WILLIAM L. JENKINS FORENSIC CENTER
EAST TENNESSEE STATE UNIVERSITY

ANNUAL REPORT 2024

William L. Jenkins Forensic Center
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Table of Contents

I. William L. Jenkins Regional Forensic Center Operations 1
- Mission Statement
- History
- NAME Accreditation
- Service
- Coverage
- Legal Jurisdiction
- Function
- Indications for a Complete Autopsy
- Death Certification
- Case Management
- Cremation Permit Authorization
- Public Health and Safety
- Education
- Medical Examiners/Forensic Pathologists
- Medicolegal Death Investigators
- Autopsy Technicians
- Administration Staff

II. Regional Forensic Center Case Counts 10

III. Homicide Demographics 17

IV. Suicide Demographics 20

V. Accidental Death Demographics 23

VI. Natural Death Demographics 26

VII. Undetermined Death Demographics 29

VIII. Decedent Characteristics by Mechanism of Death 30
- Motor Vehicle Collision Deaths
- Drug-Related Deaths
- Firearm Injury Deaths
- Disaster-Related Deaths

IX. Pediatric Death Demographics 43

X. Elderly Death Demographics 46

XI. Staff-Specific Data 49

I. William L. Jenkins Regional Forensic Center Operations

Mission Statement

The mission of the William L. Jenkins Forensic Center is to provide the highest level of service to the people of northeast Tennessee. The center investigates and documents deaths which fall under the Medical Examiner's jurisdiction with professionalism, compassion and efficiency.

The facility will investigate cooperatively with, but independently from, law enforcement and prosecutors in our region to provide impartial and professional quality death investigation and to document the circumstances, evidence, and contributing factors associated with cases that fall under the Medical Examiner jurisdiction.

We are further dedicated to the interest of public health and public safety of the citizens of upper east Tennessee, across the state, and nationally.

History

The Upper East Tennessee Forensic Center began operating in 1985 through the Department of Pathology with East Tennessee State University, Division of Forensic Pathology. The Forensic Center operated out of a small one-room morgue in the basement of the Pathology Department on the Quillen College of Medicine/Veterans Administration Campus in Johnson City and served the eight counties of the First Tennessee Development District (Carter, Greene, Hancock, Hawkins, Johnson, Sullivan, Unicoi and Washington Counties). Each county appointed a physician to serve as their County Medical Examiner. The purpose of the Forensic Center was to perform autopsies ordered by the County Medical Examiner and provide an opinion as to the cause and manner of death, based on their findings.

In 2007, the Upper East Tennessee Forensic Center began operating in its own facility in a historic building on the Veterans Administration Campus in Johnson City, renovated with funding provided by the State of Tennessee and the eight counties of the First Tennessee Development District, and officially named the William L. Jenkins Forensic Center (Regional Forensic Center) after the Hawkins County congressman who assisted in obtaining funding for the Forensic Center. In 2014, Karen Cline-Parhamovich, D.O., a forensic pathologist with the Forensic Center, was appointed to serve as Washington County Medical Examiner, and then the remainder of the counties in the First Judicial District (Carter, Unicoi and Johnson) appointed her their Medical Examiner as well. Currently, Emilie Cook, D.O., Director of the William L. Jenkins Forensic Center, serves as the Interim County Medical Examiner for Carter, Johnson, Unicoi and Washington Counties. The William L. Jenkins Forensic Center also provides autopsy and consultative services to Greene, Hancock, Hawkins and Sullivan Counties.

Accreditation

The William L. Jenkins Forensic Center received accreditation from the National Association of Medical Examiners (NAME) in October 2014. We have maintained full accreditation. The NAME Accreditation process consists of a rigorous inspection of the physical facility and review of the office practices, including that the application of the standards set forth by NAME. Maintenance of accreditation ensures that the Forensic Center maintains a high caliber medicolegal death investigation system for the communities in the jurisdiction for which we serve. A full on-site inspection will occur again in October 2027. Information regarding inspection and accreditation is available at https://www.thename.org

Table 1.1 below shows selected statistics generated by year for NAME accreditation from 2018 to 2023; the process is on-going for 2024.

Table 1.1 Selected NAME Criteria for 2018-2023

	2018	2019	2020	2021	2022	2023
Deaths Reported to Office	2124	2251	2499	2868	2383	2708
Cases Accepted by Office	661	683	699	880	945	985
Total Number of Complete Autopsies	547	495	475	665	636	616
Total Number of External Examinations	114	188	217	200	301	224
Total Number of Partial Autopsies	0	0	7	14	10	17
Records Review	4	5	18	32	51	128
Cases where Toxicology is Performed	541	541	531	778	718	812
Cases where Histology is Performed	285	264	275	338	292	209
Scene Visits	363	402	521	329	571	503
Bodies Transported by Office or Order of Office	661	683	699	880	945	885
Jurisdiction Declined but Accepted for Storage Only	38	38	53	50	44	28

Service

The William L. Jenkins Forensic Center is the Forensic Pathology Division and under the purview of the Department of Pathology with East Tennessee State University's Quillen College of Medicine. It serves as the Office of the Chief Medical Examiner for Washington, Carter, Unicoi and Johnson Counties and provides autopsy and consultative services for four other counties (Greene, Hancock, Hawkins, Sullivan Counties) in northeast Tennessee. Services are provided 24 hours a day, seven days a week, with a Medical Examiner/Forensic Pathologist on-call and a Medicolegal Death Investigator available to respond to death scene investigations.

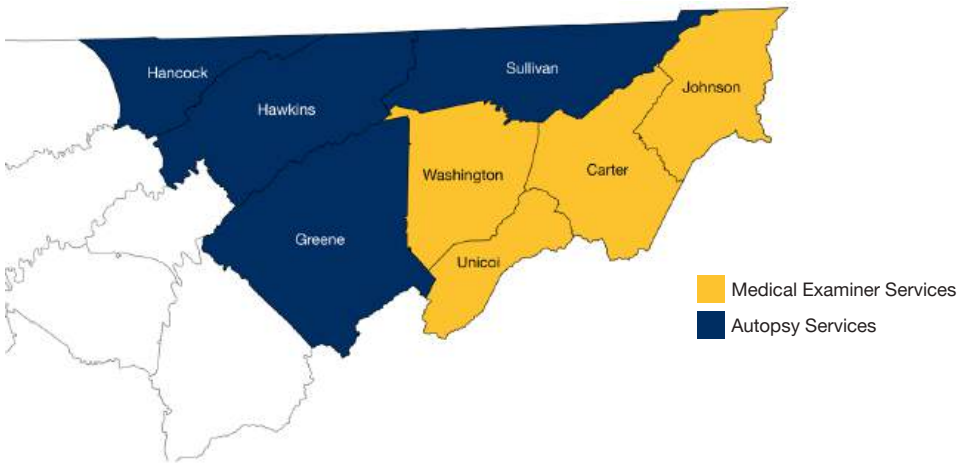
Coverage

The Forensic Center Staff provide services to its four jurisdictional counties (Carter, Johnson, Unicoi, and Washington) and four non-jurisdictional counties (Greene, Hancock, Hawkins, and Sullivan).

Jurisdictional counties (yellow on map) are those where Dr. Emilie Cook is the Chief Medical Examiner. For Washington County the Regional Forensic Center (RFC) investigators serve as county Medicolegal Death Investigators (MDI). In Carter, Johnson and Unicoi each county has a Field Medicolegal Death Investigator (FMDI) appointed to serve as primary death investigator and report to the RFC. The RFC investigators will also respond to sudden unexplained infant deaths, homicides, multiple fatalities and deaths deemed suspicious alongside the FMDI in Carter, Johnson and Unicoi Counties.

Non-jurisdictional counties (blue on the map below) are those where there is an appointed county Medical Examiner (not Dr. Emilie Cook or one of the RFC Deputy Medical Examiners). The county Medical Examiner is a physician licensed in Tennessee and responsible for conducting medicolegal death investigative activities. These agencies may or may not also have Medicolegal Death Investigators working in their counties.

Map 1.1 Regional Forensic Center Coverage Map



Legal Jurisdiction

Tennessee Code Annotated §38-7-104 – County Medical Examiner

> A county Medical Examiner shall be appointed by the county mayor, subject to confirmation by the county legislative body, based on a recommendation from a convention of physicians residents in the county. A county Medical Examiner shall be a physician who is either a graduate of an accredited medical school authorized to confer upon graduates the degree of doctor of medicine (M.D.) and who is duly licensed in Tennessee, or is a graduate of a recognized osteopathic college authorized to confer the degree of doctor of osteopathy (D.O.) and who is licensed to practice osteopathic medicine in Tennessee, and shall be elected from a list of a maximum of two (2) doctors of medicine or osteopathy nominated by convention of the physicians, medical or osteopathic, residents in the county, the convention to be called for this purpose by the county mayor.

Tennessee Code Annotated §38-7-104 – Medicolegal death investigators

> A medical investigator shall be a licensed emergency medical technician (EMT), paramedic, registered nurse, physician's assistant or a person registered by or a diplomat of the American Board of Medicolegal death investigators and approved by the county Medical Examiner as qualified to serve as medical investigator. The county medical investigator may conduct investigations when a death is reported, as provided in §38-7-108, under the supervision of the county Medical Examiner. The county medical investigator may make pronouncements of death and may recommend to the county Medical Examiner that an autopsy be ordered. However, the county medical investigator shall not be empowered to sign a death certificate. The county Medical Examiner may delegate to the county medical investigator the authority to order an autopsy.

Tennessee Code Annotated §38-7-108 – Death under suspicious, unusual or unnatural circumstances

> Any physician, undertaker, law enforcement officer, or other person having knowledge of the death of any person from violence or trauma of any type, suddenly when in apparent health, sudden unexpected death of infants and children, deaths of prisoners or persons in state custody, deaths on the job or related to employment, deaths believed to represent a threat to public health, deaths where neglect or abuse of extended care residents are suspected or confirmed, deaths where the identity of the person is unknown or unclear, deaths in any suspicious/unusual/unnatural manner, found dead, or where the body is to be cremated, shall immediately notify the county Medical Examiner or the district attorney general, the local police or the county sheriff, who in turn shall notify the county Medical Examiner.

Function

Each county in Tennessee is required to have a licensed physician appointed by the county commissioners to serve as the Medical Examiner. The Office of the Medical Examiner is responsible for investigating deaths reported based upon the Tennessee State Statute 38-7-108. William L. Jenkins Forensic Center (WLJFC) Board Certified Pathologists serve as Medical Examiner and deputy Medical Examiners for Washington County, Carter County, Unicoi County and Johnson County.

In general, the deaths investigated by our office include those that are sudden, unexpected, often times violent, and not readily explainable at the time of death.

Because deaths occur regardless of time or day, the Medical Examiner's office responds to deaths 24 hours per day, 365 days per year. These deaths are investigated by Medicolegal Death Investigators (MDIs) that arrive to death scenes to gather information from families and law enforcement, and examine/photograph the body and surroundings. This information will be relayed to Forensic Pathologists for case management.

Which deaths do we investigate?

Any physician, undertaker, law enforcement officer, or other person having knowledge of the death of any person from the following reportable deaths shall immediately notify the county Medical Examiner or the district attorney general, the local police or the county sheriff, who in turn shall notify the county Medical Examiner in the county in which the death occurred.

Reportable Deaths:

- violence or trauma of any type,
- suddenly when in apparent health,
- sudden unexpected death of infants and children,
- deaths of prisoners or persons in state custody,
- deaths on the job or related to employment,
- deaths believed to represent a threat to public health,
- deaths where neglect or abuse of extended care residents are suspected or confirmed,
- deaths where the identity of the person is unknown or unclear,
- deaths in any suspicious/unusual/unnatural manner, found dead, or where the body is to be cremated.

We also consider the NAME standards in deciding which deaths to investigate which include:

- Deaths due to violence
- Known or suspected non-natural deaths
- Unexpected or unexplained deaths when in apparent good health
- Unexpected or unexplained deaths of infants and children
- Deaths occurring under unusual or suspicious circumstances
- Deaths of persons in custody
- Deaths known or suspected to be caused by diseases constituting a threat to public health
- Deaths of persons not under the care of a physician.

Identification of Decedent

Tennessee State Statute 38-7-108 requires a scientific identification in cases where visual identification of a decedent is impossible as a result of burns, decomposition, or other disfiguring injuries or the death is the result of an accident that involved two or more individuals who were approximately the same age, sex, height, weight, hair color, eye color, and race. In these cases, the county Medical Examiner is required to verify the identity of the decedent through fingerprints, dental records, DNA, or another definitive identification procedure.

Indications for a Complete Autopsy

The decision regarding whether a complete autopsy should be performed is based on the NAME Autopsy Performance Standards. Consequently, an autopsy is performed when the:

- The death is known or suspected to have been caused by apparent criminal violence.
- The death is unexpected and unexplained in an infant or child.
- The death is associated with police action.
- The death is apparently non-natural and in custody of a local, state, or federal institution.
- The death is due to acute workplace injury.***
- The death is caused by apparent electrocution.***
- The death is by apparent intoxication by alcohol, drugs, or poison, unless a significant interval has passed, and the medical findings and absence of trauma are well documented.
- The death is caused by unwitnessed or suspected drowning.***
- The body is unidentified and the autopsy may aid in identification.
- The body is skeletonized.
- The body is charred.
- The forensic pathologist deems a forensic autopsy is necessary to determine cause or manner of death, or document injuries/disease, or collect evidence.

- The deceased is involved in a motor vehicle incident and an autopsy is necessary to document injuries and/or determine the cause of death.

*** Unless sufficient antemortem medical evaluation has adequately documented findings and issues of concern that would otherwise have required autopsy performance.

Death Certification

The main focus of our investigation is to determine the cause and manner of death, and to clarify or confirm circumstances surrounding the death. The cause of death is related to the underlying disease and/or injury that resulted in the individual's death. The manner of death, in the state of Tennessee, is limited to these possibilities: natural, accident, suicide, homicide, or undetermined.

What is the difference between Cause of Death and Manner of Death?

The Cause of Death is (a) the disease or injury that initiated the sequence of morbid events leading directly to death, or (b) the circumstances of the accident or violence that produced fatal injury.

Unlike the cause of death, with thousands of possibilities, in Tennessee, manner of death is limited to: Natural, Suicide, Accident, Homicide and Undetermined. The fundamental purpose for determining the manner of death is for public health surveillance and vital statistics.

- **Natural** — are due solely or nearly totally to disease and/or the aging process.
- **Accident** — applies when an injury or poisoning (such as a drug overdose) causes death and there is little or no evidence that the injury or poisoning occurred with intent to harm or cause death. In essence, the fatal outcome was unintentional.
- **Suicide** — results from an injury or poisoning as a result of an intentional, self-inflicted act.
- **Homicide** — occurs when the death results from a volitional act committed by another person to cause fear, harm, or death. Intent to cause death is a common element but is not required for classification as a homicide. It must be emphasized that the classification of homicide for the purpose of death certification is a "neutral" term and neither indicates nor implies criminal intent, which remains a determination within the province of legal processes.
- **Undetermined** — is a classification used when the information pointing to one manner of death is no more compelling than one or more other competing manners of death, in thorough consideration of all available information.

In general, when death involves a combination of natural processes and external factors, such as injury or poisoning, preference is given to the non-natural manner of death.

Case Management

A Medicolegal Death Investigator (MDI) responds to nearly all of the death scenes within the counties we serve as Medical Examiner. They gather information, apply office policies, and consult with the Medical Examiner.

- The MDI is trained to recognize the vast majority of the deaths requiring postmortem examinations and, in those cases, immediately arranges for transport to WLJFC for a postmortem examination. Homicides, infant deaths, suicides and drug overdoses are examples of the deaths that are immediately sent.

- The MDI writes a report documenting their findings and uploads images obtained at the investigation. These reports and photos are reviewed by the Medical Examiner or deputy Medical Examiner.

The Medical Examiner or a deputy Medical Examiner is assigned to each case and generally uses one of the following approaches in each of the deaths for which our office is responsible:

- **Jurisdiction Declined** – A reported death classified as an attended natural death should be documented as a Declined Jurisdiction case. The body is released directly from the scene or hospital to the funeral home. The MDI views the body and collects information including scene circumstances, medical history, and social history. This information is provided to the on-call Medical Examiner who may decide to release a body directly to the funeral home chosen by the family.
- **Storage** – Jurisdiction has been declined, but the body will be taken to WLJFC for temporary storage until a funeral home has been chosen. If the family cannot be found or if the family does not assume responsibility for the disposition of the remains, an unclaimed remains process ensues.
- **External Examination** – An external examination includes a careful evaluation of the circumstances of the death and an examination of the external surfaces of the body, with possible laboratory/toxicology testing. This includes the production of a written report.
- **Record Review** – A record review is a case where the Medical Examiner accepts jurisdiction and will sign the death certificate, but the body is not viewed by the Medical Examiner; therefore, a report of examination is not completed. This type of case review is done when a decedent has been hospitalized for a period of time following an injury (typically falls in the elderly) and lethal injuries have been sufficiently documented.
- **Complete Autopsy** – A complete autopsy includes external and internal examination, plus toxicology. This includes the production of a written report.
- **Limited autopsy** – A partial autopsy includes external and limited internal examination, plus toxicology at the discretion of the pathologist. This includes the production of a written report.

Cremation Permit Authorization

Tennessee state law requires funeral directors and embalmers to obtain a signed permit from the Medical Examiner for the county in which the death occurred. Our office reviews hundreds of cremation permit requests each year. The request for authorization to cremate involves reviewing the death certificate provided by the funeral director to assure that deaths that should have been reported to the office were, in fact, reported. Deaths that were not properly reported are investigated before cremation is authorized.

Public Health and Safety

The major purpose of the Medical Examiner's Office is to conduct death investigations. The information obtained from individual death investigations may also be studied collectively to gather information that may be used to address public health and safety issues. Our office participates with the Ballad Health M & M Review Board. We also participate in a child fatality review team, providing significant information regarding how children died with the goal of preventing future deaths.

Education

WLJFC is a division of East Tennessee State University, Quillen College of Medicine, Pathology Department. WLJFC pathologists hold faculty appointments with associated mentoring duties. Medical students, residents, and other students in advanced degree programs have the opportunity to complete elective rotations in the Medical Examiner's Office to gain experience and exposure to forensic pathology, forensic anthropology and medicolegal death investigation. The education of medical students and residents in the Medical Examiner's Office is provided with great attention to respect for the decedents and their families.

Medical Examiners/Forensic Pathologists

The William L. Jenkins Forensic Center physicians are Board Certified Forensic Pathologists who perform autopsies, compile reports of their findings and testify in criminal and civil court proceedings. They also educate medical students and residents and provide continuing education to death investigators and local law enforcement. They advance public health by providing information about emerging drug trends, infections and bioterrorism.

Emilie V. Cook, D.O.
Forensic Pathologist, Director
Interim Chief Medical Examiner for Carter, Johnson, Unicoi and Washington Counties

Ami Murphy, D.O.
Forensic Pathologist
Deputy County Medical Examiner for Carter, Johnson, Unicoi and Washington Counties

Andrea M. Orvik, M.D.
Forensic Pathologist
Deputy County Medical Examiner for Carter, Johnson, Unicoi and Washington Counties

Ellen Wallen, M.D.
Forensic Pathologist
Deputy County Medical Examiner for Carter, Johnson, Unicoi and Washington Counties

Medicolegal Death Investigators

The medicolegal death investigators are required to become certified by the American Board of Medicolegal Death Investigators (ABMDI). The Forensic Center employees five RFC Investigators; three are Diplomates with the ABMDI.

These staff members have an initial responsibility for accepting or declining jurisdiction for death cases reported to the RFC. If jurisdiction is accepted, MDIs are responsible for a variety of activities to assure the case is properly investigated.

