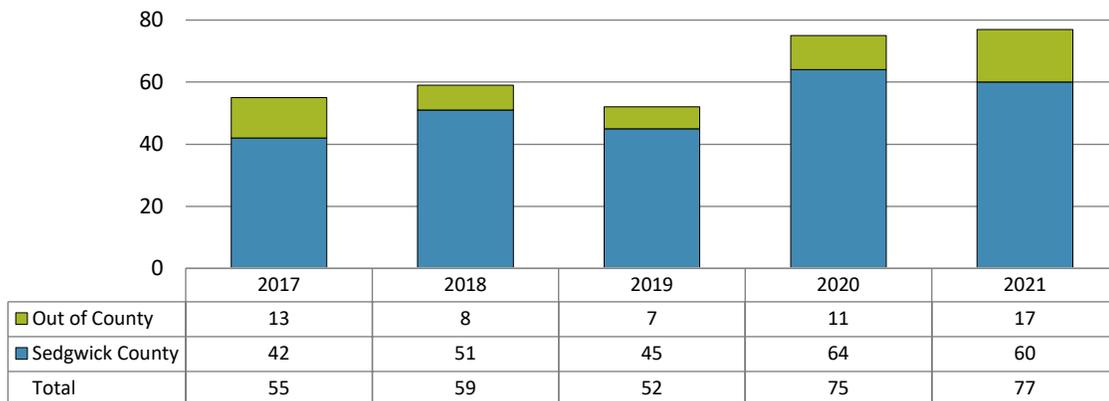


Figure 20: The number of homicides examined that were determined by the RFSC categorized as originating in Sedgwick County versus all other counties.

Figure 21 illustrates the percentage of homicides by decedent gender.

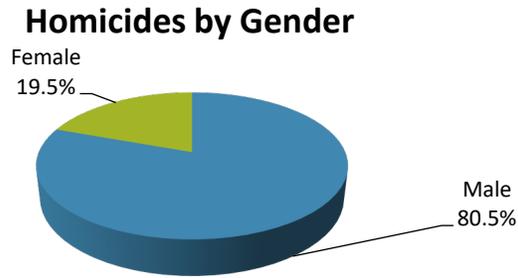


Figure 21: Percentage of homicides per decedent gender.

Figure 22 illustrates the percentage of homicides by race.

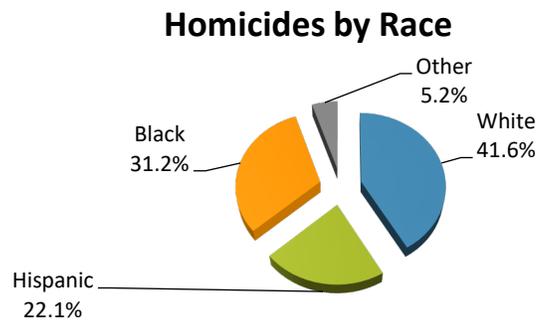


Figure 22: Percentage of homicides per decedent race.

Figures 23 and 24 illustrate the number of homicides categorized by decedent gender and race over the past 5 years.

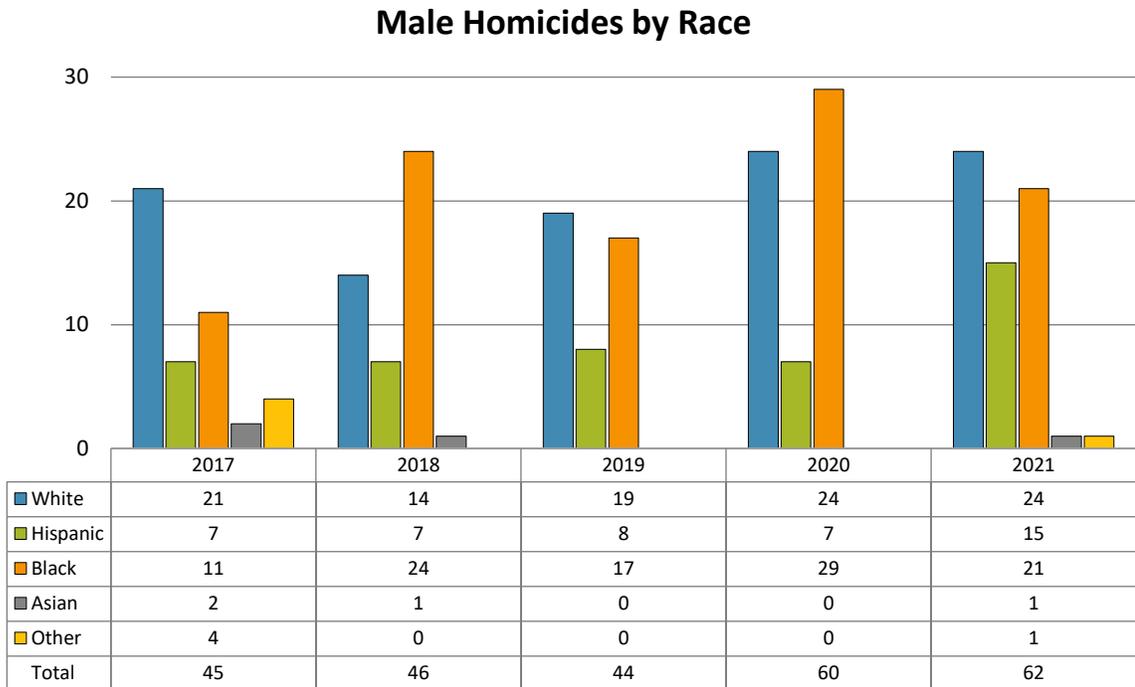


Figure 23: The number of males that died by homicide categorized by race over the past 5 years.

