WILLIAM L. JENKINS FORENSIC CENTER

EAST TENNESSEE STATE UNIVERSITY

ANNUAL REPORT 2022

William L. Jenkins Forensic Center
ETSU Division of Forensic Pathology
Box 70425
Johnson City, TN 37614
(423) 439-8038

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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, Andrea Orvik, M.D., Director of the William L. Jenkins Forensic Center, serves as the 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 2024. Information regarding inspection and accreditation is available at https://www.thename.org

Table 1 below shows selected statistics generated in 2021 for NAME accreditation; the process is on-going for 2022.

Table 1. Selected NAME Criteria for 2021

	Washington	Carter	Unicoi	Sullivan	Greene	Hawkins	Hancock	Johnson	Total
Deaths Reported to Office	1878	403	133	205	86	43	13	107	2868
Cases Accepted by Office	369	92	38	205	86	43	13	34	880
Total Number of Complete Autopsies	207	76	24	201	80	39	13	25	665
Total Number of External Examinations	152	16	13	4	4	3	0	8	200
Total Number of Partial Autopsies	9	0	1	0	2	1	0	1	14
Cases where Toxicology is Performed	288	86	35	202	82	40	13	32	778
Cases where Histology is Performed	105	37	13	101	35	22	8	17	338
Scene Visits	263	35	11	5	3	4	3	5	329
County Field MDI Scene Visits	0	100	54	36	41	23	13	29	296
Bodies Transported by Office or Order of Office	369	92	38	205	86	43	13	34	880
Bodies Transported to the Office	411	95	41	206	86	43	13	35	930
Records Review	26	3	3	0	0	0	0	0	32

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. Andrea Orvik 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. Andrea Orvik 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.

Figure 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 exam/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.

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.

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

Emilie V. Cook, D.O.
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, one is a Fellow and three are Diplomates with the ABMDI; one is in the process of earning certification.

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
Kevin Brown, F-ABMDI
Katrina Kokko, D-ABMDI
Dean Petrone (in training)
Laura Beth Scala, D-ABMDI
Amber Zeigler, D-ABMDI

Field Medicolegal Death Investigators
Carter County: Benny Colbaugh
Johnson County: Willie Deboard
Unicoi County: Jimmy Erwin

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
Ariel Diaz
Dustin Lafollette

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
Penny Rutledge, Forensic Center Coordinator
Jennifer Poux, 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 2022 was 525,455, according to the latest data provided by the US Census Bureau. As of April 10th, 2023, provisional statistical death data provided by the Tennessee Vital Statistics division at the TN Department of Health states that there have been 9,193 deaths in these same eight counties. Overall, therefore, the mortality rate in this region in 2022 was 1749.5 deaths per 100,000 residents. There were 4,756 cases reported to WLJFC in 2022, suggesting that approximately 52% of deaths in the counties of service involved some interaction with the forensic center.

These statistics are displayed by county in Table 2 and Figure 2, shown below. We can see that Washington and Sullivan counties have the highest mortality rates, but a higher percentage of deaths in Washington County was reported to the RFC. All jurisdictional counties had a higher reporting percentage than the non-jurisdictional counties.