Regional Forensic Center Medicolegal Death Investigators

Julia Welch, BS, D-ABMDI
Jasmyn McKinney, BS, D-ABMDI
Virginia Daniel, RN, CEN, D-ABMDI
Victoria Sanchez, MS
Cassidy Cooper, BS

Field Medicolegal Death Investigators

Carter County
Benny Colbaugh, Nathan Ward
Johnson County
Willie Deboard, Joey Luckett
Unicoi County:
Jimmy Erwin, Rebecca Harrison, David Walker, Patrick Potts

Autopsy Technicians

The Autopsy Technicians are responsible for assisting Forensic Pathologists in conducting autopsies and external examinations, including preparation of the body for autopsy, documenting personal property, forensic photography, performing radiologic imaging, evisceration; and working with funeral homes to transition the decedent for their final disposition.

Mark Dunn
Savannah Collins
Mercedes Bright
Matthew Dlugosz

Administration

The Director of Operations is responsible to the Director of Forensic Pathology/Chief Medical Examiner for managing the operations of the William L. Jenkins Forensic Center, and supervises the investigative, technical, and administrative staff; ensuring the Forensic Center maintains accreditation. The Forensic Center Coordinator and Medical Program Facilitators are responsible for coordinating Forensic Pathologists' schedules for depositions and court testimony, medical billing, completing open records requests and assuring proper case closure, among other activities. They work with funeral homes, law enforcement, District Attorney's offices, attorneys, families, media, and others to ensure requested information is provided in a timely manner. The Forensic Center Coordinator and Medical Program Facilitators are also responsible for coordinating proper death certificate actions between the State of Tennessee Department of Vital Records, Funeral Homes, and the Regional Forensic Center.

Laura Beth Parsons, F-ABMDI, Director of Operations
Ashley Hatfield, Forensic Center Coordinator
Sarah Craig, Medical Program Facilitator
Miranda Roberts, Medical Program Facilitator

II. Regional Forensic Center Case Counts

The estimated population of the eight counties served by WLJFC in 2024 was 535,964, according to the latest data provided by the US Census Bureau. As of May 5th, 2025, provisional statistical death data provided by the Tennessee Vital Statistics division at the TN Department of Health states that there have been 8,371 deaths in these same eight counties. Overall, therefore, the mortality rate in this region in 2024 was 1561.9 deaths per 100,000 residents.

There were 2,607 cases reported to WLJFC in 2024, suggesting that approximately 31.1% of deaths in the counties of service involved some interaction with the forensic center. This percentage varies widely by county; in particular, jurisdictional counties will have a higher reporting percentage than the non-jurisdictional counties. Recall from Section I that WLJFC performs multiple services for jurisdictional counties, including cremation permit authorization, investigations, as well as autopsy services; for non-jurisdictional counties, with some exceptions, WLJFC predominantly provides autopsy services only. As shown in Table 2.1, more than sixty percent of deaths in the jurisdictional counties were reported to the forensic center, but only around seven percent of deaths in non-jurisdictional counties were reported.

Map 2.1 Percentage of Deaths Reported to RFC by County, 2024 (N = 2,607)

Table 2.1 Number of Cases Reported to RFC in 2024 (N = 2,607)

	Total Population	Mortality Rate Per 100,000 Residents*	Total Provisional Death Count†	Deaths Reported to RFC
Jurisdictional Counties				
Carter	57,434	1079.5	620	309
Johnson	18,506	961.9	178	102
Unicoi	17,872	1152.6	206	119
Washington	139,642	1815.4	2535	1747
Non-Jurisdictional Counties				
Greene	73,398	1166.2	856	93
Hancock	7,038	1392.4	98	17
Hawkins	59,371	973.5	578	42
Sullivan	162,703	2028.2	3300	178

*Rates calculated by dividing death count by population and multiplying result by 100,000

†2024 deaths calculated using provisional death file generated 5 May 2025

Figure 2.1 Yearly RFC Case Percentage, 2018-2024

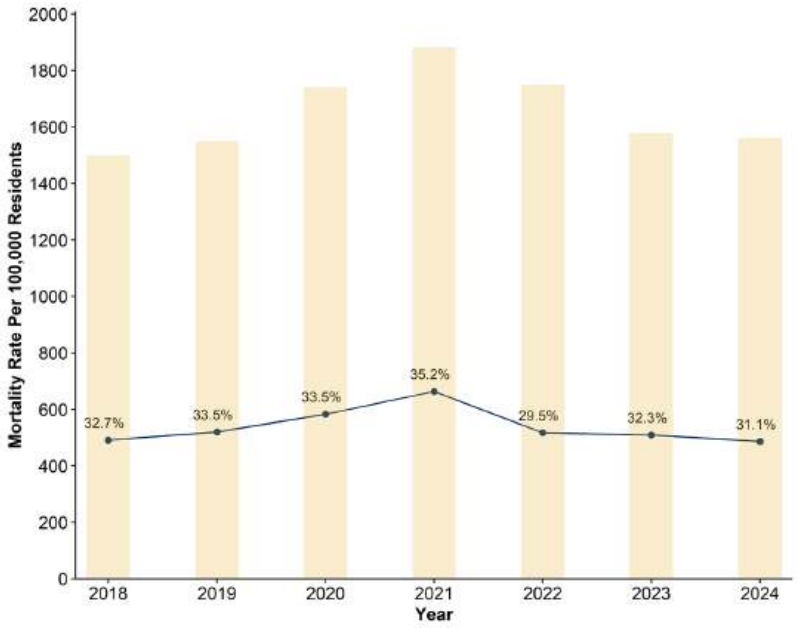


Figure 2.1 above shows how the percentage of deaths in the counties of service has fluctuated over time in comparison to the annual mortality rate in the region. From 2018 to 2021, the percentage of reported cases increased even in comparison to the mortality rate. From 2021 to 2022, the mortality rate decreased, as did the percentage of reported cases, but we see that since that time, the percentage of cases reported to WLJFC has stayed relatively steady.

Table 2.2 focuses on the 2,607 cases reported to the RFC by activity type (e.g., record review, complete autopsy) as described in the Case Management section above. For jurisdictional counties, 34.6% of reported cases are accepted for either autopsy or record review, 31.7% are cremation permit cases, and 33.7% are declined. For non-jurisdictional counties, only cases accepted for autopsy are included in the table, with the exception of one case that falls outside of standard case definitions[1]. Excluded counts are indicated with asterisks.

Table 2.2 Activities Completed by WLJFC by County, 2024 (N = 2,607)

	Cremation Permit*	Jurisdiction Declined	Jurisdiction Accepted				Total Number Reported to RFC
			Full Autopsy	External Exam	Limited Exam	Record Review	
Jurisdictional Counties							
Carter	135	86	51	29	2	6	309
Johnson	39	34	12	11	4	2	102
Unicoi	52	33	9	12	12	1	119
Washington	600	725	138	124	15	145	1747
Non-Jurisdictional Counties							
Greene	*	*	66	21	6	*	93
Hancock	*	*	14	3	0	*	17
Hawkins	*	*	33	9	0	*	43†
Sullivan	*	*	143	34	1	*	178

*Cremation permit counts are based on date of death of the decedent, not date permit was issued. This count therefore represents the number of 2024 deaths in each jurisdictional county that required a cremation permit.
†Total count reflects cases that fall outside of the standard case definitions but jurisdiction was still accepted by WLJFC.

1 WLJFC staff does not complete all cases for non-jurisdictional counties in MDILog, the case management software; only cases accepted for autopsy or exam are filled out by RFC staff. Because of this, there are profound differences in how these cases are completed in the software, and to ensure proper classification of cases, this report excludes all non-jurisdictional county cases that are indicated as “jurisdiction declined,” “record review,” and all cremation permit authorizations that WLJFC staff did not directly complete..

Figure 2.2 Activities Completed by WLJFC for Jurisdictional Counties, 2024 (N = 2,277)

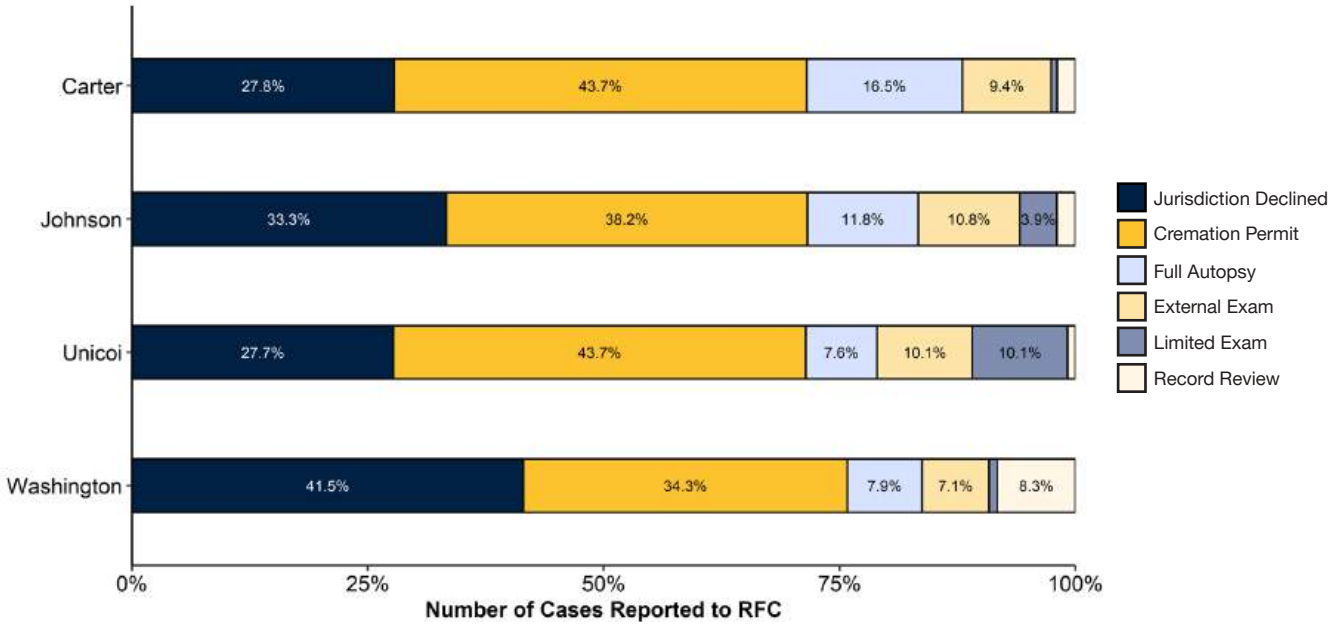
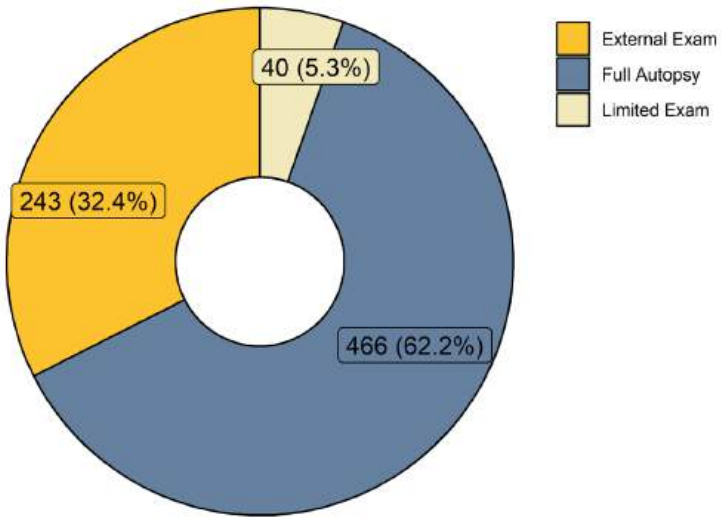


Figure 2.2 compares the distribution of activities performed for each jurisdictional county. It should be noted that these percentages must be considered in combination with Table 2.2 for full context. For example, a higher percentage of Johnson County RFC cases (33.7%) were declined compared to Carter County (27.8%), but the overall number of Carter County cases is more than three times higher than the total number of Johnson County cases, so there were many more cases in Carter where jurisdiction was declined compared to Johnson. We present the table beside the figure so that the reader may examine the data from multiple viewpoints.

Figure 2.3 shows the percentages of the full autopsies, limited exams, and external exams conducted in 2024. Overall, there were 749 autopsies or exams performed, 62.2% of which were full autopsies, 32.4% were external exams, and 5.3% were limited exams.

Figure 2.3 Autopsies and Exams Performed at WLJFC, 2024 (N = 749)



To conclude this section, we turn our attention to the manners of death for the 904 cases where jurisdiction was accepted (JA). Table 2.3 shows the manners of death by county for these cases. While different counties have slightly different distributions, they are similar enough that it makes sense to consider the manners of death in aggregate. Figure 2.4 on the next page compares this overall distribution (shown in 4a) with the various counties by jurisdiction (jurisdictional counties shown in 4b and non-jurisdictional counties shown in 2.4c). Due to the interest in drug-related deaths, as well as deaths due to motor vehicle accidents (MVA), these cases are shown separately from all other accidental deaths. Note in Figure 2.4b and 2.4c that the shaded bars follow the same order as the columns in Table 2.3 to make interpreting the percentages more straightforward.

Table 2.3 Manners of Death for Jurisdiction-Accepted Cases by County, 2024 (N = 904)

	Accident: Drug-Related	Accident: MVA	Accident: Other	Homicide	Suicide	Undetermined or Pending	Natural	Total Accepted
Jurisdictional Counties								
Carter	11	9	10	1	11	2	44	88
Johnson	2	3	5	3	2	1	13	29
Unicoi	5	0	10	0	4	1	14	34
Washington	40	72	152	9	38	7	104	422
Non-Jurisdictional Counties								
Greene	24	19	9	4	10	3	24	93
Hancock	6	2	1	1	3	1	3	17
Hawkins	11	3	5	1	7	3	13	43
Sullivan	66	5	10	9	29	7	52	178

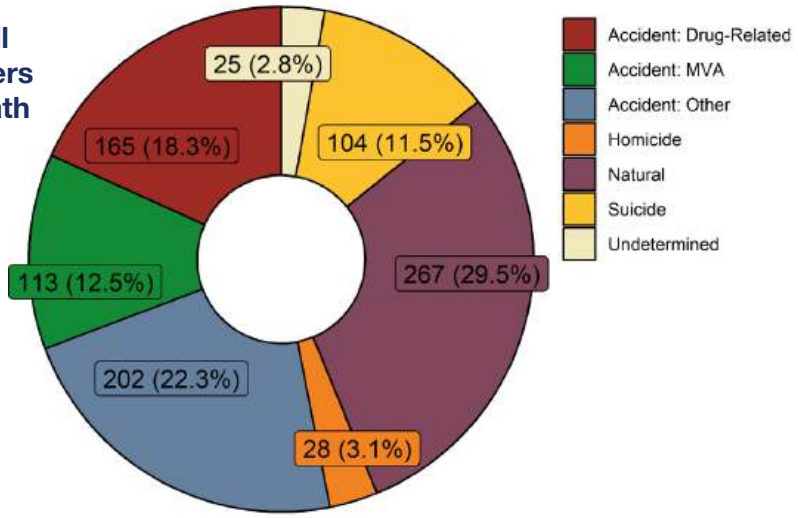
Overall, accidental deaths accounted for about half (53.1%) of all JA cases, with drug-related deaths being 18.3% of all JA cases and MVA deaths being 12.5% of JA cases. Natural deaths were 29.5% of JA cases, with suicide deaths accounting for 11.5%, homicide deaths accounting for 3.1%, and deaths due to undetermined intent accounting for the remaining 2.8%.

For Greene and Sullivan Counties, the highest percentage of deaths were drug-related accidental deaths. For Washington County, the highest percentage of deaths were non-drug or MVA accidental deaths. For Carter, Johnson, Unicoi, and Hawkins Counties, the highest percentage of deaths were natural deaths. Additional details of all of these manners of death are provided in separate sections of this report.

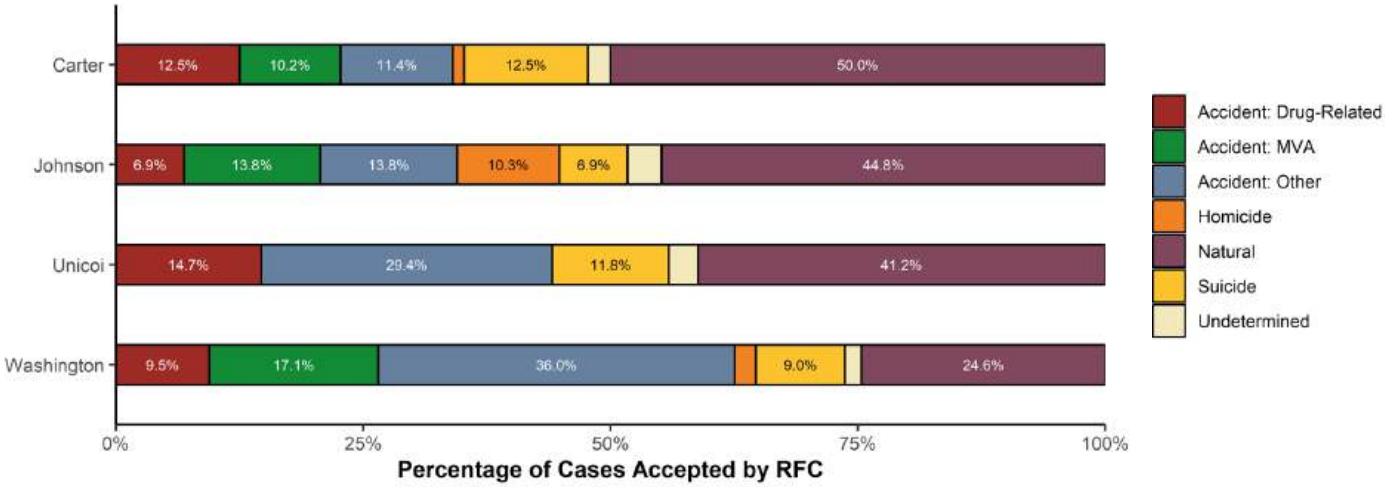
For Hancock County, it should be noted that the counts in each category were so low that they are not statistically different from zero in any category, implying that one should not attempt to draw any conclusions from these counts. It is never recommended to infer information from statistics performed on small counts like these. We present these results only for completeness.

Figure 2.4 Manners of Death for JA Cases, 2024 (N = 904)

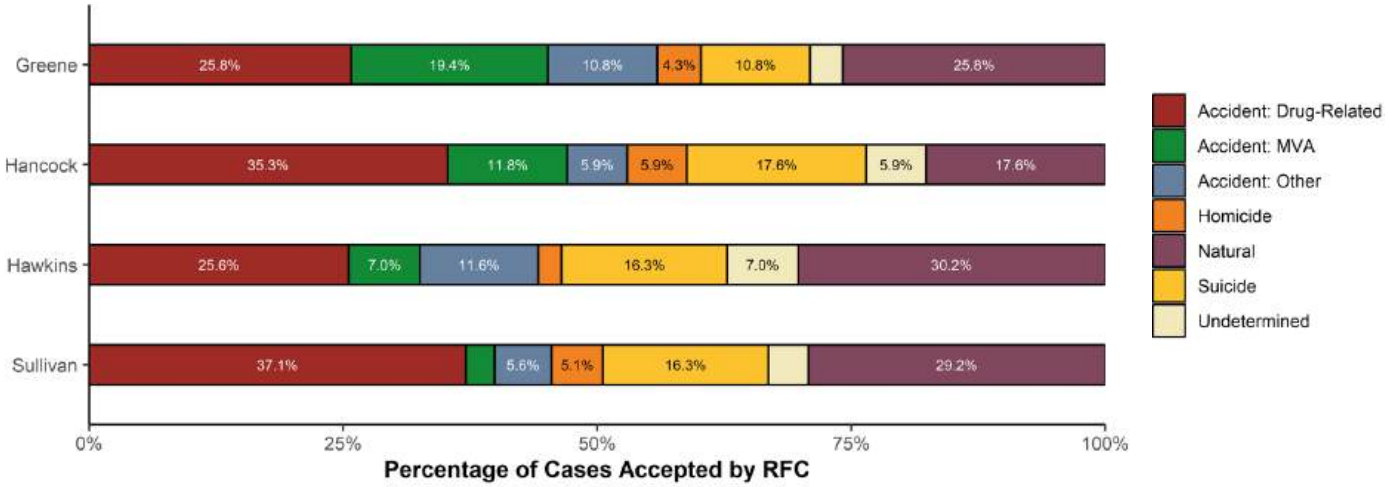
(a) Overall Manners of Death



(b) Manners of Death by Jurisdictional County



(c) Manners of Death by Non-Jurisdictional County



To conclude this section, we look at the demographics (age, sex, race/ethnicity) of the JA cases for 2024. Table 2.4 shows the sex of JA cases by county. Overall, 67.3% of cases were male decedents, and 32.6% were female. One case is not included in the table; due to complexities in the circumstances of the case, decedent sex could not be determined.