Female Homicides by Race

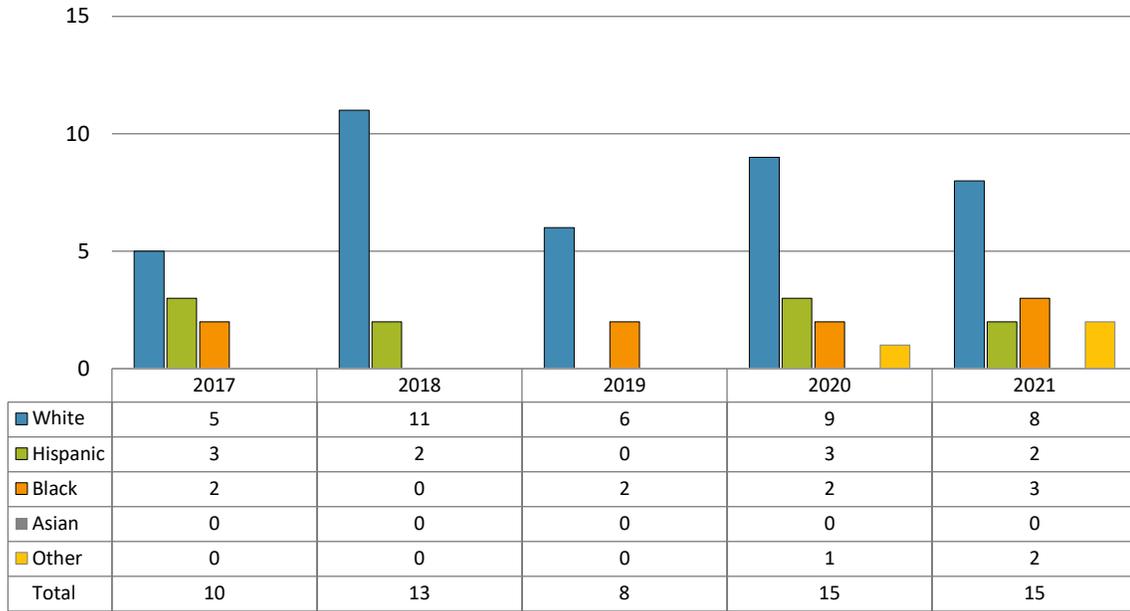


Figure 24: The number of females that died by homicide categorized by race over the past 5 years.

There were 77 homicide cases examined in 2021. **Figure 25** illustrates the number of cases categorized by age group. As depicted, most homicides occurred within the age group of 19-29 years old.

Homicides Examined by Age Group

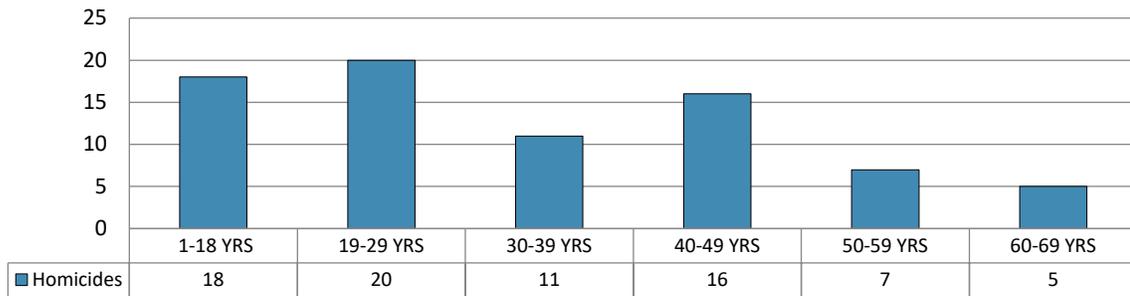


Figure 25: The number of homicides examined categorized by the decedent age that have been grouped.

There were 75 homicides reported in 2021. **Figure 26** illustrates the number of homicide cases that occurred in 2021 categorized by the month of occurrence. The chart shows that most homicides occurred in December.

Homicides Occurring in 2021 by Month

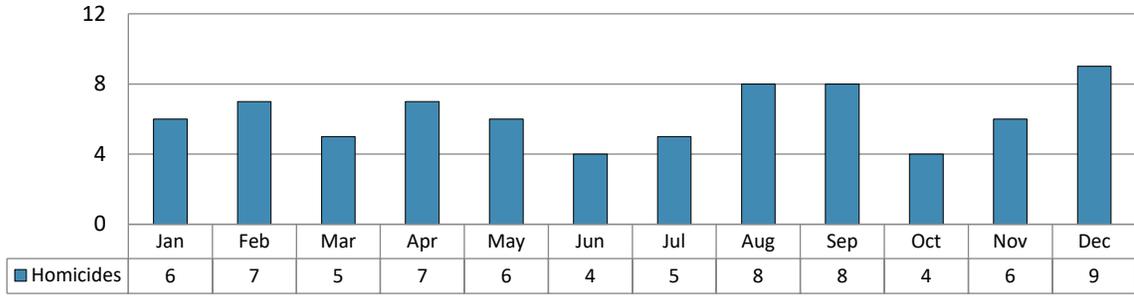


Figure 26: The number of cases determined to be homicides per month the death occurred.

Figure 27 illustrates the number of homicide cases that occurred in 2021 categorized by the weekday of occurrence. The chart shows that most homicides occurred on Sunday.

Homicides Occurring in 2021 by Weekday

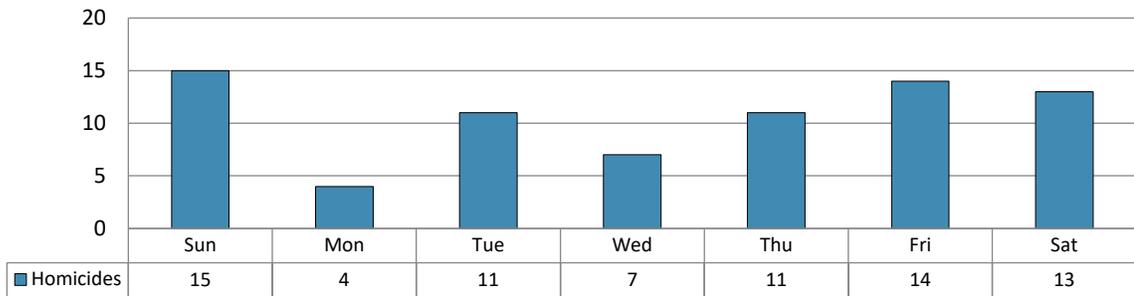


Figure 27: Number of cases determined to homicides per day of the week the death occurred.