Figure 2. Mortality Rate by County by Reporting to RFC in 2022

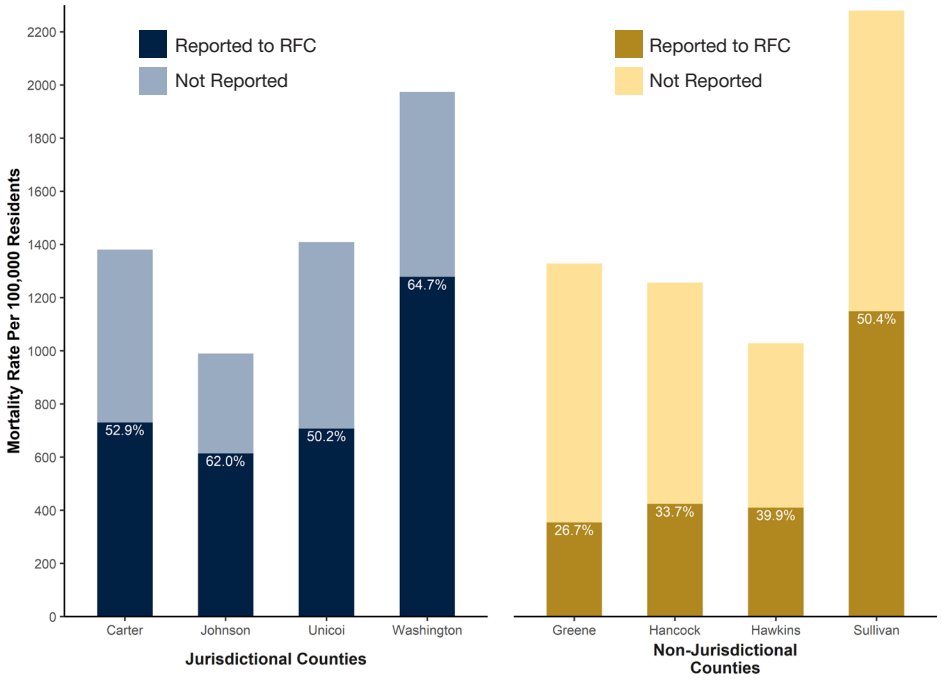


Table 2. Number of Cases Reported to RFC in 2022

	Total Population	Mortality Rate Per 100,000 Residents*	Total Provisional Death Count†	Deaths Reported to RFC
Jurisdictional Counties				
Carter	56,410	1381.0	779	412
Johnson	18,086	989.7	179	111
Unicoi	17,674	1408.8	249	125
Washington	136,172	1974.0	2688	1740
Non-Jurisdictional Counties				
Greene	71,405	1327.6	948	253
Hancock	6,845	1256.4	86	29
Hawkins	58,043	1028.5	597	238
Sullivan	160,820	2280.2	3667	1848

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

†2022 deaths calculated using provisional death file generated 10 April 2023

Table 3 and Figure 3 focus on the 4,756 cases reported to the forensic center in 2022 by breaking them down by activity type (e.g., record review, complete autopsy) as described in the Case Management section above. For jurisdictional counties, 27.1% of reported cases are accepted for either autopsy or record review, 38.1% are cremation permit cases, and 34.8% are declined. For non-jurisdictional counties, 14.7% of reported cases are accepted for autopsy, less than one percent are cremation permit cases, and 85.1% are declined.