Figure 2.5 shows the age distribution by sex; we can see a slight bimodality in the distribution for female decedents here. The largest number of deaths occurs in the 55-64 year group, but additionally, we can see that for females, all year groups above age 35 are roughly proportional.

We also note that due to the social differences between adolescents and young adults, we do not present age data stratified by the usual deciles (15 to 24 years) and instead separate these into children/adolescents (0 to 17 years) and young adults (18-24 years). This grouping will be observed in all age graphs presented throughout this report. In Section IX, where pediatric deaths are discussed in detail, the 0-17 year group will be further stratified.

Table 2.4 Sex of Jurisdiction-Accepted Decedents by County, 2024 (N = 904)

	Male		Female		Total
	Count	Percent	Count	Percent	Accepted
Jurisdictional Counties					
Carter	58	65.9	30	34.1	88
Johnson	22	75.9	7	24.1	29
Unicoi	20	58.8	14	41.2	34
Washington	263	62.3	159	37.7	422
Non-Jurisdictional Counties					
Greene	65	69.9	28	30.1	93
Hancock	9	52.9	8	47.1	17
Hawkins	23	53.5	18	41.9	43*
Sullivan	121	68.0	57	32.0	178

*Two decedents not included in sex counts; due to complex circumstances, decedent sex could not be determined

Figure 2.5 Age at Death by Sex for Jurisdiction-Accepted Decedents, 2024 (N = 904)

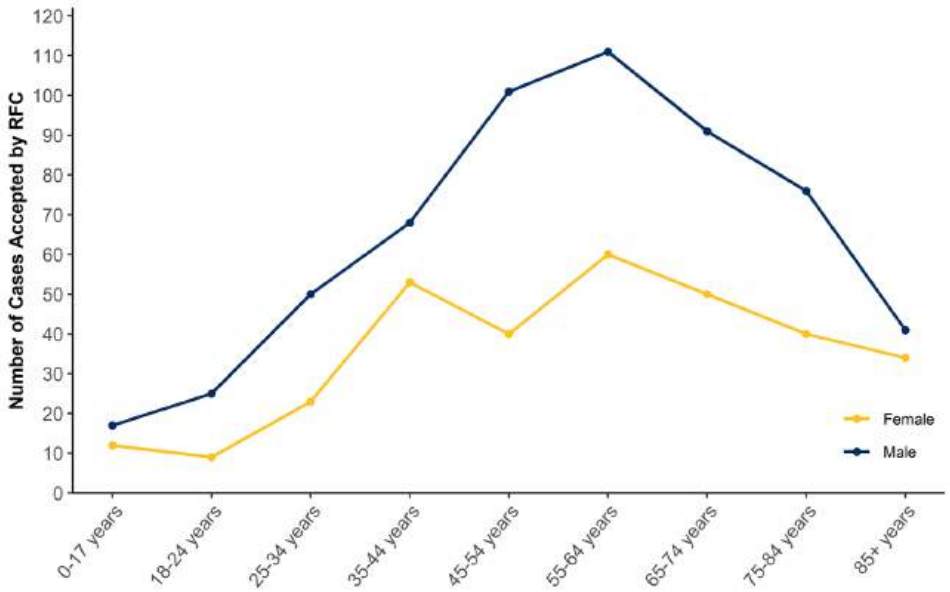


Table 2.5 Race and Ethnicity of Jurisdiction-Accepted Decedents by County, 2024 (N = 904)

	Black or African American, non-Hispanic	White, non-Hispanic	Asian	Other, non-HIspanic	Any Race, Hispanic	Unspecified Race and Ethnicity	Total Accepted
Jurisdictional Counties							
Carter	0	86	1	0	1	0	88
Johnson	2	26	0	0	1	0	29
Unicoi	0	29	0	1	3	1	34
Washington	18	396	2	1	4	1	422
Non-Jurisdictional Counties							
Greene	1	87	1	1	3	0	93
Hancock	0	17	0	0	0	0	17
Hawkins	3	39	0	0	0	1	43
Sullivan	6	172	0	0	0	0	178

Figure 2.6 Race and Ethnicity of Jurisdiction-Accepted Decedents, 2024 (N = 904)

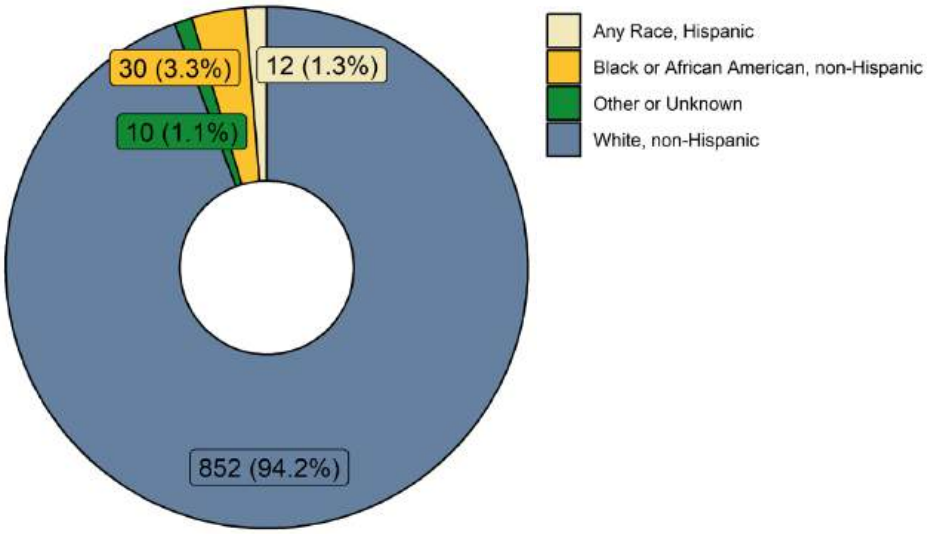


Table 2.5 and Figure 2.6 display information about the race and ethnicity; 94.2% of decedents were white, non-Hispanic and 3.3% of decedents were non-Hispanic black or African American. About two percent (2.4%) of decedents were of Hispanic ethnicity or were described as a race other than white or black. In Table 2.5, we can see that this distribution is relatively consistent across all eight counties of service.

III. Homicide Demographics

In 2024, there were 28 homicides reported to the forensic center. Thirteen of them occurred in jurisdictional counties, and the remaining fifteen occurred in non-jurisdictional counties (refer to Table 2.3 in the previous section for the by-county counts). In this section, we will present information about sex, age, race and ethnicity, mechanism of death, and geographic data.

Twenty of the decedents were male, and 8 were female. The youngest male decedent was below one year old, and the youngest female decedent was 4 years old. The racial distribution was similar for both sexes, although we note that the counts are too small to be stable enough for interpretation. We list these counts here because the small numbers make it difficult to generate meaningful sex-specific tables or figures. We will separate mechanism of death by sex in Table 3.1.

Figure 3.1 below shows the age distribution of homicide deaths. We again note here that due to the social differences between adolescents and young adults, we do not present age data stratified by the usual deciles (15 to 24 years) and instead separate these into children/adolescents (0 to 17 years) and young adults (18 to 24 years). We see in this plot that the largest number of homicide victims were between 55 and 64 years old.

Figure 3.2 below shows the race and ethnicity of homicide deaths. The majority of victims were white, non-Hispanic.

Figure 3.1 Homicide Counts by Age, 2024 (N = 28)

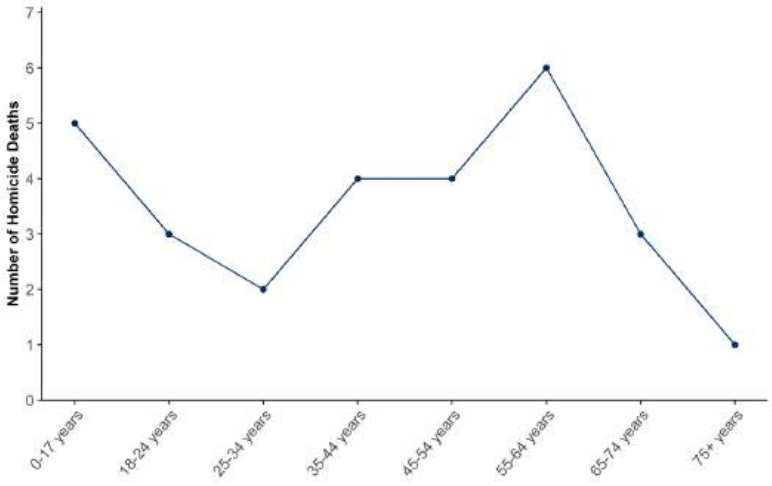


Figure 3.2 Race\Ethnicity of Homicides, 2024 (N = 28)

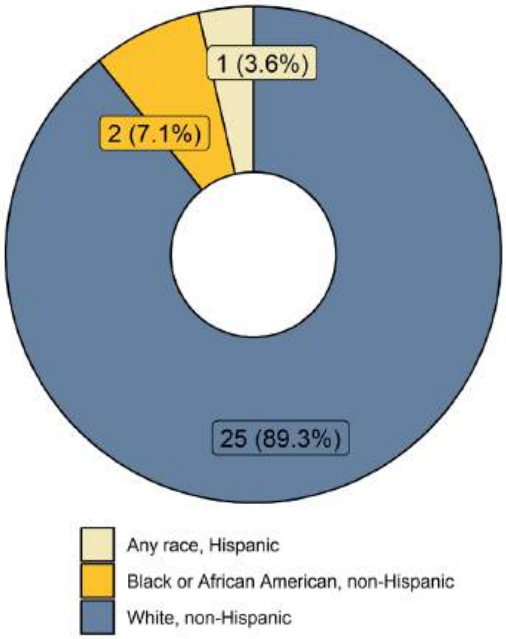


Table 3.1 Homicides by Mechanism of Death by Sex, 2024 (N = 28)

	Male		Female	
	Count	Percent	Count	Percent
Asphyxia	2	10.0	2	25.0
Blunt Force	5	25.0	2	25.0
Complications of Assault	1	5.0	0	0.0
Firearm	7	35.0	3	37.5
Sharp Instrument	5	25.0	1	12.5
Total	20		8	

Table 3.1 above shows the mechanism of death by sex for homicide deaths. The most common mechanism was firearm; 10 (35.7%) victims died by firearm. The next most common mechanism was blunt force; 7 (25.0%) victims died by blunt force trauma.

The case management system allows investigators and pathologists to enter weapon information for firearm deaths. For 50.0% of firearm homicides, weapon type was able to be specified. In the majority of these deaths, the weapon was a handgun. For an additional 20.0% of firearm homicides, the weapon type was listed by the investigator or pathologist as 'Unknown.'

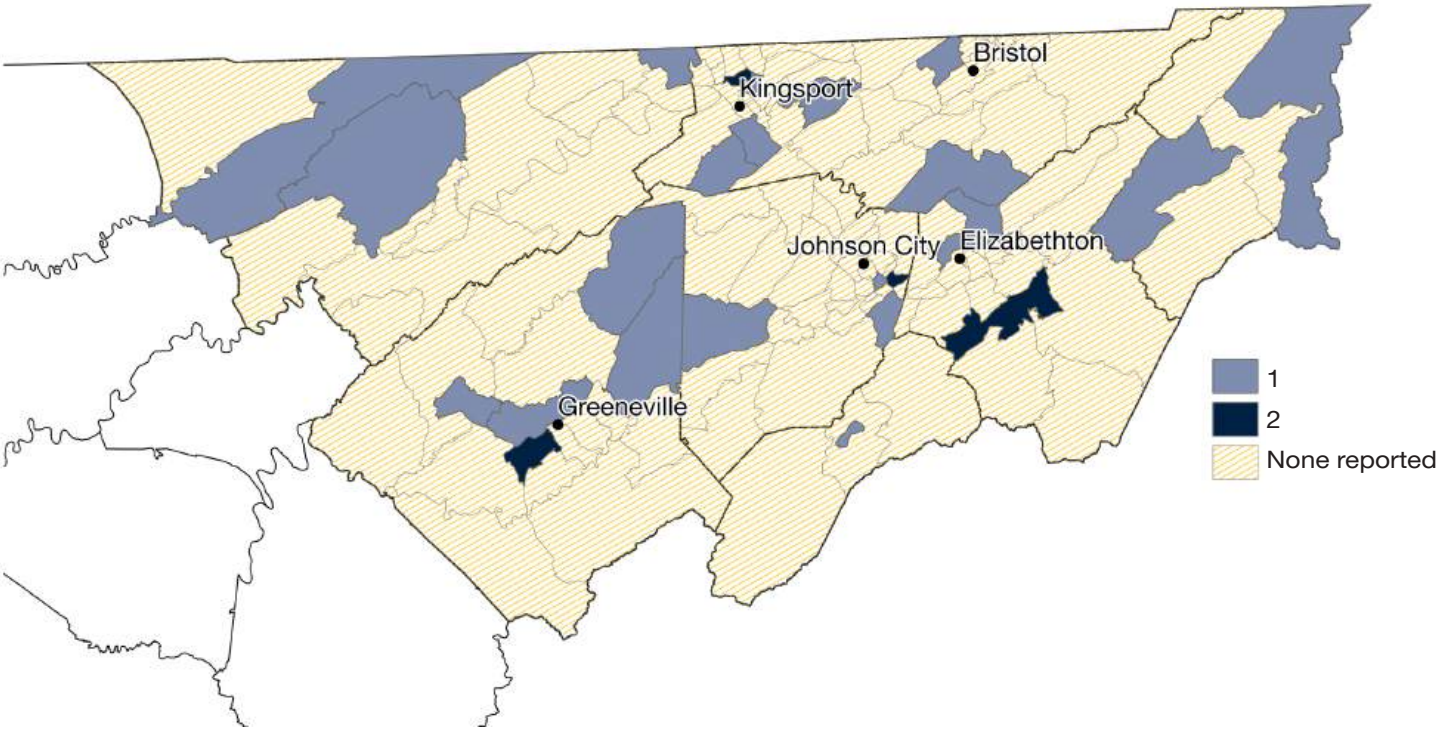
To examine geographical trends, we first geocoded the address information of the location of injury associated with the homicide. This injury location was not necessarily within the service area of WLJFC; the county of service may be the county where injury occurred, where death occurred, or both. For example, if a decedent was injured across the state line, but transported to the trauma center in Johnson City, where they died of their injuries, it is likely that WLJFC will investigate and subsequently accept jurisdiction. To generate a readable map, we elected only to show cases where the injury location was within the service counties of the forensic center. City centers are also shown to help orient the viewer.

We then decided to represent the injury location on our map by using census tracts[1]. Broadly speaking, a census tract is a small area within a county used by the US Census Bureau and other such entities for a variety of purposes. Census tracts are designed to be relatively homogeneous in population and for the population size between tracts to be relatively comparable. Unlike zip codes, census tracts are contained completely within single counties, and they can be more consistently linked to public health indices such as SDI (the supplemental demographic index) for geospatial analysis. Additionally, from the 2000 Census forward, census tracts completely cover the entire geography of the United States, meaning that there are no coordinates that cannot be mapped to a census tract.

Map 3.1 shows the number of homicide deaths with an injury in each census tract for the service area of WLJFC. In the areas shaded in lighter blue, there was one homicide injury. In the areas shaded darker blue, there were two homicide injuries. In the areas shaded yellow, there were no homicide injuries reported. The outlines of the census regions are shown in light grey for comparison to county lines shown in black.

1 https://www.census.gov/data/academy/data-gems/2018/tract.html

Map 3.1 Injury Locations of Homicide Deaths, 2024 (N = 28)



IV. Suicide Demographics

In 2024, there were 104 suicides reported to the forensic center. Fifty-five of them (52.9%) occurred in jurisdictional counties, and the remaining 49 (47.1%) occurred in non-jurisdictional counties (refer to Table 2.3 for the by-county counts). In this section, we will present information about sex, age, race and ethnicity, and mechanism of death.

Eighty of the decedents (76.9%) were male and 24 (23.1%) were female. Figure 4.1 below shows the age distribution of suicide deaths by sex. The average age at death was higher for males (50.4 years) than females (44.0 years); the distribution has a suggestion of bimodality in the female population but is too complex to categorize in the male population. Fewer than ten decedents were under the age of 18, with the youngest being 14.

Figure 4.1 Age Distribution of Deaths due to Suicide by Sex, 2024 (N = 104)

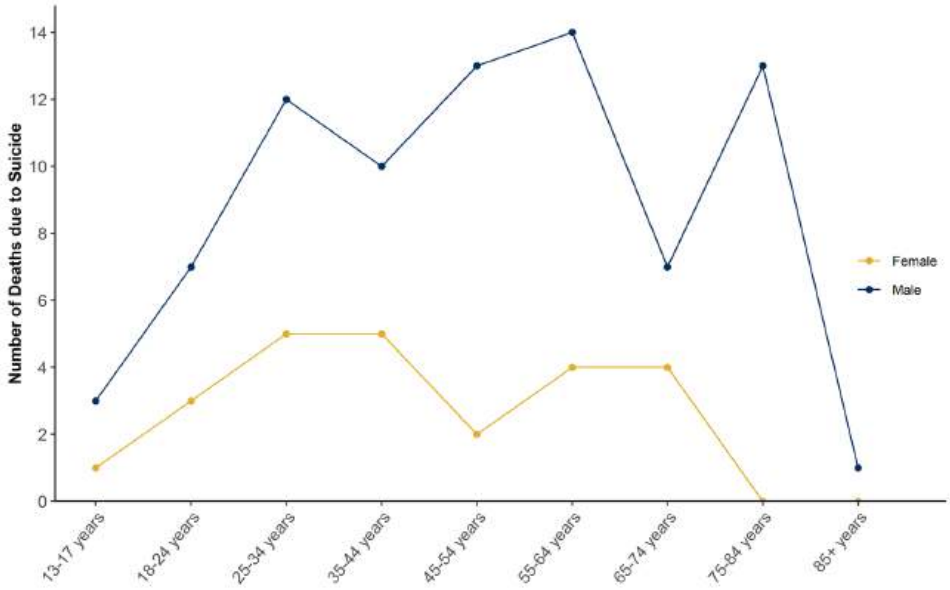
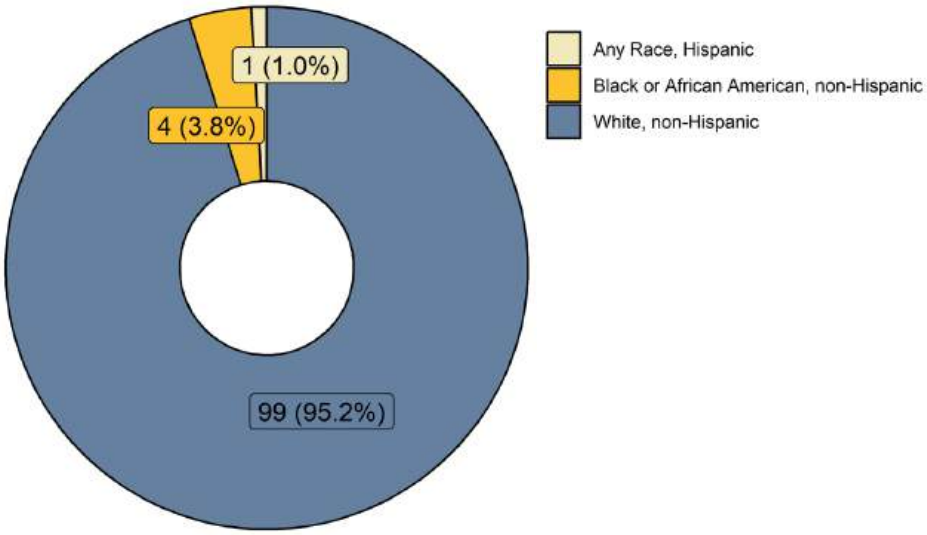


Figure 4.2 below shows the race and ethnicity distribution of individuals who died by suicide. Almost ninety-five percent (95.2%) of decedents were white, non-Hispanic.