Figure 28 illustrates the percentage of homicides occurring in 2021 categorized by what was determined to be the cause of death. As depicted, most homicides were caused by the use of firearms.

Homicides by Cause

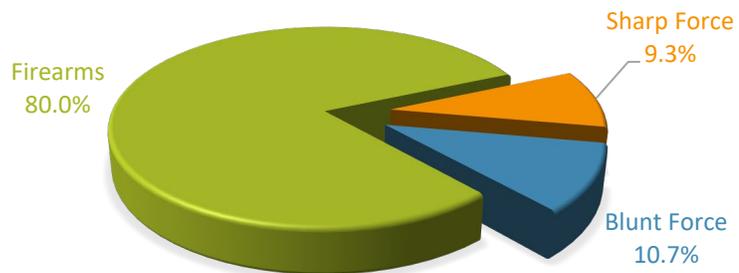


Figure 28: Homicides by cause.

Suicides

There were 130 cases were certified as suicide occurring in 2021. Compared to 2020, the percentage of cases ruled suicide decreased by approximately 13% in 2021. **Figure 29** shows a range of 126 to 150 of total suicides over the past five years.

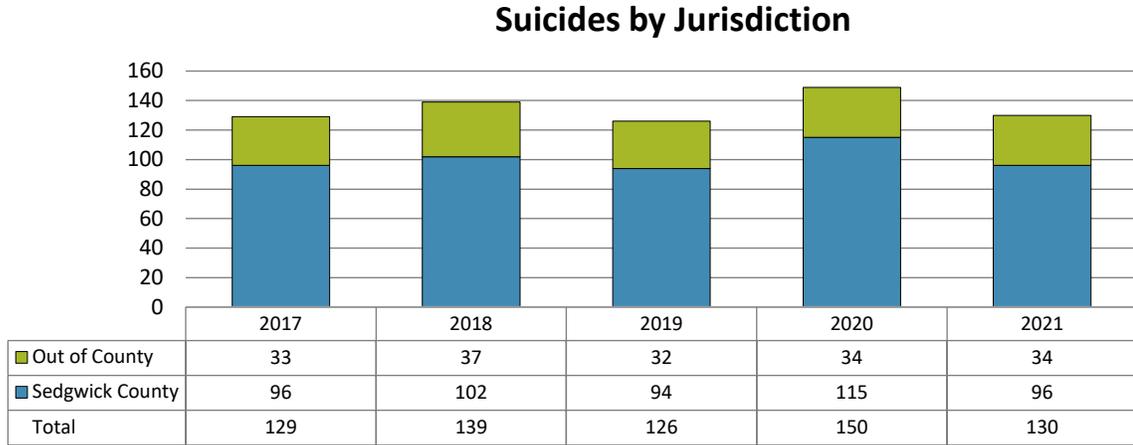


Figure 29: Suicides by county jurisdiction (Sedgwick County vs. out of county).

Figure 30 provides the percentage of suicides by gender. In 2021, males committed 85.4% of suicides and females committed 14.6%.

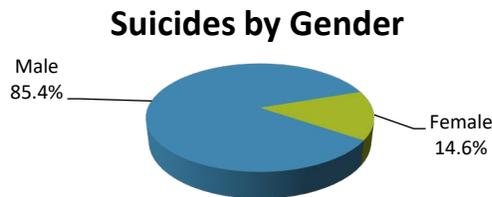


Figure 30: Percentage of suicides by gender.

Figure 31 provides the percentage of suicides by race. The race that committed the greatest percentage of suicides is White (80%), with Asian (0.8%) being the lowest percentage reported.

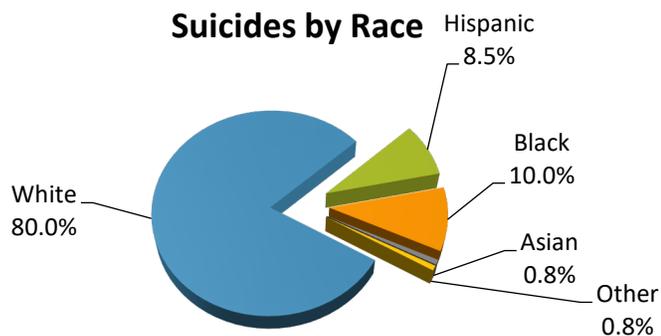


Figure 31: Suicide percentages categorized by race.

Figures 32 and 33 provide the number of suicides by gender broken down by race.