Figure 3. Activities Completed by RFC in 2022

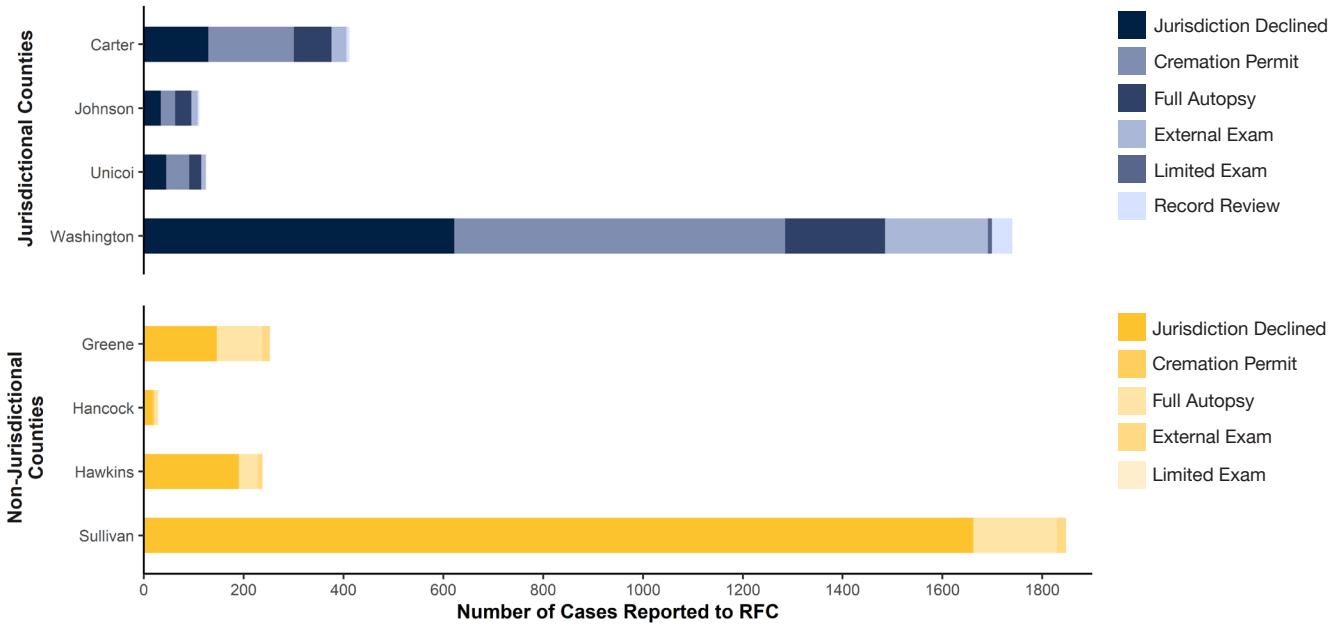


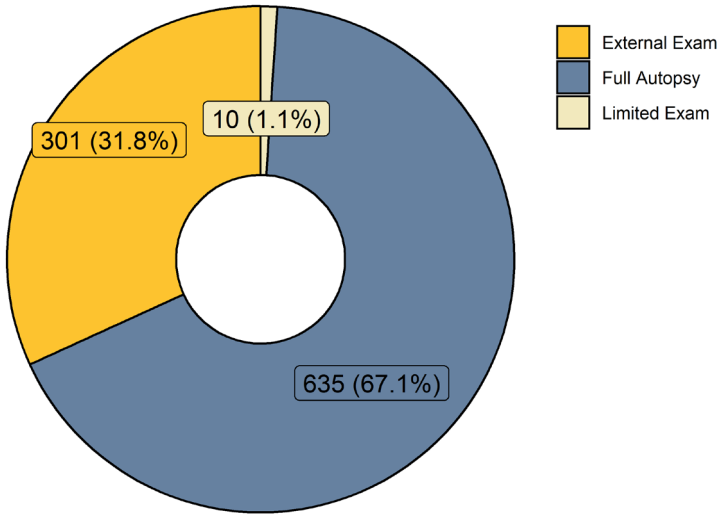
Table 3. Activities Completed by RFC in 2022

	Cremation Permit	Jurisdiction Declined	Jurisdiction Accepted				Total Number Reported to RFC
			Full Autopsy	External Exam	Limited Exam	Record Review	
Jurisdictional Counties							
Carter	172	129	75	30	0	6	412
Johnson	29	34	32	13	0	3	111
Unicoi	46	45	24	9	0	1	125
Washington	663	622	200*	206	8	41	1740
Non-Jurisdictional Counties							
Greene	0	146	91	15	1	N/A	253
Hancock	4	17	8	0	0	N/A	29
Hawkins	0	190	38	10	0	N/A	238
Sullivan	1	1661	167	18	1	N/A	1848

*Medical Examiner jurisdiction accepted; incident occurred in another jurisdiction and body was sent to another facility for autopsy

There were 946 autopsies and exams performed at the forensic center in 2022. Figure 3 shows the percentages of external and limited exams and full autopsies. The majority of exams were full autopsies (67.1%), followed by external exams (31.8%) and limited exams (1.1%).

Figure 4. Autopsies and Exams Performed at RFC in 2022



To conclude this section, we turn our attention to the manners of death for the 997 cases where jurisdiction was accepted (JA). These were cases that had autopsies or exams, or cases where a record review was requested.

Table 4 shows the manners of death by county for the JA 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 5 compares this overall distribution (shown in 5a) with the various counties (shown in 5b). Due to the interest in motor vehicle accidents (MVA), these cases are shown separately from all other accidental deaths. Note in Figure 5b that the shaded bars follow the same order as the columns in Table 4 to make interpreting the percentages more straightforward.

Overall, accidental deaths accounted for about half (53.4%) of all JA cases, with MVA deaths being 11.8% of JA cases. Natural deaths were 27.3% of JA cases, with suicide deaths accounting for 12.1%, homicide deaths accounting for 3.4%, and deaths due to undetermined intent accounting for the remaining 3.7%.