Figure 4.2 Race and Ethnicity of Deaths due to Suicide, 2024 (N = 104)

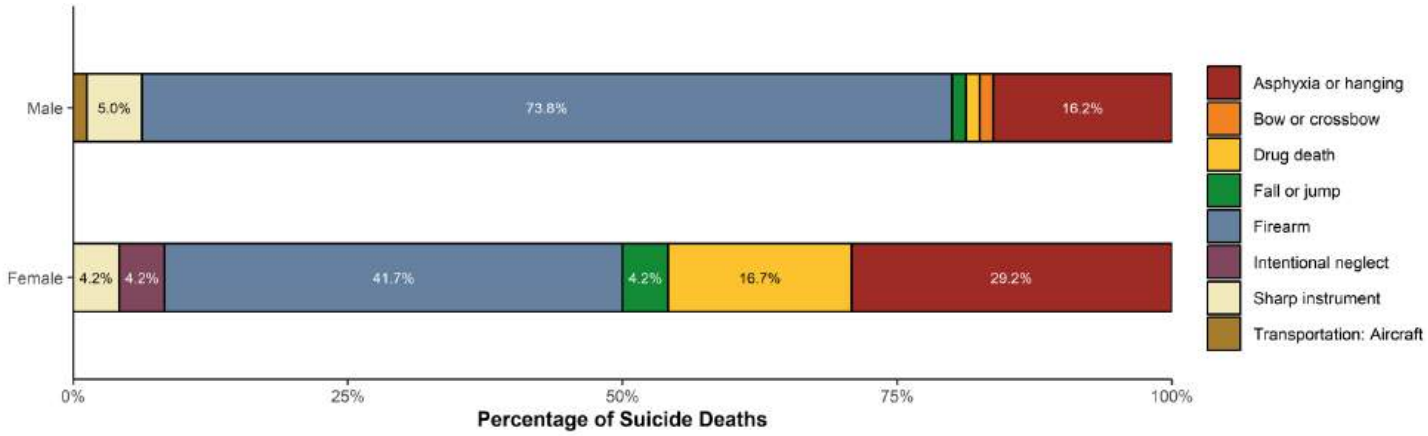


We now examine the mechanism of death in Table 4.1 and Figure 4.3, which both show the counts by mechanism by sex. A higher percentage of males died due to firearm than females, and a higher percentage of females died due to drug overdose or hanging than males. The remaining counts are too small to attempt to attribute to a statistical trend. The counts are shown in Table 4.1, and the corresponding distribution is shown in Figure 4.3.

Table 4.1 Suicide Counts by Mechanism of Death by Sex, 2024 (N = 104)

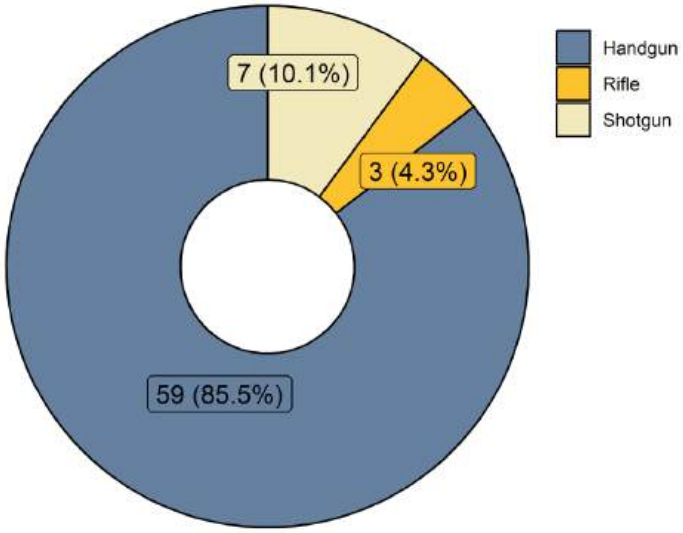
	Male		Female	
	Count	Percent	Count	Percent
Asphyxia or hanging	13	16.3	7	29.2
Bow or crossbow	1	1.3	0	0.0
Drug death	1	1.3	4	16.7
Fall or jump	1	1.3	1	4.2
Firearm	59	73.8	10	41.7
Intentional neglect	0	0.0	1	4.2
Sharp instrument	4	5.0	1	4.2
Transportation: Aircraft	1	1.3	0	0.0
Total	80		24	

Figure 4.3 Suicide Counts by Mechanism of Death by Sex, 2024 (N = 104)



As stated in the previous section, certifiers are able to enter firearm information into the system when available for analysis. For 85.5% of the 69 suicide deaths due to firearm in 2024, the weapon type specified was a handgun. In 10.1% of firearm suicide deaths, the weapon type was a shotgun, and in the remaining 4.3%, the weapon type was a rifle. Figure 4.4 on the following page shows this distribution.

Figure 4.4 Weapon Type Identified in Firearm Suicide Deaths, 2024 (N = 93)



V. Accidental Death Demographics

In 2024, there were 480 accidental deaths reported to the forensic center. The majority of them (319 cases, 66.4%) occurred in jurisdictional counties, and the remaining 161 (33.5%) occurred in non-jurisdictional counties. As in the previous section, we will present information about demographics and the mechanism of death.

About sixty percent (62.7%) of these decedents were male, and 37.3% were female. Figure 5.1 shows the age distribution of these decedents by sex. The largest number of accidental deaths among male decedents occurred between 55 and 64 years. For female decedents, the trendline is relatively flat for all age groups 35 years and higher.

Figure 5.1 Accidental Death Counts by Sex, 2024 (N = 480)

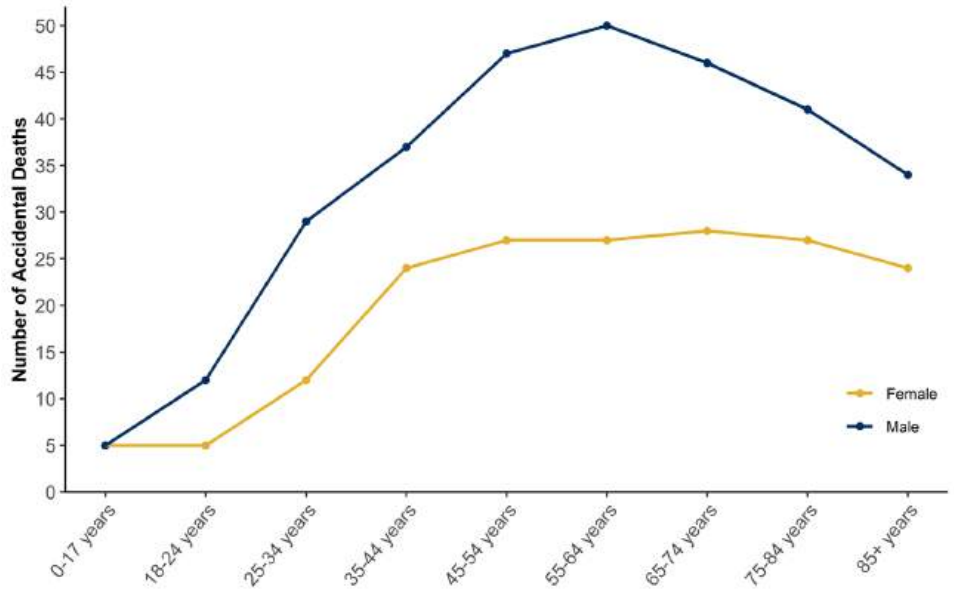
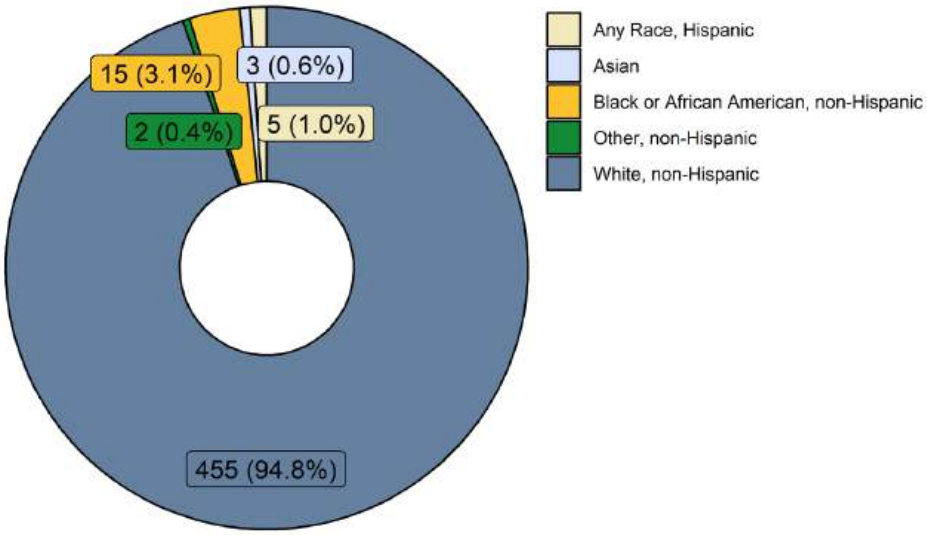


Figure 5.2 below shows the race and ethnicity distribution of these decedents. Almost ninety-five percent (94.8%) of decedents were white, non-Hispanic.

Figure 5.2 Race and Ethnicity of Accidental Deaths, 2024 (N = 480)



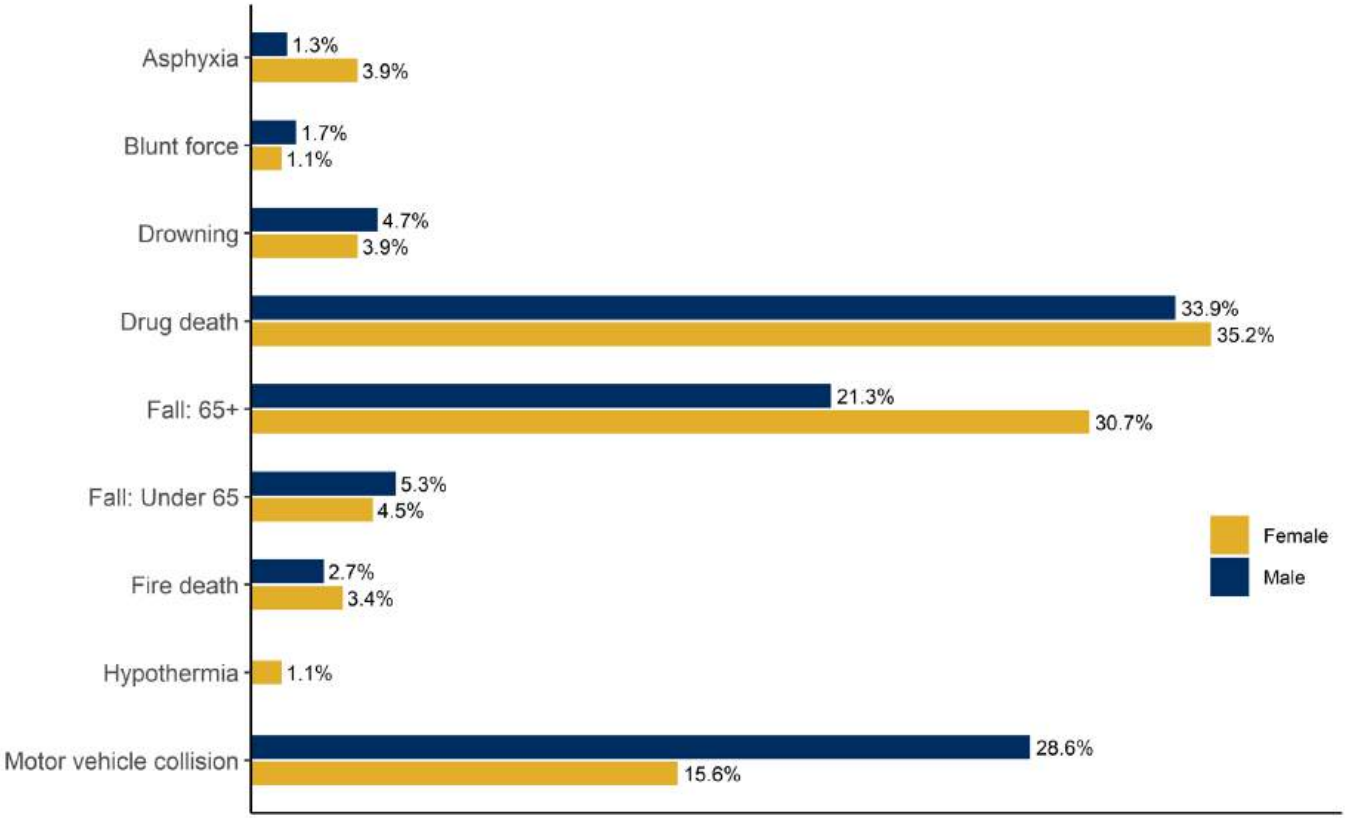
We now examine the mechanism of death in Table 5.1 and Figure 5.3, which both show counts by mechanism of death by sex. For male decedents, the most common mechanisms are drug death (33.9%), motor vehicle collisions (28.6%), and falls for individuals aged 65 and older (21.3%). For female decedents, the majority of accidental deaths are drug deaths (35.2%), falls for individuals aged 65 and older (30.7%), or motor vehicle collisions (15.6%). We will discuss drug-related deaths and deaths due to motor vehicle collision in more detail in Section VIII.

It should be noted that mechanisms where the total count is less than ten have too small a number to infer any trend; the statistical error is very high for small counts. Mechanisms with a percentage less than one are not shown on Figure 5.3.

Table 5.1 Accidental Deaths by Mechanism by Sex, 2024 (N = 480)

	Male		Female	
	Count	Percent	Count	Percent
Animal attack	1	0.3	1	0.6
Asphyxia	4	1.3	7	3.9
Blunt force	5	1.7	2	1.1
Drowning	14	4.7	7	3.9
Drug death	102	33.9	63	35.2
Electrical	1	0.3	0	0.0
Fall: 65+	64	21.3	55	30.7
Fall: Under 65	16	5.3	8	4.5
Fire death	8	2.7	6	3.4
Hypothermia	1	0.3	2	1.1
Motor vehicle collision	85	28.2	28	15.6
Total	301		179	

Figure 5.3 Accidental Deaths by Mechanism by Sex, 2024 (N = 480)



VI. Natural Death Demographics

In 2024, there were 267 natural deaths reported to the forensic center. The majority of them (175 cases, 65.5%) occurred in jurisdictional counties, and the remaining 92 (34.5%) occurred in non-jurisdictional counties. As before, we will present information about demographics and the mechanism of death.

Sixty-four percent (61.4%) of decedents were male and 38.6% were female. Figure 6.1 shows the age distribution of these decedents by sex. The age distribution of male decedents has a single peak at 55-64 years on the figure below and is skewed more strongly toward older age groups. The distribution of female decedents has a suggestion of bimodality with peaks at 35-44 years and 55-64 years.

Figure 6.1 Natural Death Counts by Age by Sex, 2024 (N = 267)

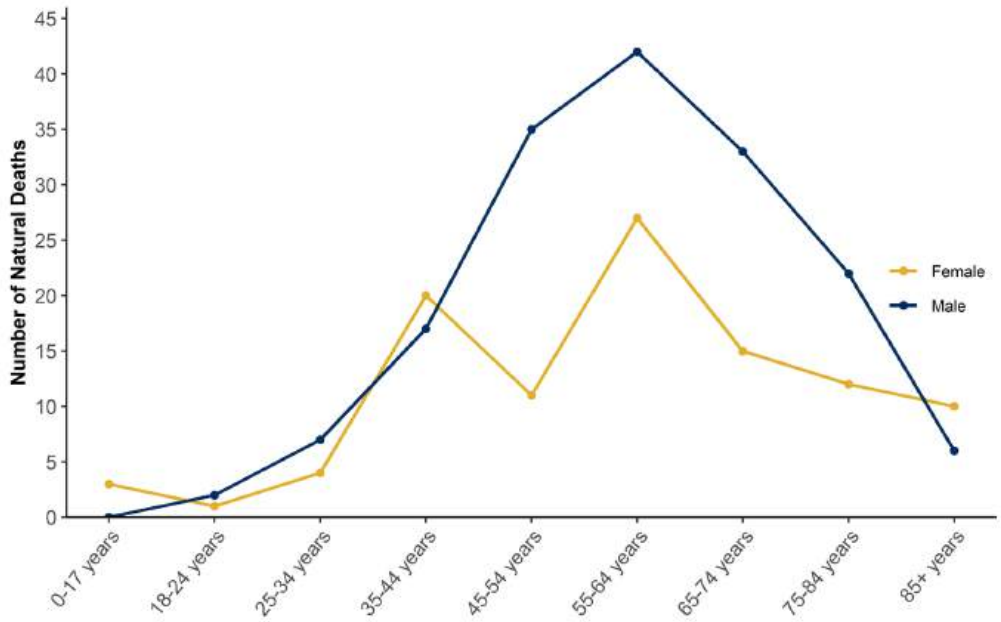


Figure 6.2 below shows the race and ethnicity distribution of these decedents. Ninety-four percent (94.0%) of decedents were white, non-Hispanic.