Male Suicides by Race

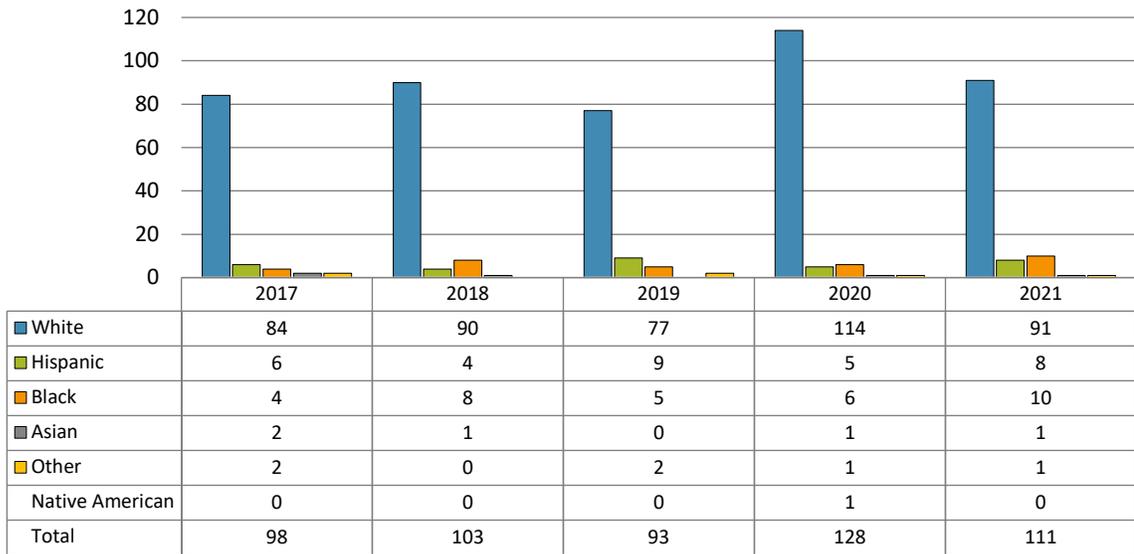


Figure 32: Number of suicides committed by males per race per year of death.

Female Suicides by Race

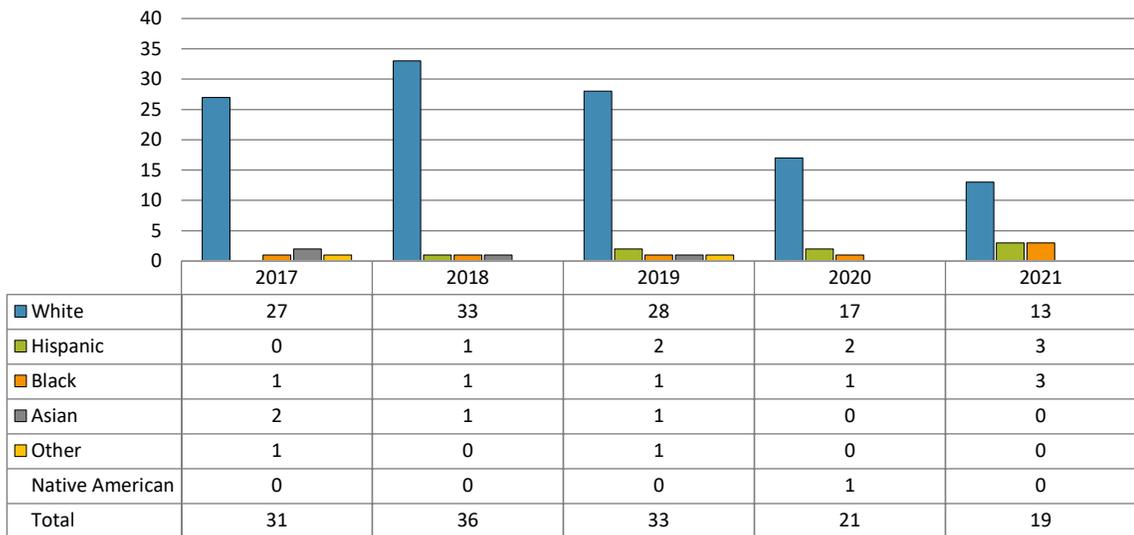


Figure 33: Number of suicides committed by females per race per year of death.

As shown in Figure 33, most suicides were committed by people between the ages of 19 and 39.

Suicides by Age Group

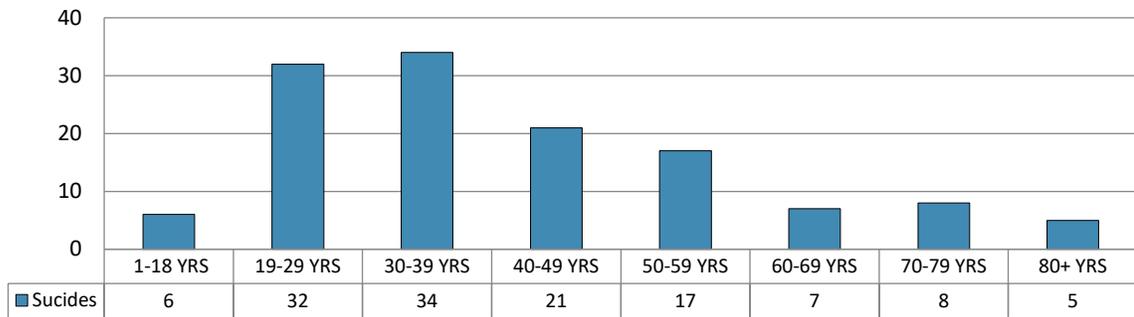


Figure 34: The number of suicides categorized by the decedent age that have been grouped.

Figure 35 illustrates the number of cases that were determined to be suicides in 2021 categorized by the month of occurrence. The chart shows that most suicides occurred in May and September.

Suicides by Month

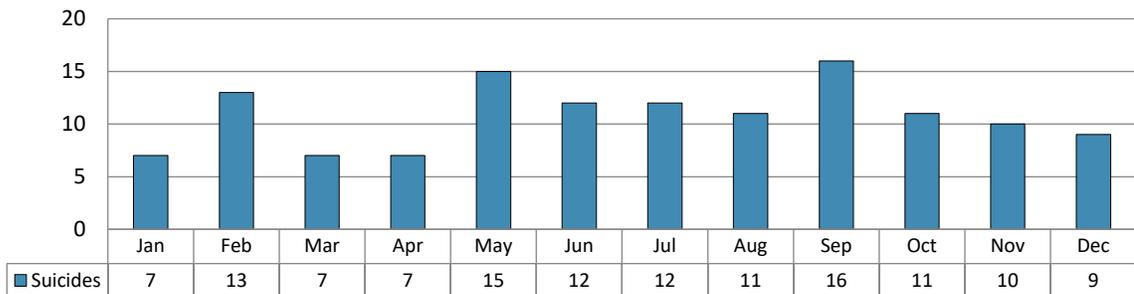


Figure 35: The number of cases determined to be suicides per month they occurred.