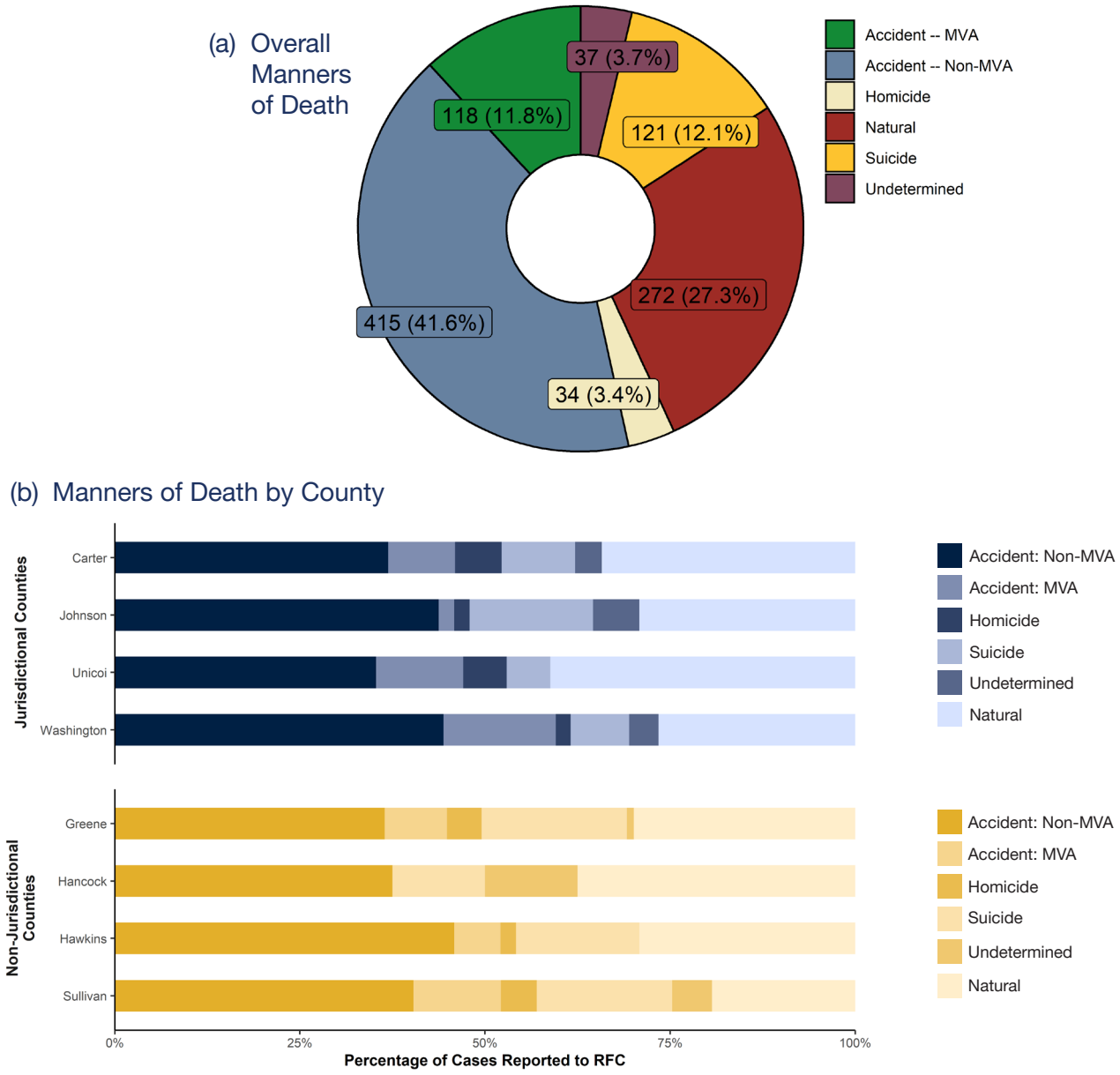
For every county except Unicoi, the highest percentage of cases were non-MVA accidental deaths, followed by natural deaths. For Unicoi, these percentages were reversed, but the numbers are close together.

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.

Table 4. Manners of Death for Jurisdiction-Accepted Cases by County in 2022

	Accident: Non-MVA	Accident: MVA	Homicide	Suicide	Undetermined	Natural	Total Accepted
Jurisdictional Counties							
Carter	41	10	7	11	4	38	111
Johnson	21	1	1	8	3	14	48
Unicoi	12	4	2	2	0	14	34
Washington	202	69	9	36	18	121	455
Non-Jurisdictional Counties							
Greene	39	9	5	21	1	32	107
Hancock	3	0	0	1	1	3	8
Hawkins	22	3	1	8	0	14	48
Sullivan	75	22	9	34	10	36	186

Figure 5. Manners of Death for JA Cases in 2022



III. Homicide Demographics

In 2022, there were 34 homicides reported to the forensic center. Nineteen of them occurred in jurisdictional counties, and the remaining fifteen occurred in non-jurisdictional counties (refer to Table 4 above 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-six of the decedents were male, and 8 were female. All female decedents were aged 18 and over, while the youngest male decedent was aged 7. All female decedents were white, non-Hispanic, while male decedents had a wider racial distribution. 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 5.

Figure 6 below shows the age distribution of homicide deaths. We 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 25 and 44 years old.

Figure 7 below shows the race and ethnicity of homicide deaths. The majority of victims were white, non-Hispanic.