Figure 6.2 Race and Ethnicity of Natural Deaths, 2024 (N = 267)

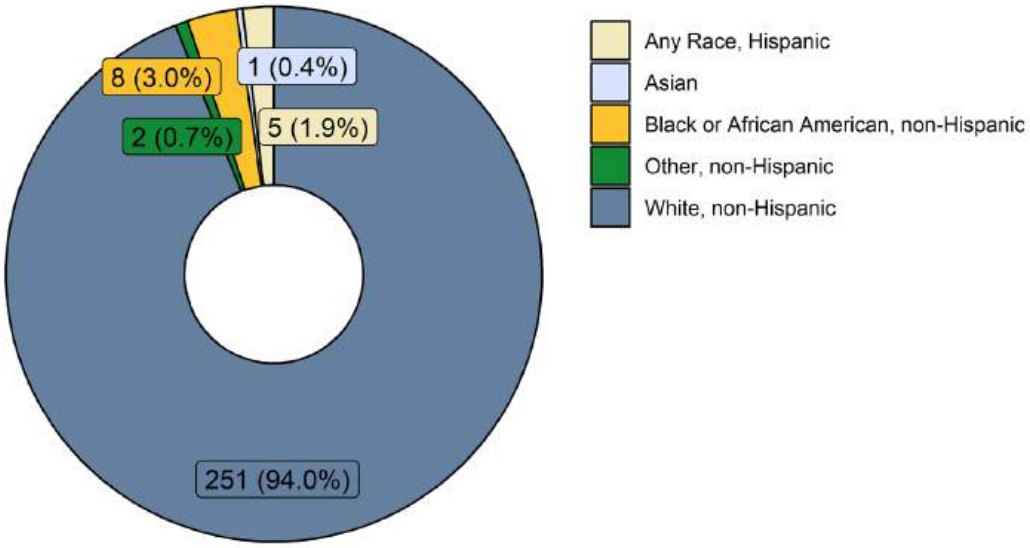
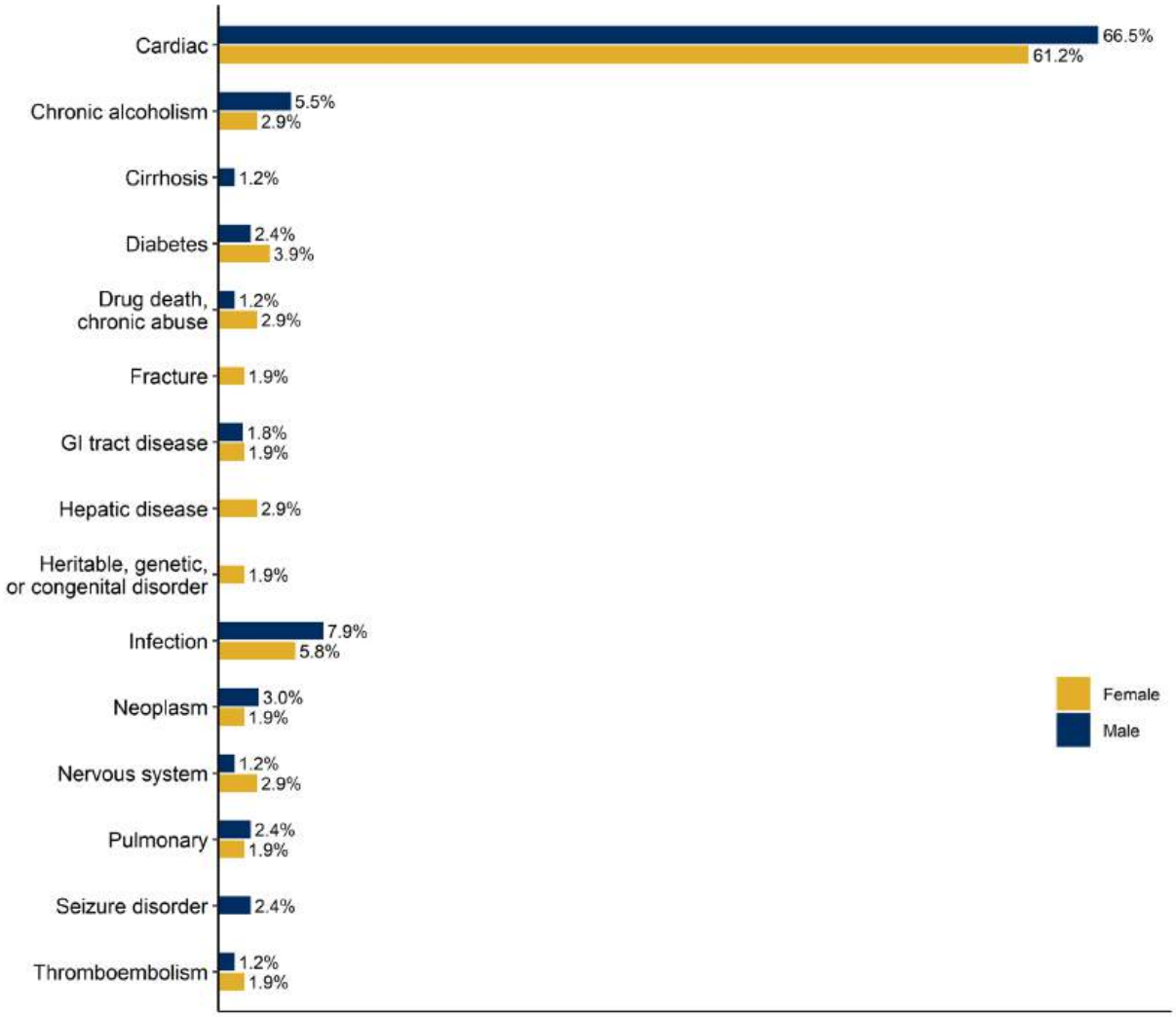


Table 6.1 Mechanism of Natural Deaths by Sex, 2024 (N = 267)

	Male		Female	
	Count	Percent	Count	Percent
Aneurysm rupture	0	0.0	1	1.0
Aorta dissection	1	0.6	0	0.0
Cardiac	109	66.5	63	61.2
Chronic alcoholism	9	5.5	3	2.9
Cirrhosis	2	1.2	0	0.0
Dementia	0	0.0	1	1.0
Diabetes	4	2.4	4	3.9
Drug death, chronic abuse	2	1.2	3	2.9
Fracture	0	0.0	2	1.9
GI tract disease	3	1.8	2	1.9
Hepatic disease	0	0.0	3	2.9
Heritable, genetic, or congenital disorder	0	0.0	2	1.9
Infection	13	7.9	6	5.8
Malnourishment	1	0.6	1	1.0
Neoplasm	5	3.0	2	1.9
Nervous system	2	1.2	3	2.9
Obesity	0	0.0	1	1.0
Pancreatitis	1	0.6	0	0.0
Pulmonary	4	2.4	2	1.9
Seizure disorder	4	2.4	1	1.0
Thromboembolism	2	1.2	2	1.9
Treatment complication	1	0.6	0	0.0
Undetermined/Other	1	0.6	1	1.0
Total	164		103	

Table 6.1 and Figure 6.3 show the counts by mechanism by sex. The majority of natural deaths for both male and female decedents were due to a cardiac-related cause. Infection is the next most-common mechanism for both male and female decedents, but the difference in proportion between cardiac-related causes and all others is substantial. Figure 6.3 on the following page shows this contrast very clearly.

Figure 6.3 Natural Deaths by Mechanism by Sex, 2024 (N = 267)



VII. Undetermined Death Demographics

In 2024, there were 25 undetermined deaths reported to the forensic center. These are deaths in which no one manner of death is more compelling than one or more others. These are often complex cases and can be unique to a degree that makes tabulating statistics difficult. We also have a very small number of undetermined deaths, so we must limit our discussion to a brief overview of basic demographics and mechanism of death.

Sixty-four percent (64.0%) of decedents were male, and 28.0% were female. Additionally, there was two cases where decedent sex could not be determined due to complex circumstances.

Eighty-eight percent (88.0%) of decedents were white, non-Hispanic, and 4.0% were black, non-Hispanic. There were two additional cases where decedent race was unspecified.

For the majority of these cases, multiple manners of death were potentially compelling to a degree that is difficult to summarize concisely. Several of them involve potential drug overdose or sudden infant death.

VIII. Decedent Characteristics by Mechanism of Death

While it is very common to report on deaths by manner, as in the previous sections of this report, it can also be useful to consider deaths grouped by specific mechanism of death instead. This allows comparisons across manner, as well as generating statistics that are more specifically related to the mechanism. In this section, we will present statistics related to motor vehicle deaths, drug-related deaths, firearm injuries, and deaths resulting from natural disaster.

Motor Vehicle Collision Deaths

In 2024, there were 113 decedents listed as dying due to an incident involving a motor vehicle of some kind. The majority of them (85 cases, 75.2%) occurred in jurisdictional counties, and the remaining 28 (24.8%) occurred in non-jurisdictional counties. All of them were accidental in manner.

Figure 8.1 shows the age distribution of these decedents by sex. The majority of age groups have fewer than ten decedents, which can make it difficult to interpret trends, but we can see that there is a possible suggestion of bimodality in the distribution of male decedents, with a maximum occurring at 65-74 years.

Figure 8.1 Motor Vehicle Accident Deaths by Age by Sex, 2024 (N = 113)

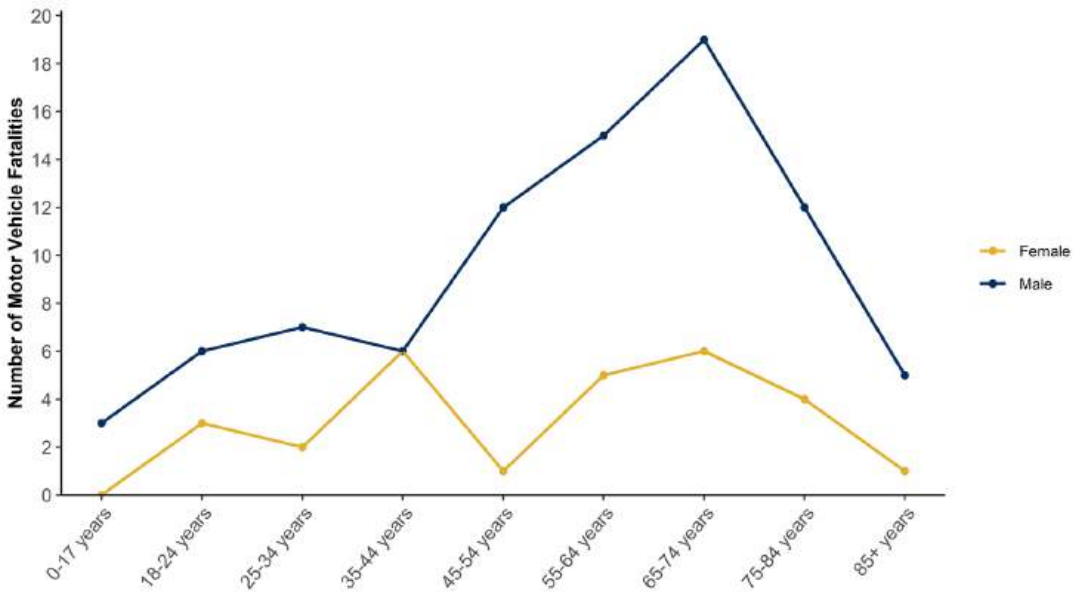


Figure 8.2 shows the race and ethnicity of decedents involved in motor vehicle collisions. Almost ninety-five percent (94.7%) of decedents were white, non-Hispanic.

Figure 8.2 Race and Ethnicity of Motor Vehicle Accident Decedents, 2024 (N = 113)

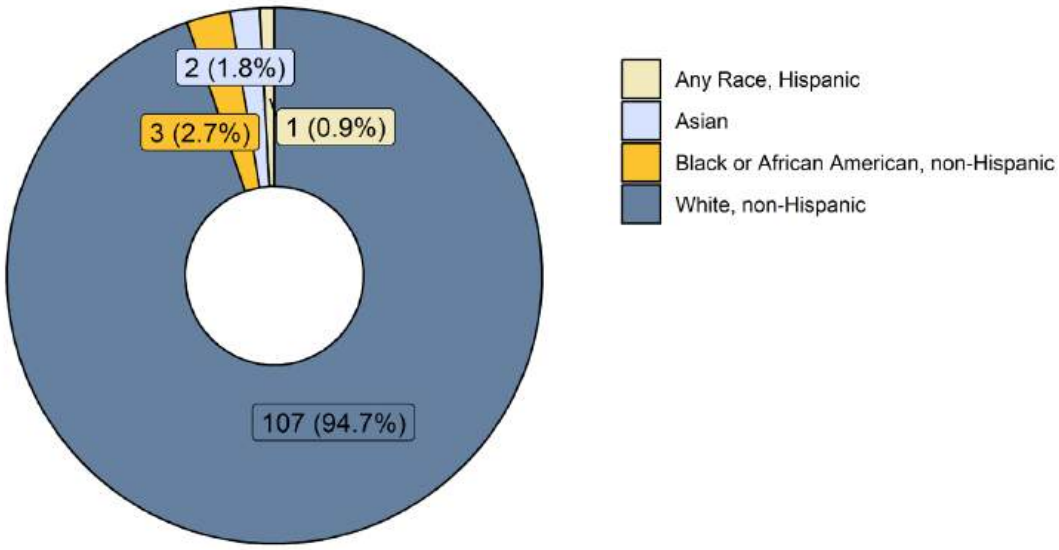
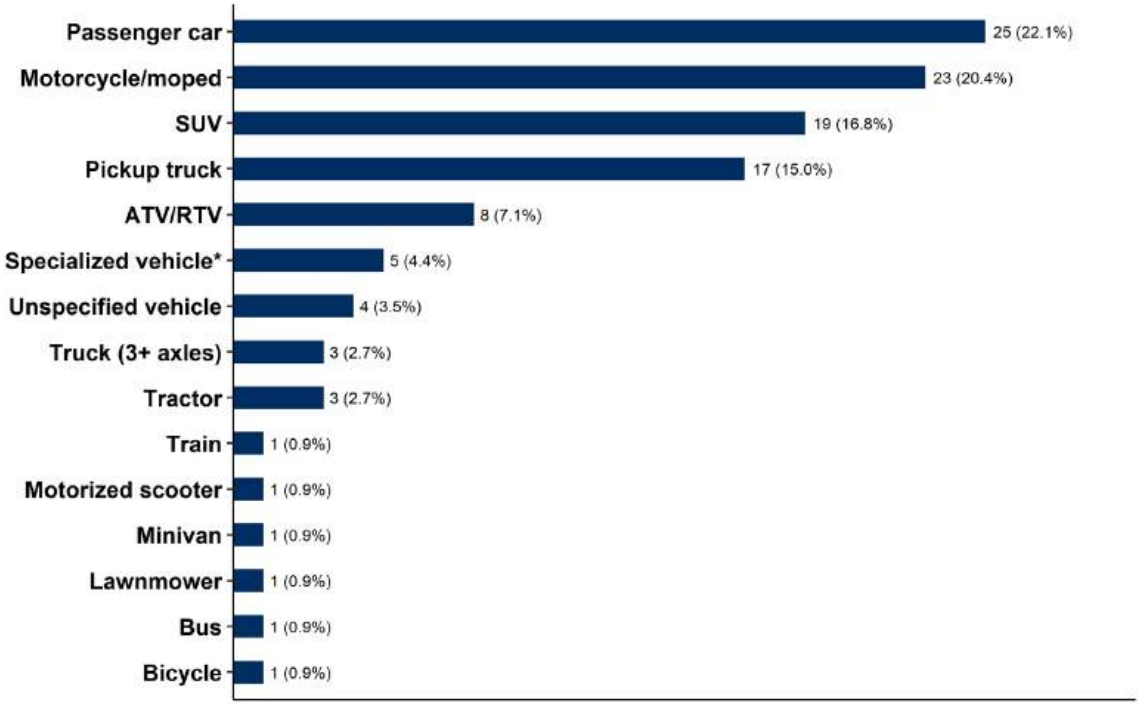


Figure 8.3 shows the information available about the type of vehicle involved in the incident. The most common vehicle was a passenger car (22.1%), followed by a motorcycle or moped (20.4%).

Figure 8.3 Vehicle Type in MVA Deaths, 2024 (N = 113)



* The category of 'specialized vehicle' includes work-related equipment such as ambulances, forklifts, and dump trucks.

Figure 8.4 shows the information available about the decedent's position relative to the vehicle in the incident. More than sixty percent of the decedents (61.1%) were classified as the driver of the vehicle. A further 12.4% were classified as the operator for vehicles such as motorcycles or ATVs. About fourteen percent of decedents (14.2%) were pedestrians struck by a vehicle. The next highest percentage of decedents with available information were front seat passengers (7.1%). The remaining categories all have very small counts, with only one incident not containing position information.

Figure 8.4 Decedent Position in Motor Vehicle Incidents, 2024 (N = 113)

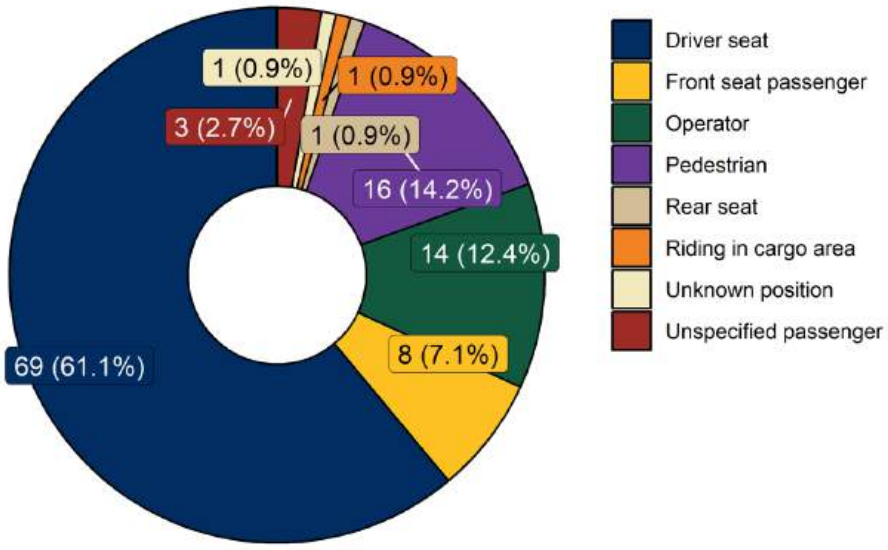
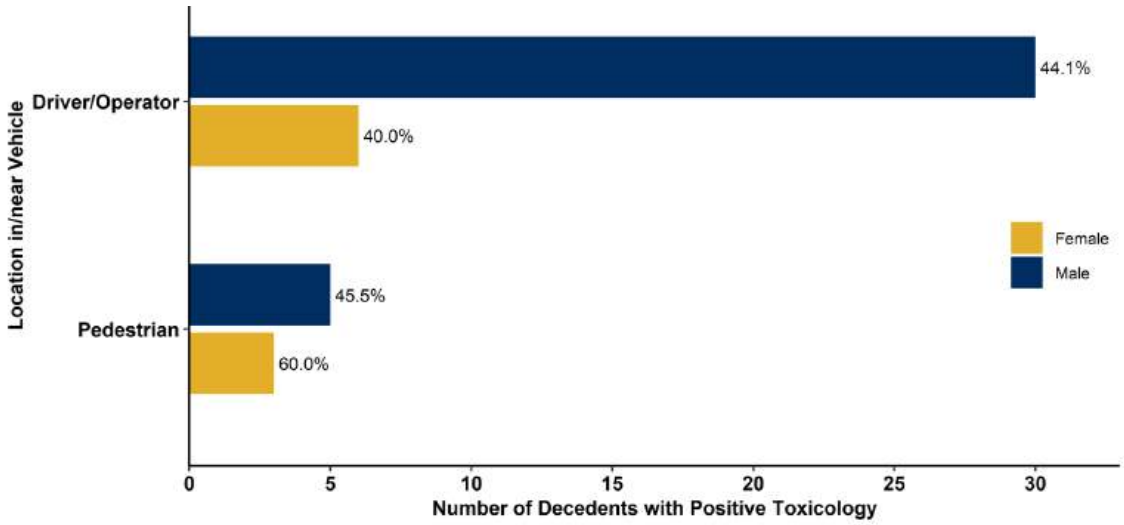


Figure 8.5 shows the counts and percentages of MVA deaths considered to involve drugs or alcohol. Decedents were identified using toxicology results; if a decedent had positive toxicology for substances such as alcohol, recreational drugs, or prescription medications that can cause impairment, they were flagged in this category. It is important to note, however, that the amount of substance was not considered. Determining impairment based on toxicology is extremely complex and depends on a large number of factors. We want to be clear that Figure 8.5 only shows the number of decedents with positive toxicology, and this does not necessarily indicate or exclude impairment.