Figure 36 illustrates the number of cases that were determined to be suicides in 2021 categorized by the weekday of occurrence.

Suicides by Weekday

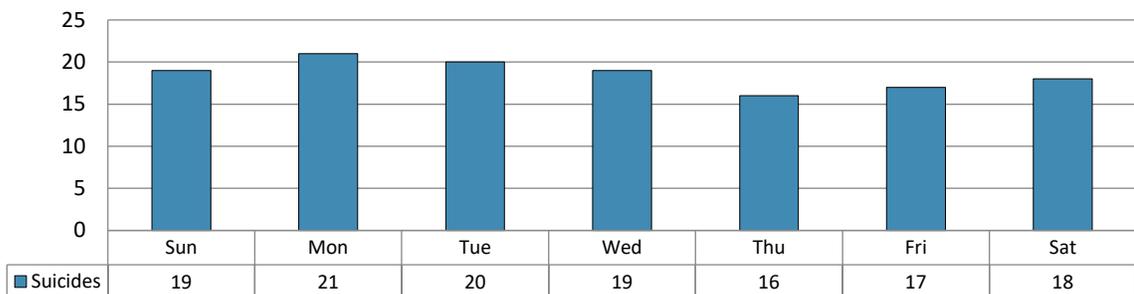


Figure 36: Number of suicides committed per weekday.

In 2021, the most common suicide methods were firearms (79) followed by asphyxia (hanging, strangulation, suffocation, or CO poisoning) (38) [Figure 37].

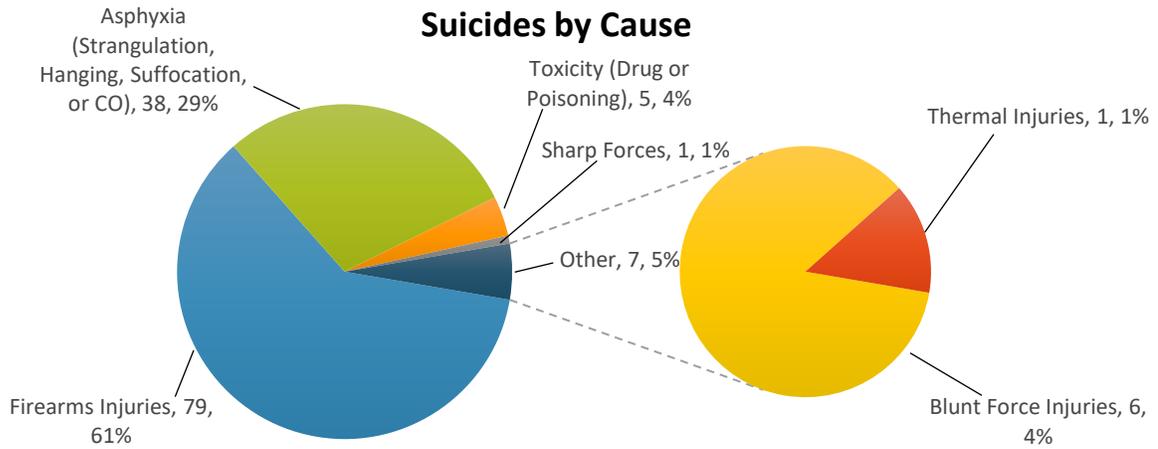


Figure 37: Suicides by cause.

TOXICOLOGY

In 2021, there were 940 pathology cases submitted to the toxicology laboratory. Not all cases require toxicological analyses [**Figure 38**]; the majority of these are associated with extended hospital stays following the initial event and no suitable specimens available for testing. As a result, 886 of the 940 pathology cases submitted to the toxicology laboratory were analyzed.

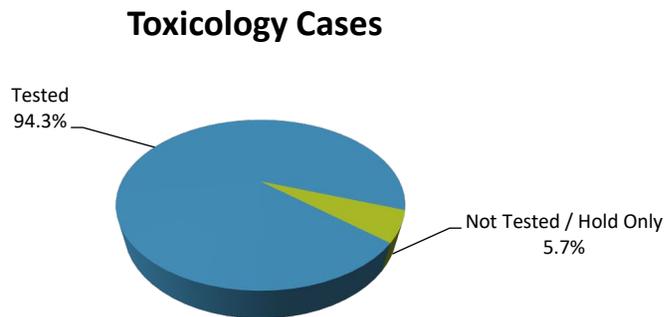


Figure 38: Percentages of cases submitted to the Toxicology Laboratory that were tested versus non-tested.

Drivers

In 2021, there were specimens from 94 post-mortem cases submitted for testing to the toxicology laboratory from decedents of motor vehicle related deaths. [**Figure 39**] depicts the results of testing for ethanol (EtOH) and drugs.

Approximately 54% of fatally injured motor vehicle occupiers had neither EtOH nor drugs in their system. Forty-six (46) decedents from motor vehicle related deaths tested negative for EtOH and negative for drugs, 7 were positive for EtOH and negative for drugs, 12 were positive for EtOH and positive for drugs, and 21 were negative for EtOH and positive for drugs.

Of the EtOH positive blood specimens [Figure 40], 16 resulted in values of 0.24 gm% or higher range, 4 in the 0.16 to 0.23 gm% range, 2 in the 0.08 to 0.15 gm% range, and 1 tested below 0.08 gm%. The highest blood alcohol detected was 0.60 gm%.