Figure 6. 2022 Homicide Counts by Age

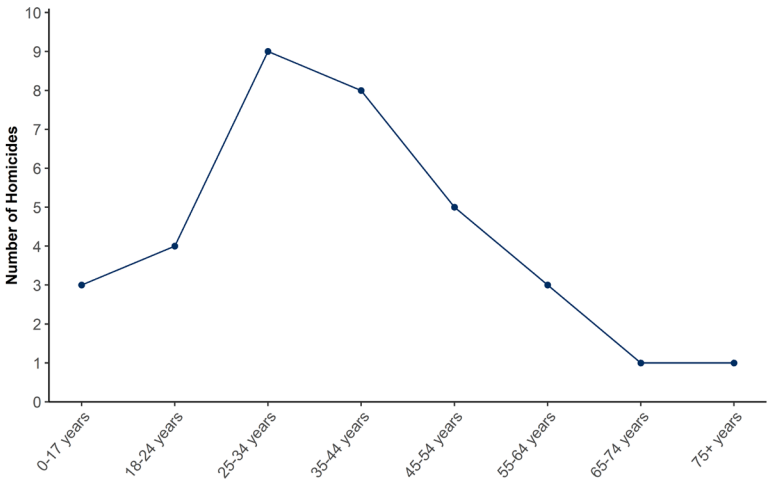


Figure 7. 2022 Homicide Counts by Race\Ethnicity

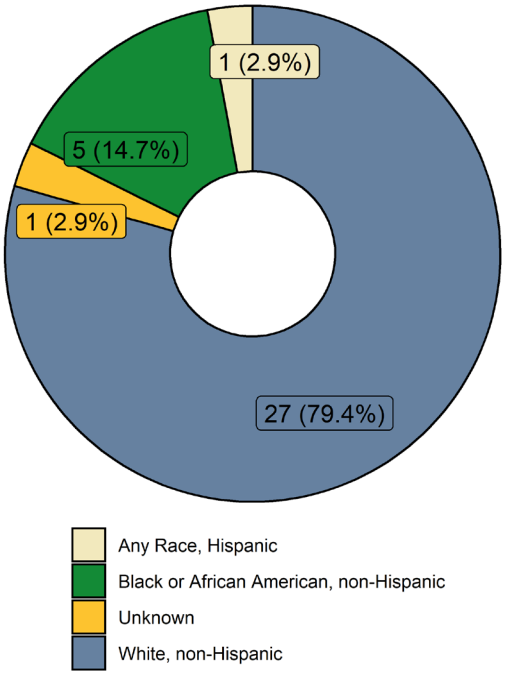


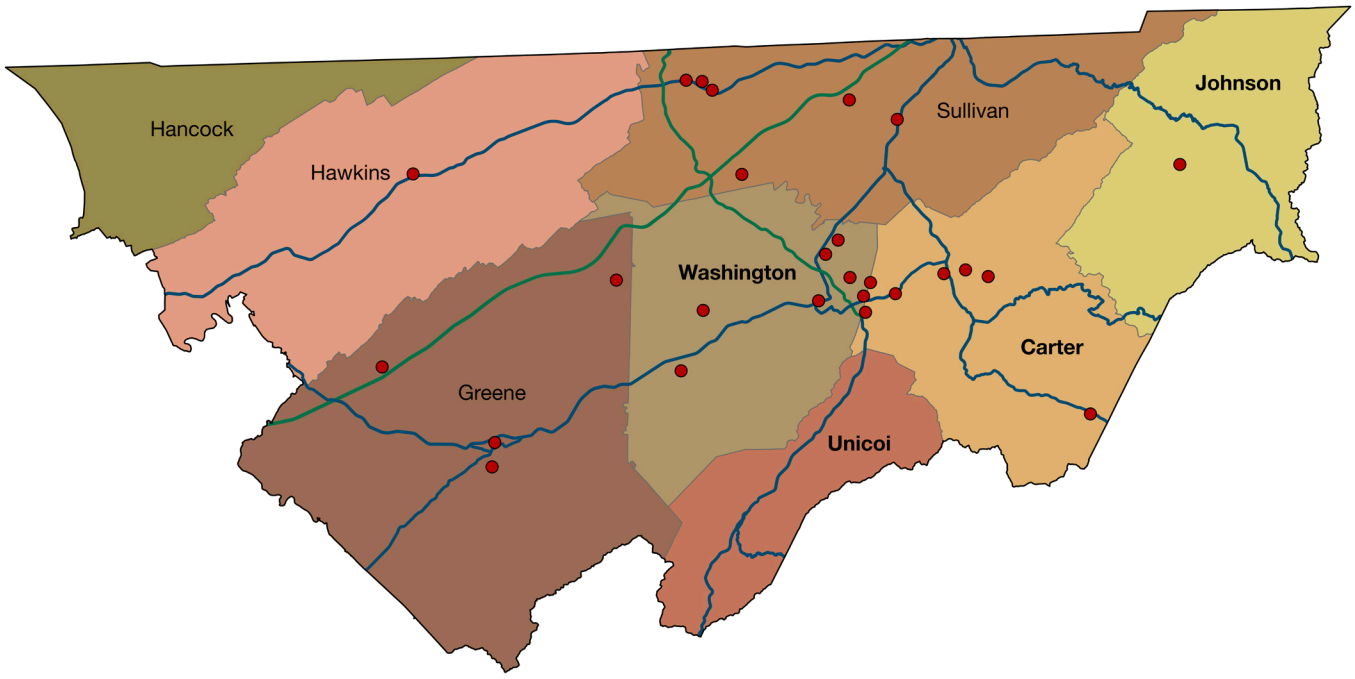
Table 5. Homicide Counts by Mechanism of Death by Sex in 2022