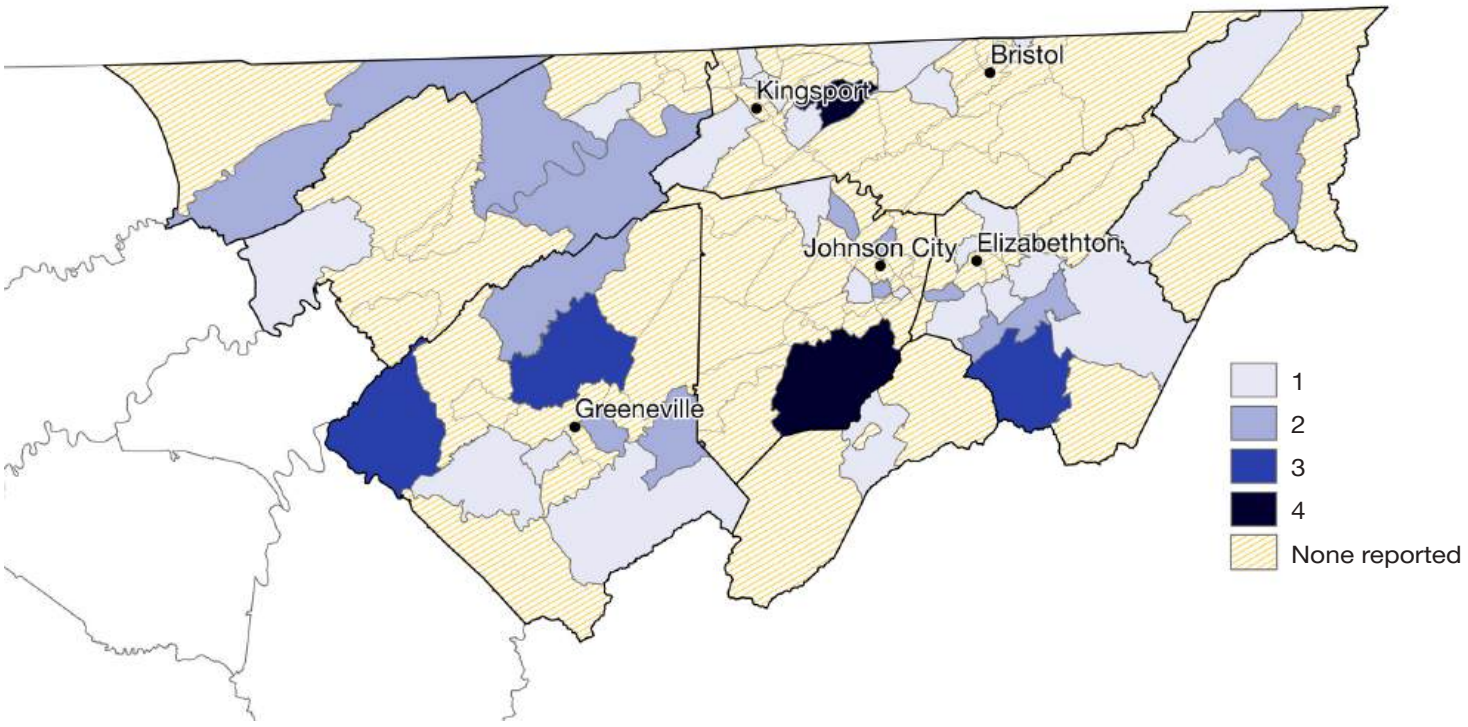
The percentages of male and female drivers or operators with positive toxicology are similar. About forty-four percent (44.1%) of males and 40.0% of females had positive toxicology. The percentages of male and female decedents identified as pedestrians differ substantially – 45.5% of male pedestrians and 60.0% of female pedestrians. It is important to note that the overall number of female pedestrian decedents is fewer than ten, so these counts are not stable.

Figure 8.5 MVA Deaths With Positive Toxicology by Sex, 2024



Map 8.1 uses the same methodology described in Section III to display the injury location by census tract for MVA where the address could be geocoded within WLJFC's service area. Twenty-six decedents either had injury locations out-of-state, in Tennessee but not in the service area, or injury location was unknown. City centers are also shown to help orient the viewer. Census tracts are shaded blue according to the number of decedents per area: lightest blue areas had one decedent and darkest blue had four decedents. Tracts with no reported injuries are shaded in yellow.

Map 8.1 Injury Location of Motor Vehicle Deaths, 2024 (N = 87)

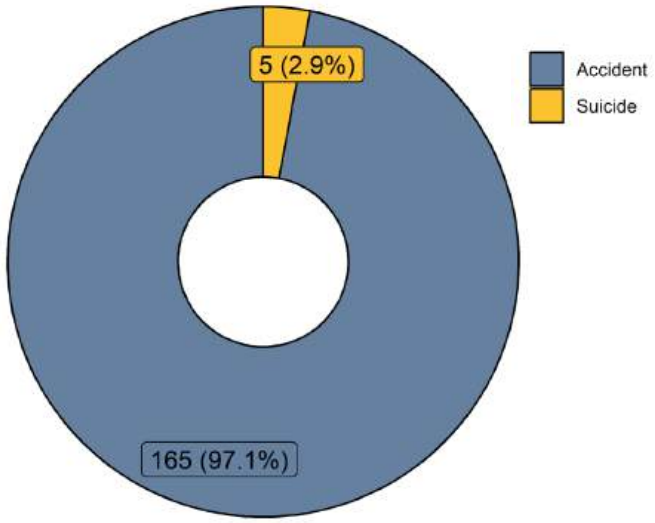


Drug-Related Deaths

In 2024, there were 175 drug-related deaths reported to the forensic center, defined as deaths where the circumstances type was stated as a drug death[1]. Five of these were chronic drug abuse deaths and will be excluded from the statistics presented in this section, bringing the total number of cases to 170.

The majority of them (108 cases, 63.5%) occurred in non-jurisdictional counties, and the remaining 62 (36.5%) occurred in jurisdictional counties. Figure 8.6 shows the distribution of drug-related deaths by manner. About ninety-seven percent (97.1%) of drug-related deaths were accidental, and the remaining 2.9% in this year were due to suicide. As mentioned above, drug-related deaths that are classified as natural manner are always cases where the decedent dies due to chronic abuse and are usually excluded from discussions related to overdose.

Figure 8.6 Drug-Related Deaths by Manner, 2024 (N = 170)



About sixty percent (103 cases, 60.6%) were male decedents, and the remaining 67 (39.4%) were female. There was no substantial difference by sex in the average age at death. No decedents were under the age of 18. Figure 8.7 on the next page shows the age distribution of drug-related deaths by sex. The maximum in both trendlines occurs at 45-54 years.

1 Drug-related deaths have decreased substantially from 2023 to 2024; in 2023, there were 312 drug-related deaths reported to WLJFC compared to the 175 reported in 2024. This is a 43.9% decrease in drug-related deaths reported to WLJFC from 2023 to 2024.

Figure 8.7 Drug-Related Deaths by Age by Sex, 2024 (N = 170)

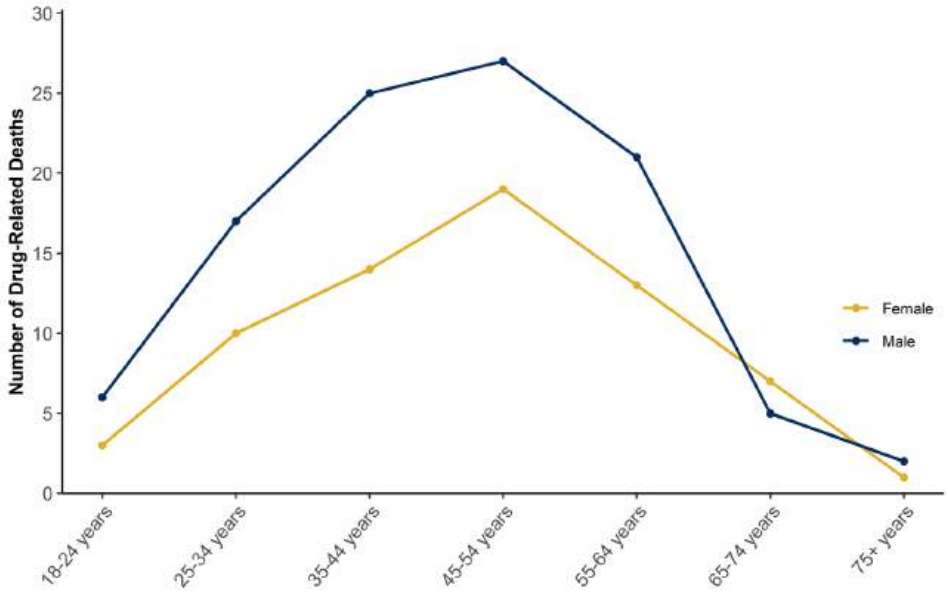
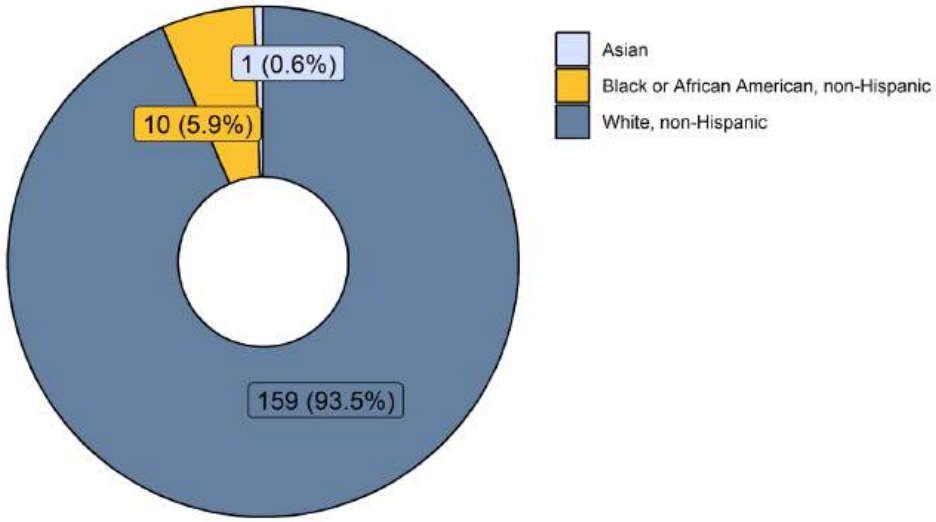


Figure 8.8 below shows the race and ethnicity information for individuals who were involved in drug-related deaths. Almost ninety-four percent (93.5%) of decedents were white, non-Hispanic.

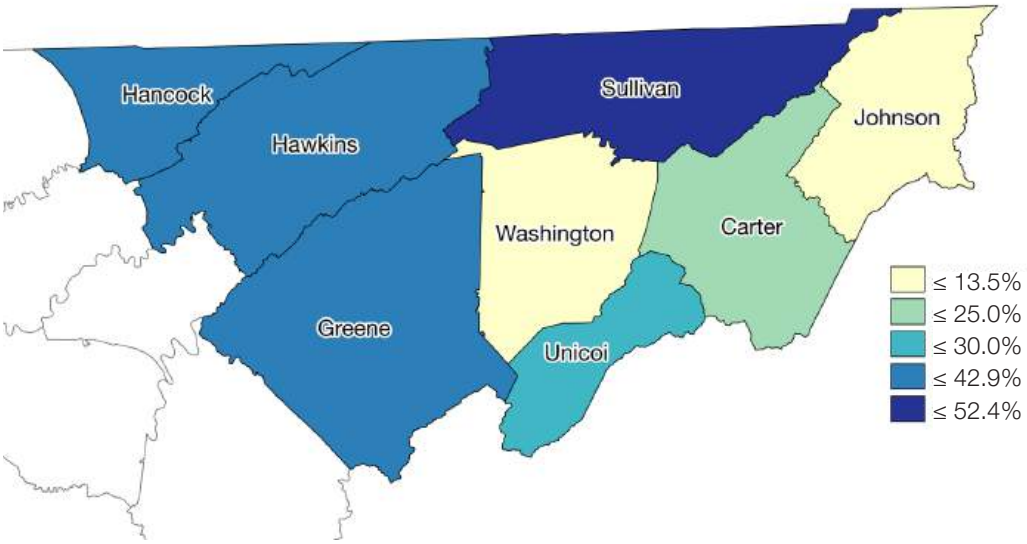
Figure 8.8 Race and Ethnicity of Drug-Related Deaths, 2024 (N = 170)



Map 8.2 on the next page shows the percentage of jurisdiction-accepted cases that are drug-related for each county. To represent this percentage more accurately, we have taken into consideration that a drug-related death will not be assigned a natural manner of death; recall from Figure 2.4 in Section II that there is a difference by jurisdiction in the percentage of natural deaths in each county. We have therefore calculated the percentages in Map 8.2 using the total count of jurisdiction-accepted cases that were not assigned a natural manner of death as the denominator.

Recall from Section II that the overall counts for Hancock County are below ten, meaning that they are too unstable to produce reliable statistics. Excluding Hancock due to low counts, the counties with the highest percentages of drug-related deaths compared to their JA case count (not including natural deaths) are Sullivan (52.4%) and Hawkins (36.7%).

Map 8.2 Percentage of Drug-Related Deaths by County, 2024 (N = 170)



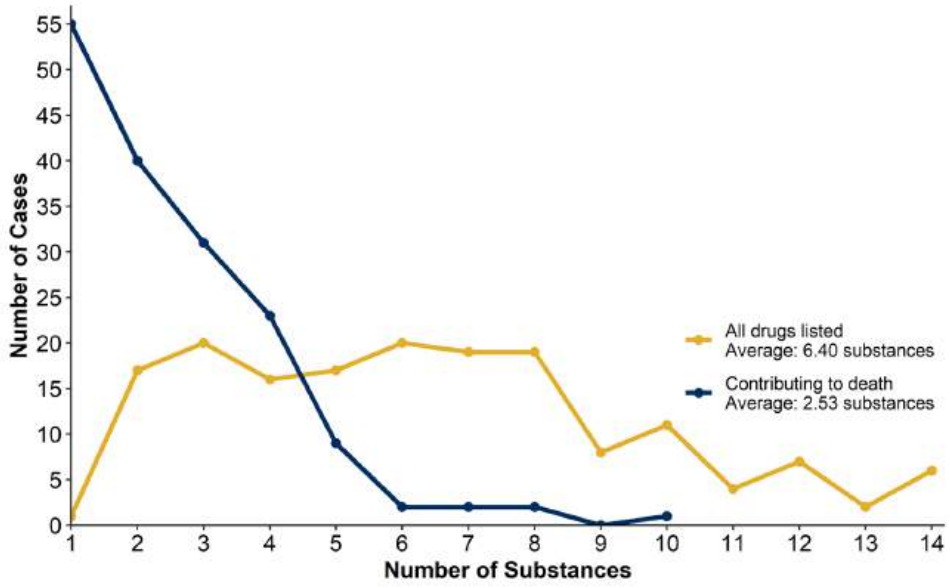
We now turn our attention to the toxicology information available for drug-related deaths. Manual review shows that two decedents did not have toxicology testing due to a long period of hospitalization prior to death. For the remainder of this section, we have excluded these cases and will only consider toxicology information for 168 cases.

Further, we excluded substances related to the 1919FL Electrolytes and Glucose Panel (Vitreous) that is sometimes ordered. These results should not contribute to any count that is meant to represent the number of ingested substances and/or metabolites of ingested substances, so these were excluded from any analysis. Similarly, we excluded positive results for caffeine, cotinine, and nicotine. These are not controlled substances and they are almost never present at potentially toxic levels, so our analysis again considers these extraneous substances and excludes them.

Figure 8.9 shows the distribution of the number of positive substances on the toxicology results for the 168 cases with available information. The blue line shows the count for all present substances, except for the exclusions mentioned above. We remind the reader that metabolites show up as distinct from the substance the decedent took. For example, depending on the time the drug spent in the system prior to death, a person taking illicit fentanyl may test positive for 1) fentanyl alone, 2) fentanyl and norfentanyl, 3) fentanyl and 4-ANPP, 4) fentanyl, norfentanyl, and 4-ANPP. This may be further impacted by residual metabolites of substances taken on a chronic basis.

Because of this, we also show the number of substances indicated as contributing to death as the yellow line, which assumes that the pathologist has interpreted the toxicology results to indicate the actual substances ingested. In some cases, a metabolite is endorsed as contributing to death when the original substance has already been fully metabolized. For example, if a decedent is positive for benzoylecognine, but the original cocaine is not present, the pathologist may endorse benzoylecognine as contributing to death but write ‘cocaine’ on the certificate. If both cocaine and benzoylecognine are present, the expectation would be that only cocaine would be endorsed as contributing.

Figure 8.9 Number of Substances Present on Toxicology in Drug-Related Deaths, 2024 (N = 168)



We note here that an additional 3 cases had no substances indicated as contributing to death. In two of these, the death was attributed to cocaine due to the detection of a cocaine metabolite, but that metabolite was not indicated as contributing to death. In the final case, the substances listed on the death certificate were identified via hospital testing prior to death; postmortem toxicology was performed but did not show those substances.

We can see in Figure 8.9 above that the number of drugs showing positive (average number is 6.40 substances) is much higher on average than the number of drugs listed as contributing to death (average number is 2.53 substances). Given the discussion on metabolites, this result is not surprising.

Also of interest are the specific substances present. We limit our focus here to only the 165 cases where one or more substances were listed as contributing to death. It is also helpful to distinguish between single-drug deaths, where one substance was listed as contributing to death, and polydrug deaths, where two or more substances were listed as contributing to death. One-hundred ten drug-related deaths (66.7%) were polydrug, and 55 (33.3%) were single-drug. The substances contributing to death are listed in Table 8.1 on the next page.

Table 8.1 Substances Contributing to Death in Drug-Related Deaths, 2024 (N = 165)

(a) Single-Drug Deaths	Count	Percent
Methamphetamine	44	80.0
Fentanyl	5	9.1
Benzoylecgonine	1	1.8
Cocaine	1	1.8
Ethanol	1	1.8
Methadone	1	1.8
Mitragynine	1	1.8
Oxycodone - Free	1	1.8
Total Number of Decedents	55	

(b) Polydrug Deaths	Count	Percent
Fentanyl	76	69.1
Methamphetamine	65	59.1
4-ANPP	28	25.5
Alprazolam	18	16.4
Buprenorphine - Free	16	14.5
Gabapentin	13	11.8
Oxycodone - Free	13	11.8
Cocaine	12	10.9
Xylazine	9	8.2
Ethanol	8	7.3
Hydroxyzine	8	7.3
Clonazepam	7	6.4
Promethazine	6	5.5
para-Fluorofentanyl	6	5.5
6-MAM - Free	5	4.5
Amitriptyline	5	4.5
Cyclobenzaprine	5	4.5
Diphenhydramine	5	4.5
Hydrocodone - Free	5	4.5
Methadone	5	4.5
Total Number of Decedents	110	

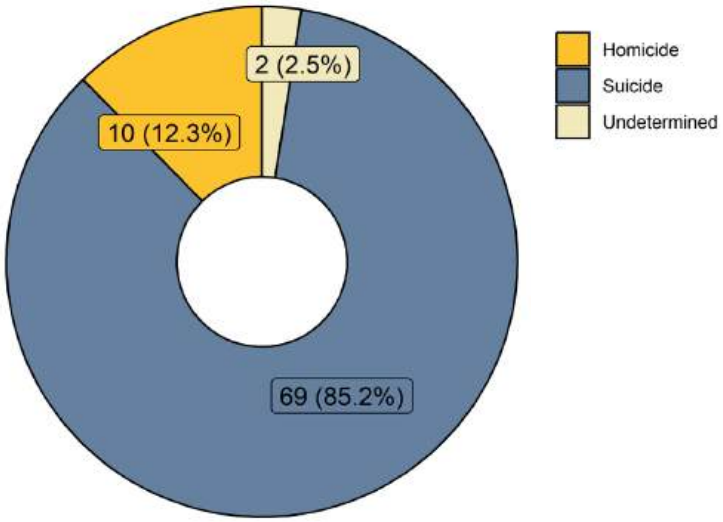
The majority of single-drug deaths were due to methamphetamine (80.0%), with the second most common substance being fentanyl (9.1%). The remainder of substances in single-drug deaths had very small counts.

Because multiple substances are associated with a single decedent for polydrug deaths, interpreting these counts is more complex. For readability, we truncate the list to substances listed for five or more decedents. In polydrug deaths, the most common substance was fentanyl (69.1%), although methamphetamine was present in a majority of deaths as well (59.1%). For 45 of the 110 polydrug decedents (40.9%), both fentanyl *and* methamphetamine were present. No other substances were present in such a high percentage of decedents, but 4-ANPP, a fentanyl precursor, the benzodiazepine alprazolam, and buprenorphine were the next most common substances.

Firearm Injury Deaths

In 2024, there were 81 deaths related to firearm injury reported to the forensic center. A slight majority of them (42 cases, 51.9%) occurred in non-jurisdictional counties, and the remaining 39 (48.1%) occurred in jurisdictional counties. Figure 8.10 shows the distribution of firearm deaths by manner. About eighty-five percent (85.2%) of firearm deaths were due to suicide, followed by 12.3% due to homicide, and 2.5% due to undetermined intent. There were no accidental firearm deaths reported to the forensic center in 2024.

Figure 8.10 Firearm Injury Deaths by Manner, 2024 (N = 81)



About eighty-four percent (68 cases, 84.0%) were male decedents, and the remaining 13 (16.0%) were female. There was no substantial difference by sex in the average age at death. Four decedents were under the age of 18; the youngest decedent was 13 years old at time of death. Figure 8.11 shows the age distribution of firearm injury deaths by sex. This distribution is relatively flat between ages 18 and 85; the majority of age groups have fewer than ten decedents, and the small variations that appear in the figure look more substantial than they actually are due to small counts.