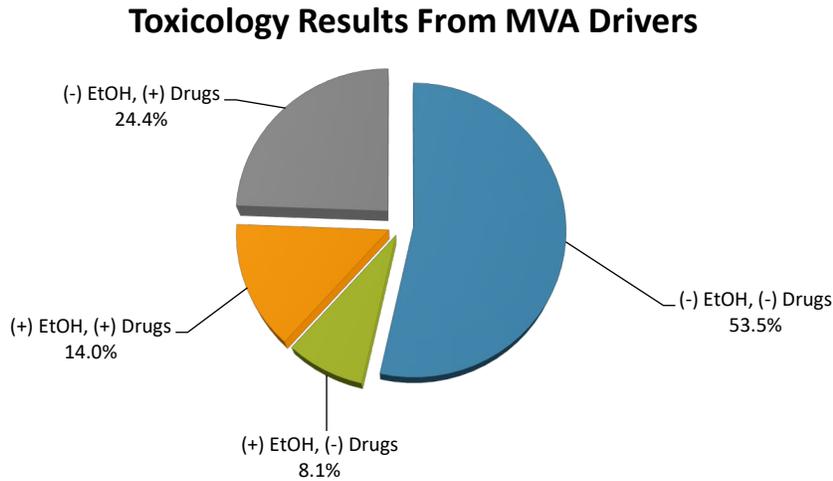


Figure 39: Ethanol and drug results from fatally injured drivers.

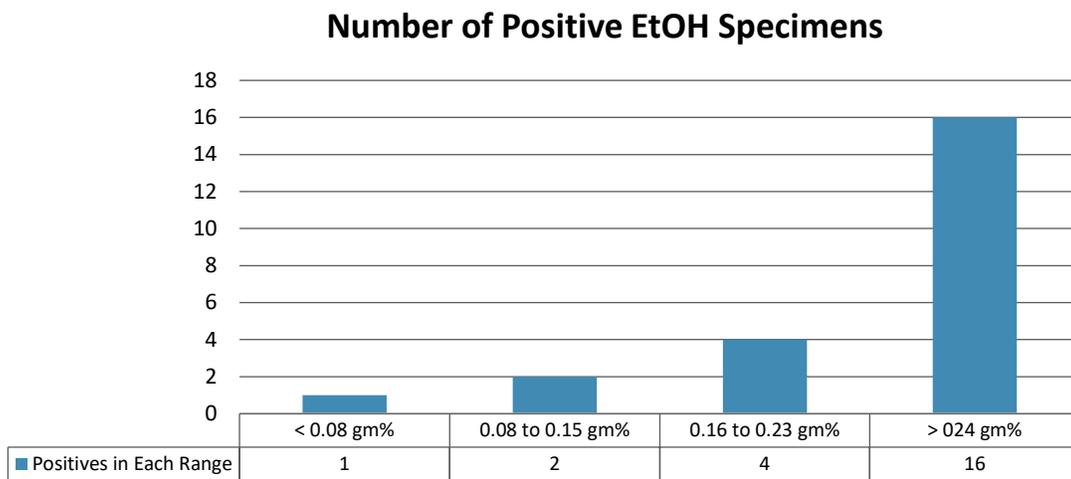


Figure 40: Illustrates the number of positive EtOH specimens within categorized as below the legal limit (< 0.08 gm%), above the legal limit (0.08 to 0.15 gm%), twice the legal limit (0.16 to 0.23 gm%), and three times or more over the legal limit (> 0.24 gm%).

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 2021, there were a total of 297 overdose fatalities, which equates to an approximate 52% increase from 2020 [Figure 41]. This is in addition to the 40% increase seen between 2019 and 2020 [Figure 42].

Overdoses per Year

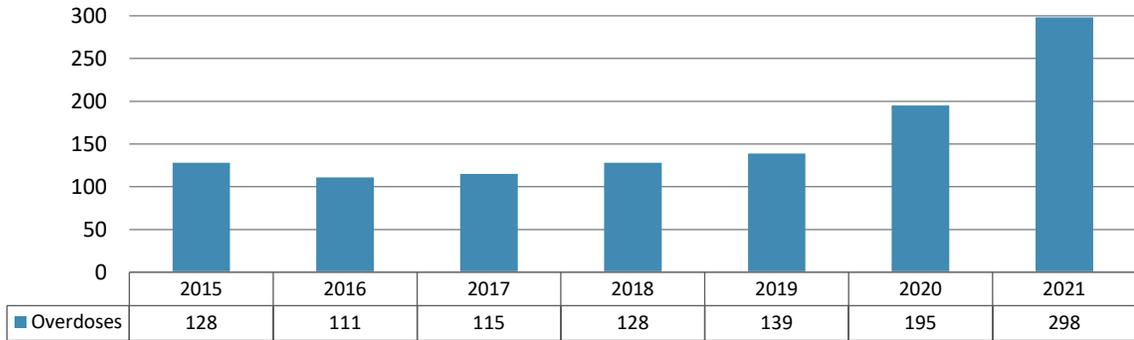


Figure 41: The number of certified overdose deaths for the past 7 years.