	Male		Female	
	Count	Percent	Count	Percent
Asphyxia	0	0	1	12.5
Blunt Force	2	7.7	1	12.5
Firearm	20	76.9	5	62.5
Homicidal Violence NOS	1	3.8	1	12.5
Sharp Instrument	3	11.5	0	0
Total	26		8	

Table 5 above shows the mechanism of death by sex for homicide deaths. The most common mechanism was firearm; 25 (73.5%) victims died by firearm. No other category had a count higher than five.

Figure 8 below shows the geographic distribution of homicide deaths with known injury location information. Major roadways are displayed on the map to help orient the viewer with interstates shown in green and US highways shown in blue. We can see here that many homicides are clustered together geographically, even though a county line runs through this cluster. It should be noted that this may simply be due to population concentration, as homicide rates tend to be higher in areas with more population density.

Figure 8. Injury Locations of Homicide Deaths in 2022



IV. Suicide Demographics

In 2022, there were 121 suicides reported to the forensic center. Fifty-seven of them (47.1%) occurred in jurisdictional counties, and the remaining 64 (52.9%) occurred in non-jurisdictional counties (refer to Table 4 above for the by-county counts). In this section, we will present information about sex, age, race and ethnicity, and mechanism of death.

One hundred of the decedents (82.6%) were male and 21 (17.4%) were female. Figure 9 below shows the age distribution of suicide deaths by sex. Females who died by suicide tended to be younger on average than males who died by suicide. Fewer than ten decedents were under the age of 18, with the youngest being 13.

Figure 9. Age Distribution of Deaths due to Suicide by Sex in 2022

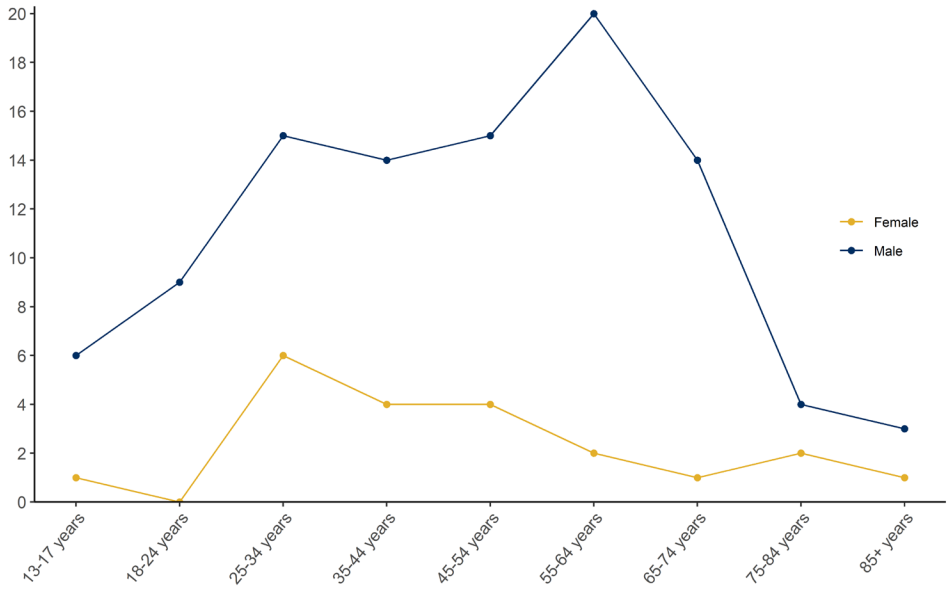
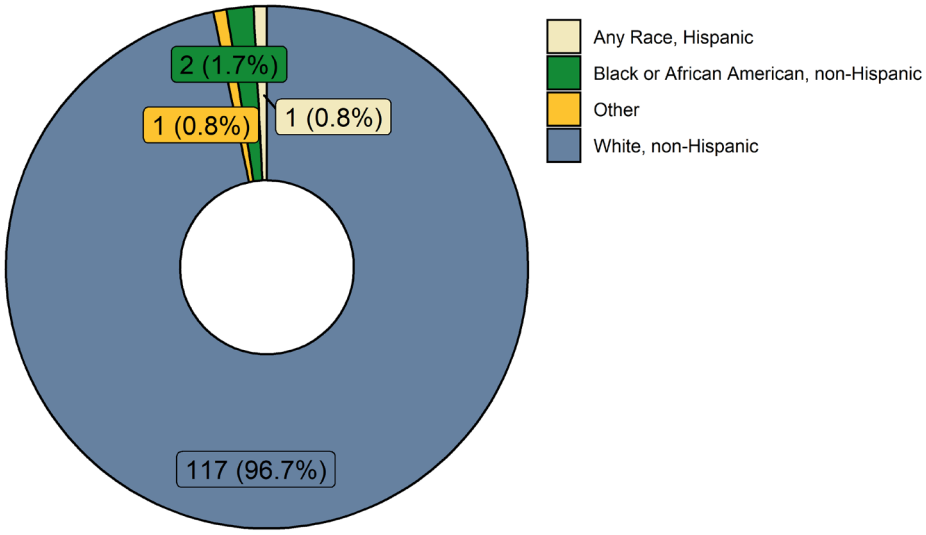