Figure 8.11 Firearm Injury Deaths by Age by Sex, 2024 (N = 81)

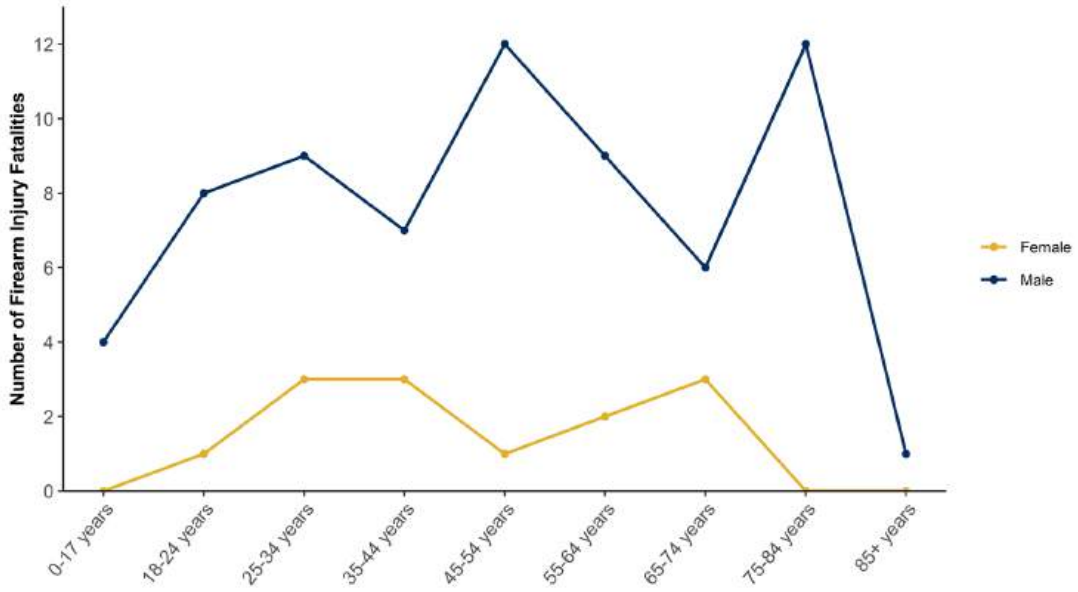
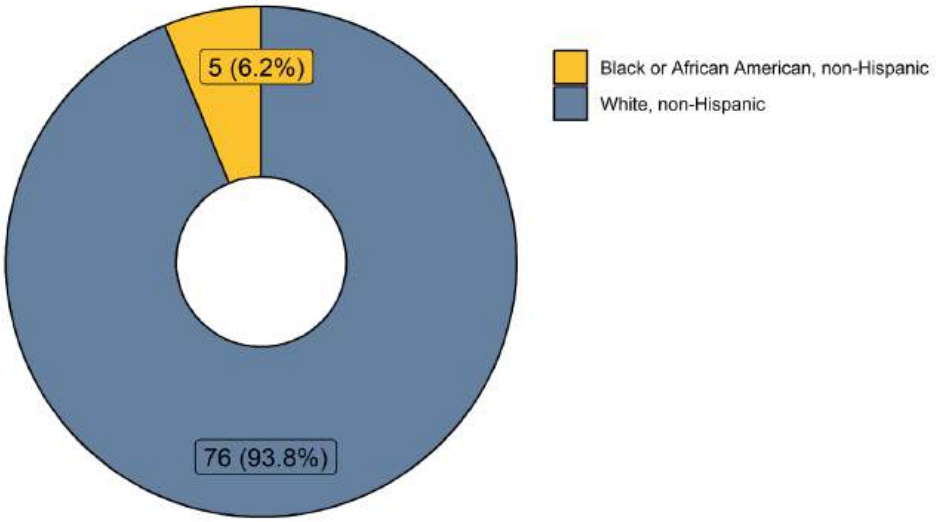


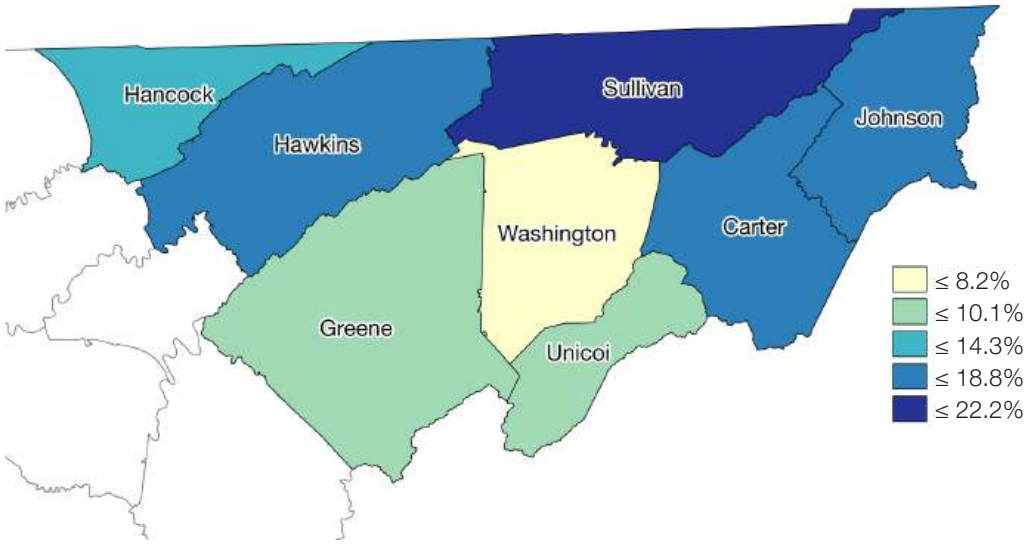
Figure 8.12 below shows the race and ethnicity information for individuals who died due to firearm injury. Almost ninety-four percent (93.8%) of decedents were white, non-Hispanic.

Figure 8.12 Race and Ethnicity of Firearm Injury Deaths, 2024 (N = 81)



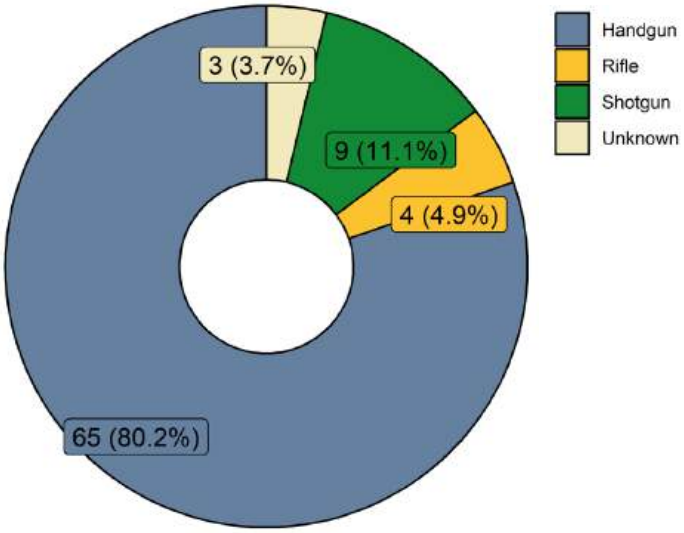
Map 8.3 shows the percentage of jurisdiction-accepted cases that are related to firearm injury for each county. We have used the same methodology from Map 8.2 of excluding natural deaths from the calculation since a death due to firearm injury cannot be assigned a natural manner. Excluding Hancock due to low counts, the counties with the highest percentages of firearm injury deaths compared to their JA case count excluding natural deaths are Sullivan (22.2%) and Johnson (18.8%).

Map 8.3 Percentage of Firearm Injury Deaths by County, 2024 (N = 81)



As stated in previous sections, certifiers are able to enter firearm information into the system when available for analysis. Figure 8.13 on the next page shows the available weapon information for 2024 firearm injury deaths. For 80.2% of these deaths, the weapon type specified was a handgun. In 11.1% of firearm suicide deaths, the weapon type was a shotgun, and in 4.9%, the weapon type was a rifle. Firearm type was unknown for 3.7% of firearm injury deaths.

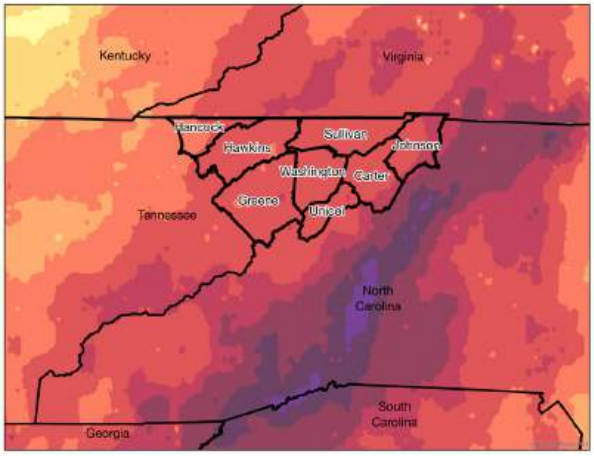
Figure 8.13 Weapon Type Identified in Firearm Injury Deaths, 2024 (N = 81)



Disaster-Related Deaths

On September 27, 2024, Hurricane Helene made landfall on the coast of Florida as a Category 4 storm. Moving quickly north over the course of the day, Helene moved across east Tennessee as a tropical storm, winds gusting as high as 60 miles per hour (officially recorded in Unicoi County)[1]. While areas across the state experienced heavy rainfall, it was the combination of that local rainfall with runoff from rivers flowing from North Carolina into Tennessee that caused historically devastating flooding. Map 8.4 shows rainfall totals for the area surrounding WLJFC's service area; western NC experienced up to 30 inches of rain, and multiple rivers in TN reached crests that broke records standing for a hundred years or more.

Map 8.4 Hurricane Helene Rainfall Totals



Fifteen of the officially reported eighteen deaths in TN in 2024 due to Hurricane Helene[2] were cases accepted by WLJFC. There were two additional cases where circumstances contributing to death were related to the storm, but those circumstances do not meet the official criteria to be directly attributed to Helene.

WLJFC also continues to work to identify more than one set of partial remains; counts will be adjusted when those efforts are successful. Additionally, in the event that victims are discovered in the future as clean-up continues, those deaths will be recorded at the time of discovery but attributed appropriately as due to Helene.

A multi-agency response was coordinated to address the impacted flood zones in northeast Tennessee. Search and rescue teams worked diligently to recover the remains of flood victims, ensuring they could be respectfully reunited with their families.

1 All storm-related statistics in this section cited from the National Hurricane Center's official report, issued 19 March 2025, available at https://www.nhc.noaa.gov/data/tcr/AL092024_Helene.pdf

2 Death count is recorded in the NHC report referenced above, as well as reported by county in the NOAA Storm Events Database: Greene County, Johnson County, Unicoi County, and Washington County

As the operation progressed, scientific identification of the remains became necessary to maintain both accuracy and timeliness in the release of victims to their loved ones. The forensic center met this challenge with exceptional professionalism, achieving an average identification time of 1.5 days, thanks to the collaborative efforts of multiple supporting agencies.

We will briefly discuss demographics of all 19 cases accepted by WLJFC where death was either directly or indirectly attributed to Hurricane Helene. The majority of deaths (78.9%) were certified as accidental, with 63.1% being certified specifically as accidental deaths due to drowning.

About half (52.6%) of decedents were male, and 42.1% were female. The sex of one decedent was unable to be determined. Figure 8.14 shows the age distribution of disaster-related deaths; due to small counts, we have not stratified these counts by sex. The largest number of deaths occurred in individuals between ages 55 and 64. Figure 8.15 shows the race and ethnicity of these decedents. The majority were white, non-Hispanic, although we note that the proportions are quite different from all other manners and mechanisms discussed in this report. Due to low counts, however, we remind the reader that interpretation of these statistics is complex.

Figure 8.14 Disaster-Related Deaths by Age, 2024 (N = 19)

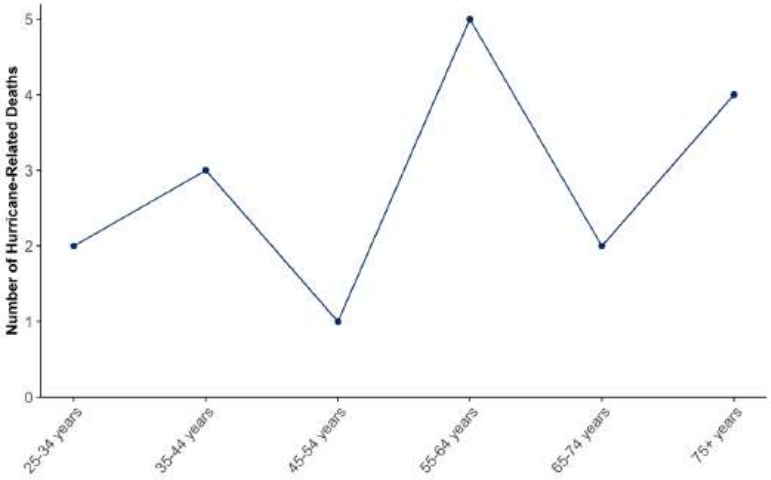
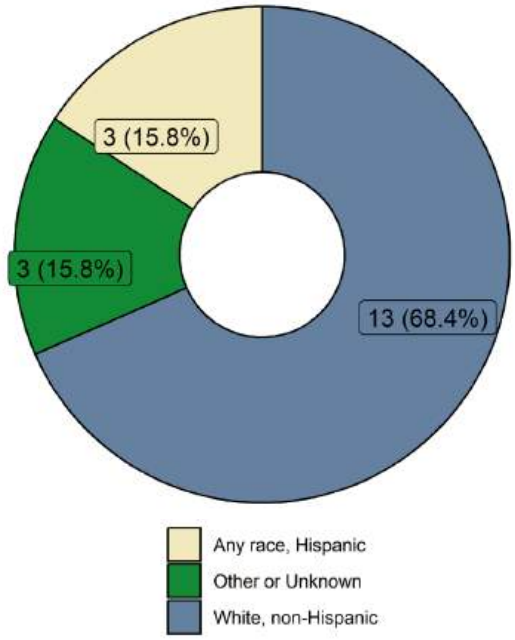


Figure 8.15 Race\Ethnicity of Disaster-Related Deaths, 2024 (N = 19)



IX. Pediatric Death Demographics

In 2024, there were 29 pediatric deaths accepted by WLJFC, defined as deaths where the decedent's age at death is below 18. To discuss pediatric deaths, we will use the grouping schema recommended by the National Institute of Child Health and Human Development (NICHD), with some modifications: infants below one year in age, toddlers between 13 and 24 months, children in early childhood between 2 and 5 years, children in middle childhood between 6 and 11 years, early adolescents between 12 and 17 years. Our modifications are to group newborns (0-28 days) with all infants, and we truncate early adolescence at 17 years instead of 18 years. It should be mentioned that there is not a standard epidemiological grouping for pediatrics; cultural and social nuances can make this complex.

Figure 9.1 shows the number of pediatric deaths by age group by sex. Adolescent decedents are more likely to be male (80.0%) than female (20.0%), and infant decedents are more likely to be female (61.5%) than male (38.5%). No other age group has a total count greater than ten, so even though there appears to be less variation by sex in pediatric cases when compared to other sections in this report, we remind the reader that small counts are not stable enough for interpretation.

Figure 9.2 on the next page shows the race and ethnicity of pediatric decedents. The majority are white, non-Hispanic (93.1%).

Figure 9.1 Pediatric Deaths by Age by Sex, 2024 (N = 29)

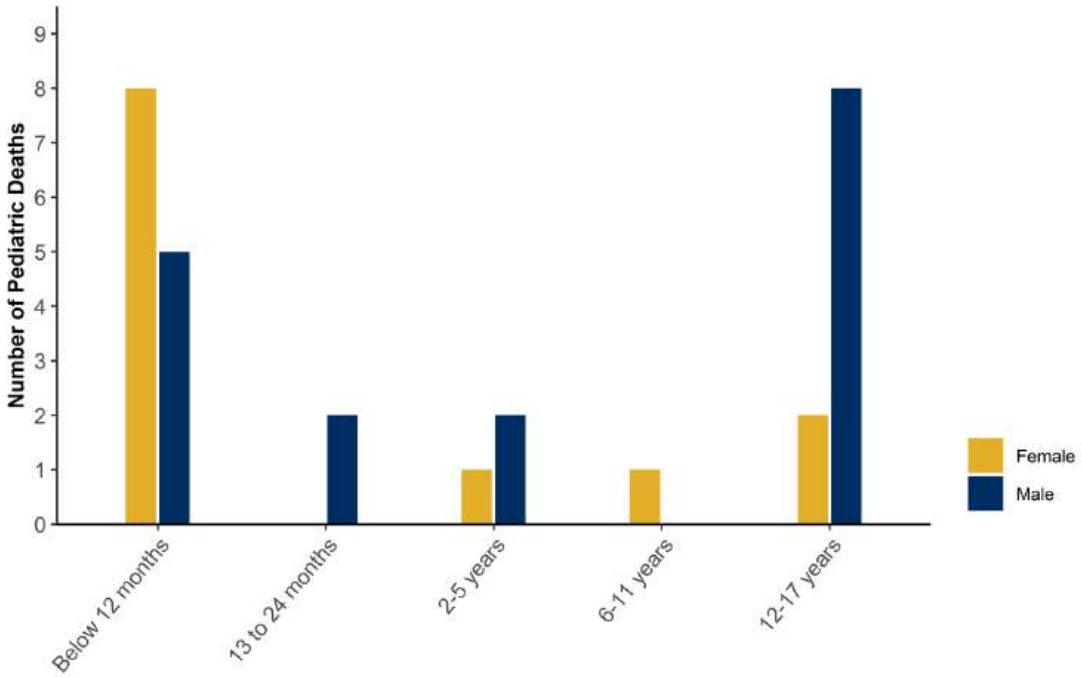
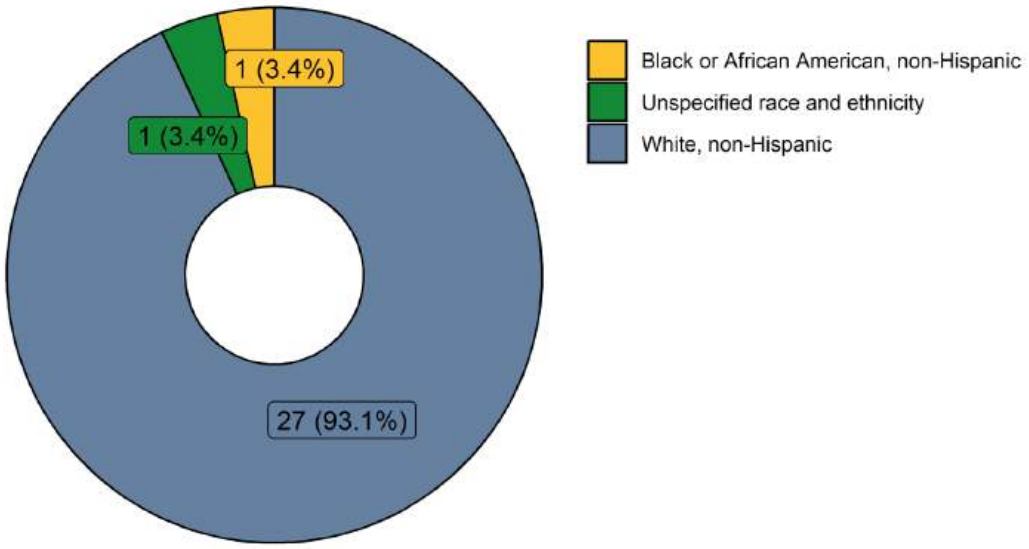


Figure 9.2 Race and Ethnicity of Pediatric Deaths, 2024 (N = 29)



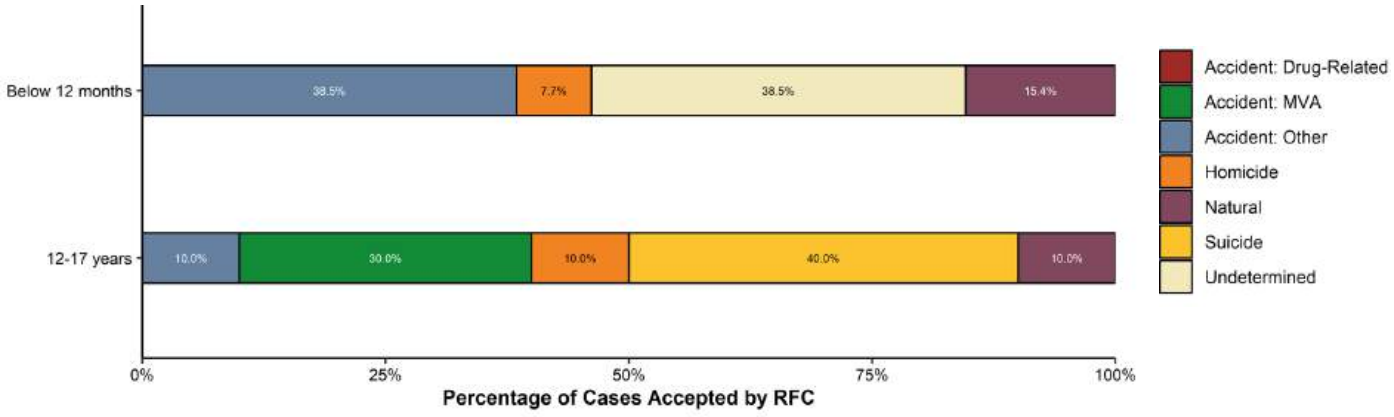
There is substantial variation in the manner and mechanism of death by age in the pediatric population. Table 9.1 presents the number of pediatric deaths by manner by age group, and Figure 9.3 shows this distribution by age group for infants and adolescents. Other age groups are not shown on the figure due to low counts. Note that in 2024, there were no reported drug-related pediatric deaths, but we left the column in Table 9.1 for easier comparison between annual reports in other years.