% Change in Overdose Deaths

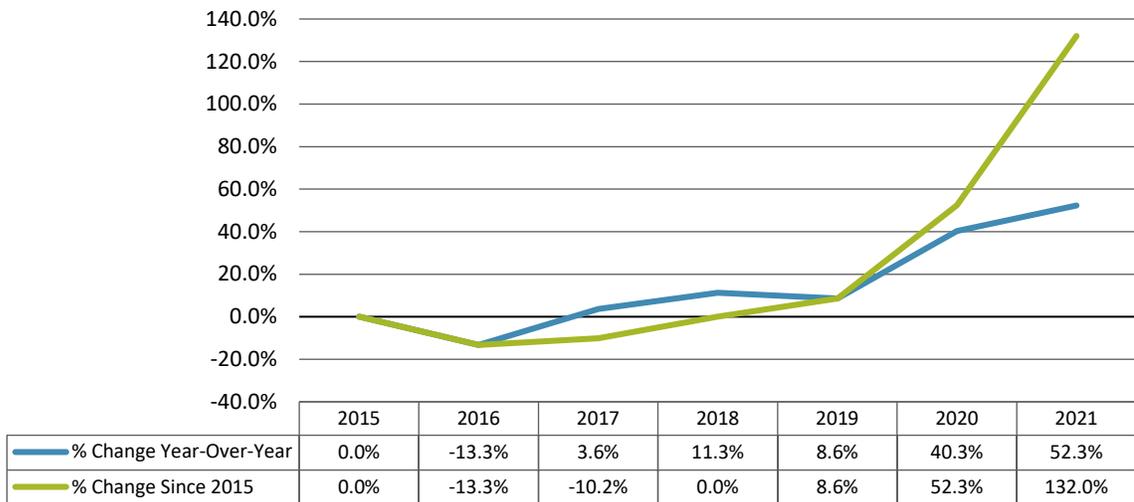


Figure 42: Percent change in overdose deaths year over year and the cumulative percent change for each year since 2015.

Opioid Related Deaths

Opioid deaths were at another record high in 2021 with a total of 259 (previous high was 180 in 2020). The range of opioid related deaths over the past seven years is 136 to 259 with an average of 173 deaths. **Figure 43** provides the count of opioid related deaths broken down into four categories (Fentanyl, Heroin, Oxycodone, and Other Opioids). **Figures 44 and 45** illustrate the percent change in fentanyl related deaths year-over-year and cumulative since 2015, respectively.

Opioid Related Deaths

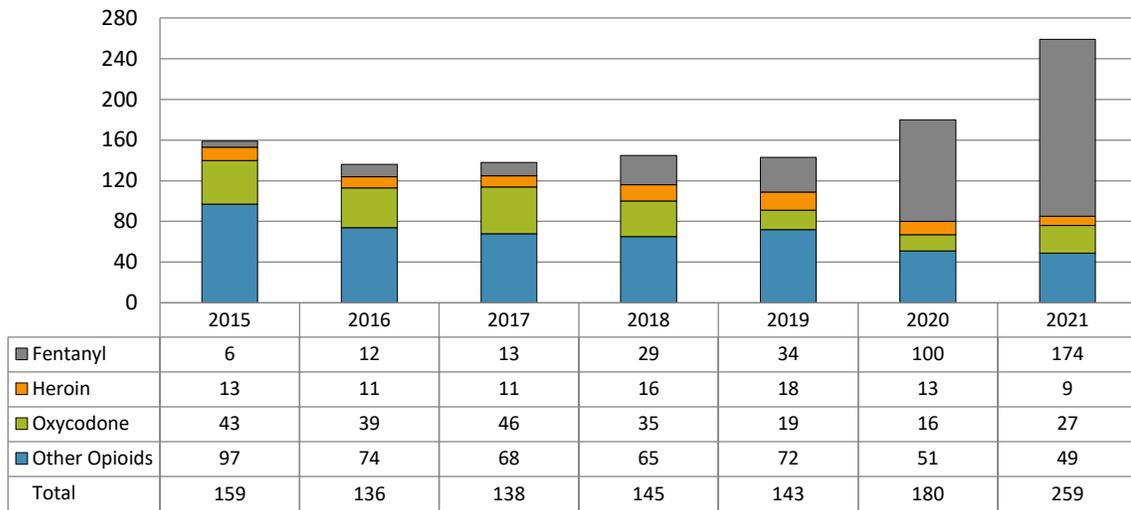


Figure 43: Opioid related deaths detected in Postmortem Toxicology cases.

% Change of Fentanyl Related Deaths Year-Over-Year

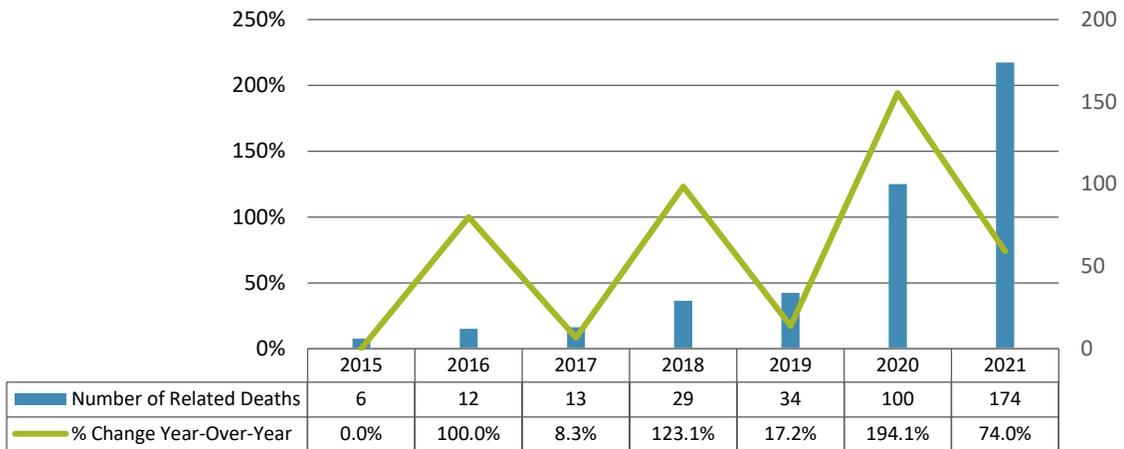


Figure 44: Illustrates the percent change of fentanyl related overdose deaths and the number of fentanyl related deaths year-over-year for each of the past six years. Note that in 2015 there were 6 fentanyl related deaths.