Figure 10 below shows the race and ethnicity distribution of individuals who died by suicide. Almost ninety-seven percent (96.7%) of decedents were white, non-Hispanic.

Figure 10. Race and Ethnicity of Deaths due to Suicide in 2022



When considering the mechanism involved in a suicide death, it must always be kept in mind that there are documented differences between males and females in this scenario. Because of this, we present both Figure 11, which shows the total counts and percentages for each mechanism, and Table 6, which shows mechanism of death by sex. Firearm is the most common suicide mechanism for both males and females, but intentional drug deaths have a much higher proportion of females than males.

Figure 11. Mechanism of Deaths due to Suicide in 2022

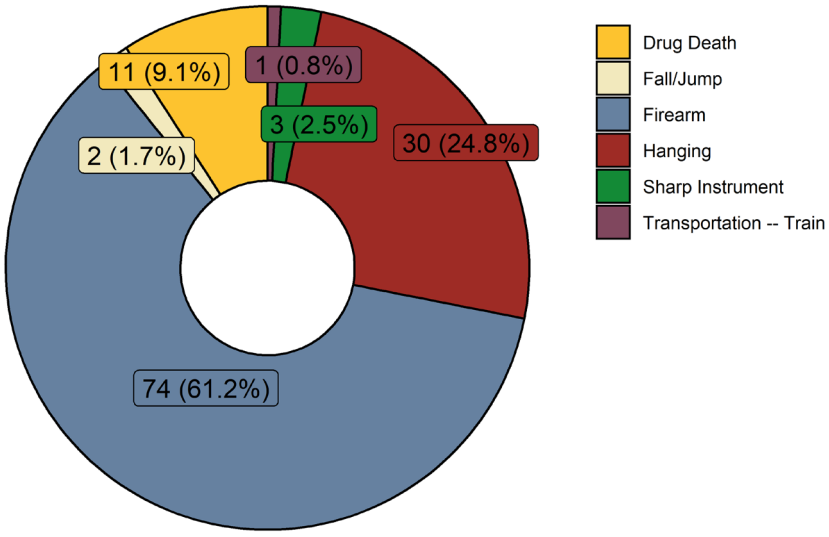


Table 6. Suicide Counts by Mechanism of Death by Sex in 2022

	Male		Female	
	Count	Percent	Count	Percent
Drug Death	6	6.0	5	23.8
Fall or Jump	2	2.0	0	0
Firearm	65	65.0	9	42.9
Hanging	25	25.0	5	23.8
Sharp Instrument	2	2.0	1	4.8
Transportation — Train	0	0	1	4.8
Total	100		21	

V. Accidental Death Demographics

In 2022, there were 533 accidental deaths reported to the forensic center. The majority of them (360 cases, 67.5%) occurred in jurisdictional counties, and the remaining 173 (32.5%) occurred in non-jurisdictional counties.