We will discuss manner and mechanism for each age group separately; because the counts are so small, this discussion will be limited to infants and adolescents.

Table 9.1 Manners of Death for Pediatric Cases by Age, 2024 (N = 29)

	Accident: Drug-Related	Accident: MVA	Accident: Other	Homicide	Suicide	Undetermined	Natural	Total
Below 12 months	0	0	5	1	0	5	2	13
13 to 24 months	0	0	0	1	0	1	0	2
2-5 years	0	0	0	2	0	1	0	3
6-11 years	0	0	1	0	0	0	0	1
12-17 years	0	3	1	1	4	0	1	10
Total	0	3	7	5	4	7	3	29

Figure 9.3 Manners of Death for Pediatric Cases by Age, 2024 (N = 29)



Birth to 12 Months

About thirty-nine percent (39.4%) of pediatric deaths in 2024 were decedents below the age of one year. Five of the thirteen deaths were due to unsafe sleeping conditions. Two were related to complications arising from prematurity or genetic conditions. One death was due to homicide. One case has been classified as sudden unexpected infant death (SUID) cases. The remaining four cases have been classified as undetermined due to complex circumstances.

Ages 12 to 17 Years

Thirty percent (30.3%) of pediatric deaths in 2024 were decedents between twelve and seventeen years old. We will look at the mechanism of these deaths based on the manner.

Forty percent (40.0%) of adolescents had an accidental manner of death; three of these cases were motor vehicle related. We observe the following characteristics:

- Two decedents were indicated as the driver of the vehicle; one had positive toxicology results
- One decedent was a pedestrian

One decedent died due to homicide by firearm.

Forty percent (40.0%) of adolescent decedents died due to suicide. Three of the four were firearm deaths, and one was due to asphyxia. Three decedents were male, and one was female. All decedents were white, non-Hispanic.

One decedent had a natural manner of death; their death was attributed to infection.

X. Elderly Death Demographics

In 2024, there were 332 deaths of individuals aged 65 or greater accepted by WLJFC. As with pediatrics, there is not a standard epidemiological grouping for elderly decedents. The demographic of most interest for statistical comparison is sex, as we have observed throughout this report that there are often differences in manner and mechanism of death between male and female decedents. This will be our focus in this section as well.

Almost sixty-three percent (208 cases, 62.7%) were male decedents, and the remaining 124 decedents (37.3%) were female. The average age at death is similar for both male and female decedents. Figure 10.1 shows the age distribution of these decedents by sex. The trend is relatively flat for both sexes until age 80, where the trendline shows a decline. We note that this graph shows total count only; this decline likely is more closely related to the fact that there are simply fewer individuals of these advanced ages living in the overall population at any point in time.

Figure 10.1 Deaths in the Elderly Population by Age by Sex, 2024 (N = 332)

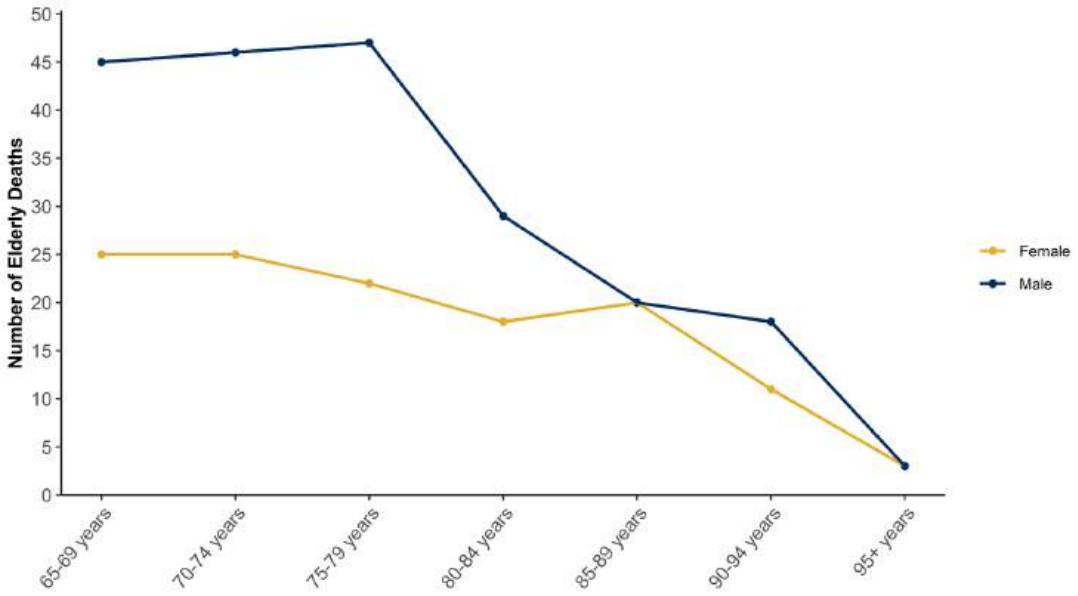
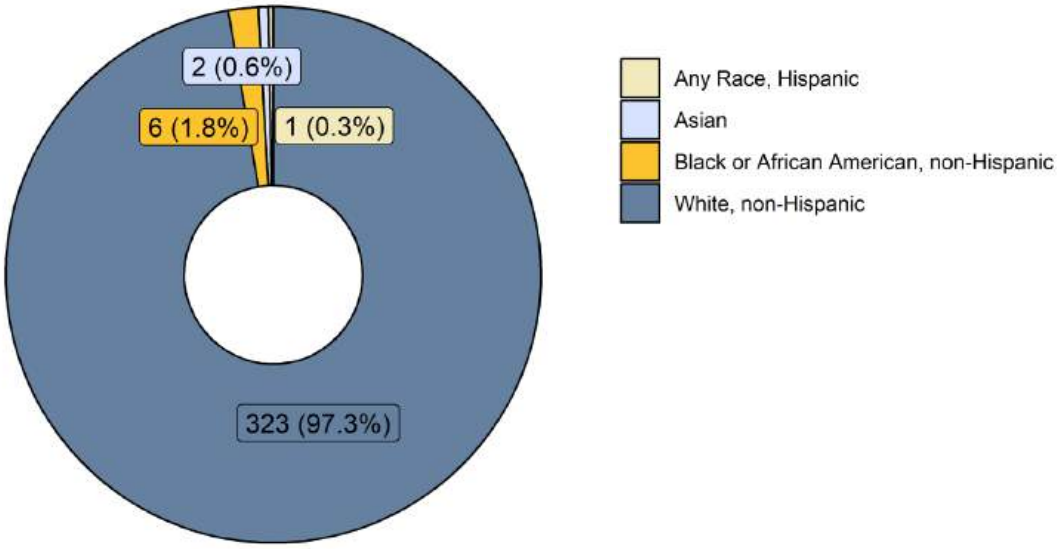


Figure 10.2 shows the race and ethnicity of these decedents. More than ninety-seven percent (97.3%) of decedents were white, non-Hispanic.

Figure 10.2 Race and Ethnicity of Elderly Decedents, 2024 (N = 332)



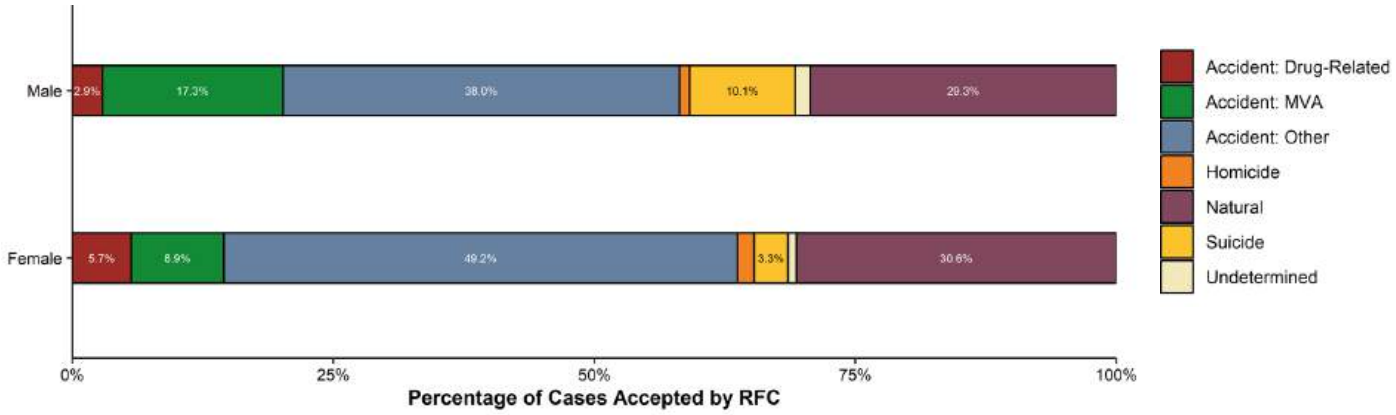
There is some variation in the manner of death of elderly decedents by sex, although there are also some shared trends. Table 10.1 presents the number of deaths of elderly decedents by manner by sex, and Figure 10.3 on the next page gives a graphical representation of the variation. We also note that the overwhelming majority of deaths of elderly decedents categorized as "Accident: Other" in other sections of this report are specifically attributed to accidental falls, so we have included a row on the table with those counts and percentages.

For both male and female decedents, the largest percentage of deaths are accidental falls, although the percentage of female decedents (44.4%) is higher than males (30.8%). An approximately equal percentage of male and female decedents had a natural manner of death. The differences begin to appear when we look at the next most-common manners of death; a much higher percentage of male decedents died due to motor vehicle accidents (17.3%) or due to suicide (10.1%) compared to female decedents. To discuss these mechanisms in more detail, we will look at sex-specific trends separately in the remainder of this section.

Table 10.1 Manners of Death of Elderly Decedents by Sex, 2024 (N = 332)

	Male		Female	
	Count	Percent	Count	Percent
Accident: Drug-Related	6	2.9	7	5.6
Accident: MVA	36	17.3	11	8.9
Accident: Other	79	38.0	61	49.2
**Accidental Fall*	*64*	*30.8*	*55*	*44.4*
Homicide	2	1.0	2	1.6
Suicide	21	10.1	4	3.2
Natural	61	29.3	38	30.6
Undetermined	3	1.4	1	0.8
Total	208		124	

Figure 10.3 Manners of Death of Elderly Decedents by Sex, 2024 (N = 332)



Male Decedents

The majority of male decedents 65 years and older at time of death where jurisdiction was accepted by WLJFC had an accidental manner of death (58.2%). We observe the following characteristics:

- The majority of these cases (64 of 121 accidental deaths) were due to a fall
- The next most common mechanism of accidental death (36 of 121 cases) was a motor vehicle accident
  - 91.7% of these decedents were indicated as the driver or operator of the vehicle; 25.0% had positive toxicology results

About twenty-nine percent (29.3%) of elderly male decedents had a natural manner of death. The majority of these cases (80.3%) were due to cardiac causes.

Ten percent (10.1%) of elderly male decedents died due to suicide. The majority of these deaths (85.7%) involved a firearm.

Fewer than five elderly male decedents had either an undetermined manner of death or died due to homicide.

Female Decedents

The majority of female decedents 65 years and older at time of death where jurisdiction was accepted by WLJFC had an accidental manner of death (63.7%). We observe the following characteristics:

- The largest percentage of these cases (55 of 79 accidental deaths) were due to a fall
- The next most common mechanism of accidental death (11 of 121 cases) was a motor vehicle accident
  - 54.5% of these decedents were indicated as the driver or operator of the vehicle; one decedent had positive toxicology results

More than thirty percent (30.6%) of elderly female decedents had a natural manner of death. The majority of these cases (64.9%) were due to cardiac causes.

Fewer than five elderly female decedents had either an undetermined manner of death or died due to homicide or suicide.

XI. Staff-Specific Data

In our final section, we turn our attention to statistics related to forensic center operations. Table 11.1 shows the distribution of case turnaround times for jurisdiction-accepted cases excluding record reviews. Turnaround time is defined as the number of days between the date of death and the date of exam (full autopsy, external or limited exam). The majority of these cases are completed in less than 30 days (53.9%). Four non-record-review cases were not included in this count due to complex circumstances.

Table 11.1 Case Turnaround Time in 2024 (N = 746)

	Count	Percent
Less than 30 days	402	53.9
Between 30 and 60 days	273	36.6
Between 60 and 90 days	50	6.7
More than 90 days	21	2.8
Total	746	

We next look at statistics pertaining to individual pathologists. Table 11.2 looks at the actions completed by the forensic center pathologists in 2024 and Table 11.3 looks at the average turnaround time by autopsy type for each pathologist. The average time only includes cases where a turnaround time was available, so we also present the percentage of cases that the average is based off of to allow comparison to other data years. In 2024, turnaround time is available for almost all cases, but that may not be the case in all data years.

We only present counts for the three medical examiner/forensic pathologists currently working at WLJFC.

Table 11.2 Activities Completed by Pathologists in 2024

	Cremation Permit	Jurisdiction Declined	Jurisdiction Accepted				Total Number Reported to RFC
			Full Autopsy	External Exam	Limited Exam	Record Review	
Emilie Cook, DO	336	235	124	67	10	48	820
Ami Murphy, DO	63	249	160	69	11	50	602
Andrea Orvik, MD	252	281	127	87	15	36	798
Ellen Wallen, MD	172	111	55	20	4	20	382

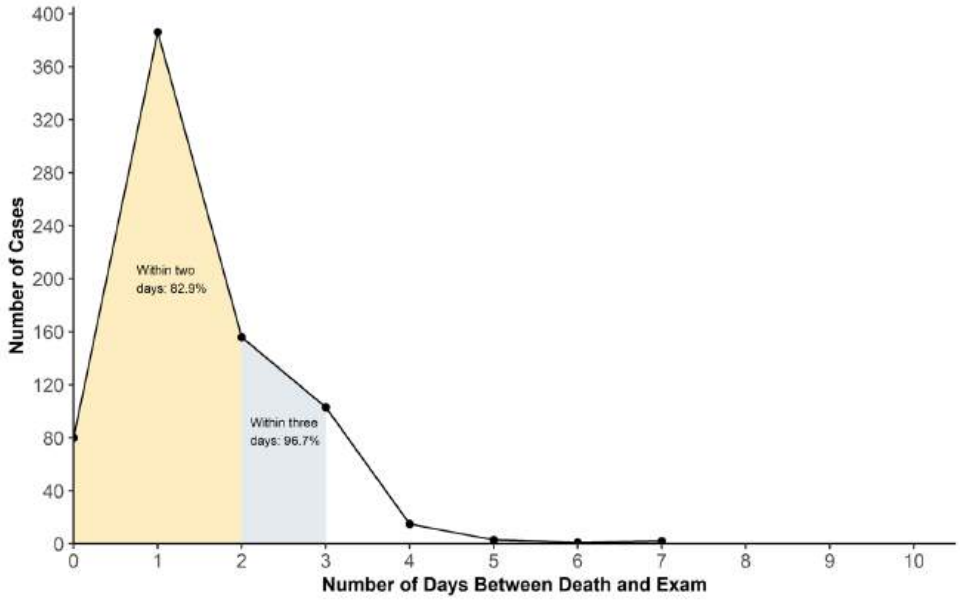
Table 11.3 Average Pathologist Turnaround Time by Autopsy/Exam Type in 2024

	Full Autopsy		External Exam		Limited Exam	
	Average Days	Percentage of Available Cases	Average Days	Percentage of Available Cases	Average Days	Percentage of Available Cases
Emilie Cook, DO	42.9	99.2	18.3	100	33.5	100
Ami Murphy, DO	35.7	100	26.6	100	19.1	100
Andrea Orvik, MD	34.8	100	24.2	100	25.6	93.3
Ellen Wallen, MD	59.4	100	52.6	100	54.8	100

Another measure related to autopsies and exams is the amount of time between the date the decedent arrived at the forensic center and the exam date. Due to data limitations, we use the date of death as a proxy for the arrival date. Even with this caveat, 82.9% of autopsies and exams are completed within two days of the date of death, and 96.7% are completed within three days, as shown in Figure 11.1.

For readability, the graph shows the distribution up to ten days between death and exam, but we note that we have truncated the figure; fewer than five cases are not shown because there were more than ten days between the decedent's death and the exam date.

Figure 11.1 Number of Days Between Death and Exam or Autopsy in 2024



Finally, we consider activities performed by the medicolegal death investigators. Table 11.4 shows the actions completed for each investigator and administrator working at WLJFC in 2024.

Table 11.4 Activities Completed by Investigators and Staff in 2024

				Jurisdiction Accepted			
	Cremation Permit	Jurisdiction Declined	Scene Response*	Sent to Facility : Storage	Sent to Autopsy Facility	Record Review	Total Number Reported to RFC
Current Investigators							
Cassidy Cooper	6	14	4	2	16	4	42
Virginia Daniel, D-ABMDI	0	81	32	4	85	12	182
Jasmyn McKinney, D-ABMDI	0	131	36	5	131	23	290
Victoria Sanchez	0	69	19	4	66	12	151
Julia Welch, D-ABMDI	0	73	19	2	60	18	153
Former Investigators							
Kevin Brown, F-ABMDI	0	87	26	5	78	9	179
Katrina Kokko, D-ABMDI	0	110	25	3	114	22	249
Laura Scala, D-ABMDI	0	79	25	1	84	15	179
Amber Zeigler, D-ABMDI	0	57	25	4	70	16	147
Other Investigators							
Fran Wheatley, F-ABMDI	0	24	1	0	0	1	26
Tiffany Gasperson, D-ABMDI	1	35	0	0	0	0	36
Staff							
Laura Parsons, F-ABMDI	8	92	24	4	51	20	175
Ashley Hatfield	73	0	0	0	0	0	73
Miranda Roberts	390	0	0	0	0	0	390
Sarah Craig	55	0	0	0	0	0	55
Jennifer Poux	284	0	0	0	0	0	284

*Scene response counts are for Washington County cases only

Report Preparation

This report was prepared using a dataset generated in MDILog on May 6, 2025. SAS and R were used to tabulate statistics and prepare figures, and all maps were created in ArcGIS using the geocoding database maintained by the TN STS-GIS division. All other sources are cited by footnote in the text above.

If there are any questions about the William L. Jenkins Forensic Center and its operations, please contact Laura Beth Parsons. If there are any questions about the statistics or methods used to generate this report, please contact Molly Golladay.

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