% Change in Fentanyl Related Deaths Since 2015

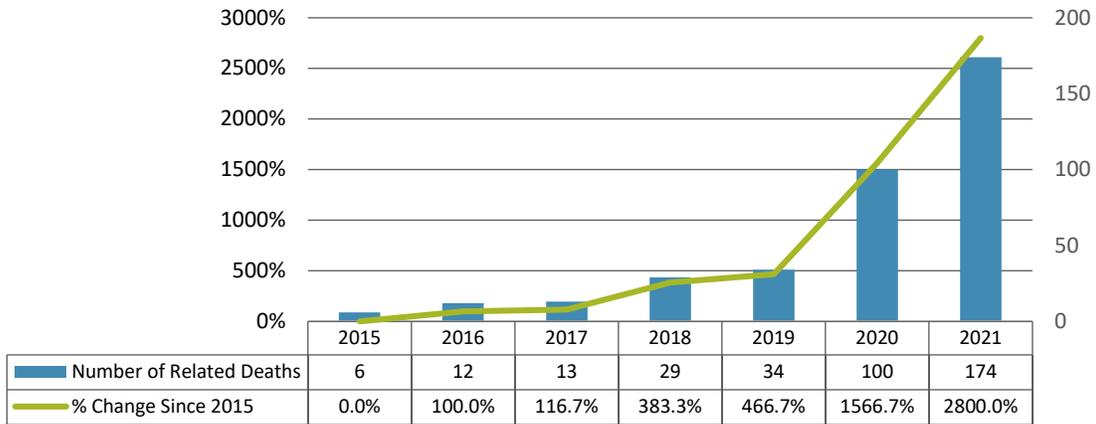


Figure 45: Cumulative percent change of fentanyl related overdose deaths and the number of fentanyl related deaths for each year since 2015.

Table 3 illustrates the count of fentanyl related deaths in 2021 within each age group. The greatest number of deaths related to fentanyl occurred in the 21 to 40 year old age group.

	Age Group	Number of Deaths (All Counties)	Number of Deaths (Sedgwick County)
2021	0-20	19	14
	21-31	45	35
	31-40	50	41
	41-50	29	26
	51-60	21	21
	61-70	9	8
	71-80	1	1

Table 3: Illustrates the number of fentanyl related deaths within each age group for all cases examined and how many of those were from Sedgwick County.

Table 4 illustrates the count of opioid related deaths per non-natural manner and cause of death. Additionally, there were 28 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
2021	Accidental	OD Substance Toxicity	189
	Accidental	Blunt Force Injuries	12
	Accidental	Other	1
	Accidental	Suffocation Asphyxia	1
	Accidental	Drowning	1
	Accidental	Thermal Injuries	1
	Homicide	Firearms Injuries	3
	Suicide	Firearms Injuries	6
	Suicide	OD Substance Toxicity	1
	Suicide	Hanging Asphyxia	1
	Undetermined	Other	7
	Undetermined	OD Substance Toxicity	2
	Undetermined	Blunt Force Injuries	1

Table 4: Number of non-natural opioid related deaths categorized by manner of death and cause of death.

Methamphetamine Related Deaths

Methamphetamine related deaths have shown also a steady increase over the last several years. In fact, methamphetamine was detected in the highest number of cases (183) ever recorded at the Center in 2021. The range of methamphetamine related deaths over the past five years is 76 to 183 with an average of 125 deaths. **Figure 46** provides the count of methamphetamine related deaths and the cumulative percent change each year since 2015.

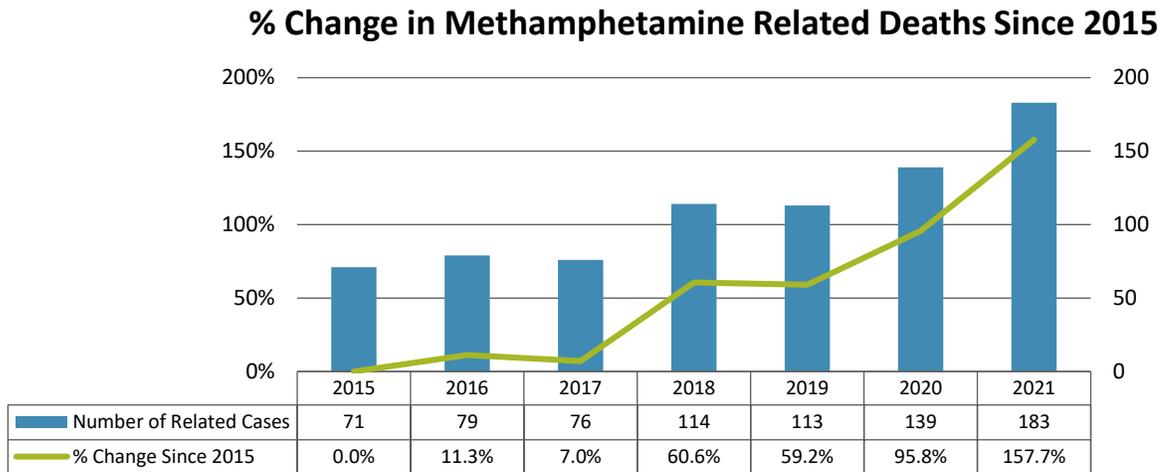


Figure 46: Illustrates the cumulative percent change in methamphetamine related overdose deaths and the number of methamphetamine related deaths for each of the past six years.

Table 5 illustrates the count of methamphetamine related deaths per non-natural manner and cause of death. Additionally, there was one case determined to be natural where methamphetamine was detected in the decedent's toxicology specimens.

	Manner of Death	Cause of Death	Number of Deaths
2021	Accidental	OD Substance Toxicity	126
	Accidental	Blunt Force Injuries	13
	Accidental	Thermal Injuries	3
	Accidental	Other	3
	Accidental	Hypothermia	2
	Accidental	Sharp Force Injuries	1
	Homicide	Firearms Injuries	9
	Homicide	Sharp Force Injuries	1
	Homicide	Blunt Force Injuries	1
	Suicide	Hanging Asphyxia	8
	Suicide	Firearms Injuries	6
	Suicide	OD Substance Toxicity	1
	Undetermined	Other	4

Table 5: The number of non-natural methamphetamine related deaths categorized by manner of death and cause of death.