Table 7 shows the counts of the mechanism of death for these cases by coverage area. In jurisdictional counties, the most common mechanisms are drug death (36.4%), falls for individuals aged 65 and older (24.2%), and motor vehicle collisions (23.1%). In non-jurisdictional counties, the majority of accidental deaths are either drug deaths (63.6%) or motor vehicle collisions (20.2%).

It should be noted that the differences in percentages may be attributable to the differences in how the counties are handled by the forensic center, and any analysis should attempt to utilize multiple data sources in order to understand how forensic center operations may affect these counts.

Table 7. Mechanism of Accidental Deaths by Coverage in 2022

	Jurisdictional Counties		Non-Jurisdictional Counties	
	Count	Percent	Count	Percent
Asphyxia	13	3.6	4	2.3
Blunt Force	15	4.2	3	1.8
Burn — Thermal, not Fire	1	0.3	0	0
Carbon Monoxide	0	0	1	0.6
Cardiac	3	0.8	2	1.2
Crushed-Pinned	1	0.3	0	0
Diabetes-Ketoacidosis	1	0.3	0	0
Drug Death	131	36.4	110	63.6
Explosion	1	0.3	1	0.6
Fall — Under 65	10	2.8	1	0.6
Fall — 65+	87	24.2	1	0.6
Fire	4	1.1	7	4.0
Gun-Pistol	1	0.3	0	0
Hypothermia	5	1.4	2	1.2
Infection-Lung	0	0	2	1.2
Motor Vehicle Collision	83	23.1	35	20.2
Nervous System	1	0.3	0	0
Pulmonary	1	0.3	1	0.6
Transportation — Boat	1	0.3	0	0
Treatment Complication	1	0.3	0	0
Undetermined/Other	0	0	3	1.7
Total	360		173	

One of the categories that is often of substantial interest is that of motor vehicle accidents. We will now turn our attention to the 118 decedents listed as dying due to an incident involving a motor vehicle of some kind. We will consider the vehicle type, the decedent's position relative to the

vehicle, the geographic incident location, and the role that drugs and alcohol may have played in the incident.

Table 8 below shows the motor vehicle type by coverage area. The most common vehicles are passenger cars, SUVs, and motorcycles, but we note that a wide variety of vehicle types are listed.

Table 8. Vehicle Type in MVA Deaths by Coverage in 2022

	Jurisdictional Counties		Non-Jurisdictional Counties	
	Count	Percent	Count	Percent
ATV	3	3.6	0	0
Commercial Dump Truck	1	1.2	0	0
Dirt Bike	0	0	1	2.9
Electric Scooter	1	1.2	0	0
Lawn Mower	3	3.6	0	0
Minivan	0	0	1	2.9
Motorcycle	15	18.1	5	14.3
Passenger Car	18	21.7	12	34.3
Pickup Truck	15	18.1	4	11.4
SUV	18	21.7	7	20.0
UTV	1	1.2	0	0
Unspecified Type	8	9.6	5	14.3
Total	83		35	

Figure 12 below shows the position of the decedent relative to the vehicle. The majority of decedents were drivers or operators of the vehicle (74.6%). The next most common position was pedestrian (12.7%).

Figure 12. Decedent Position in Motor Vehicle Incidents in 2022

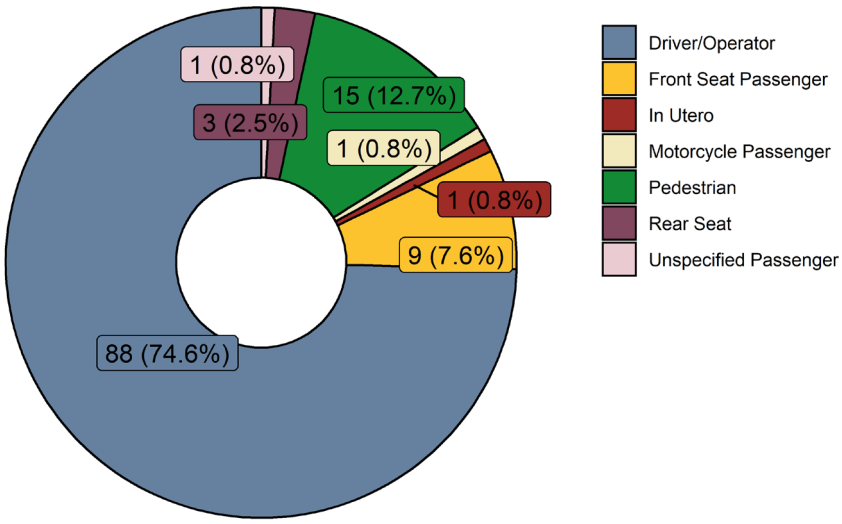
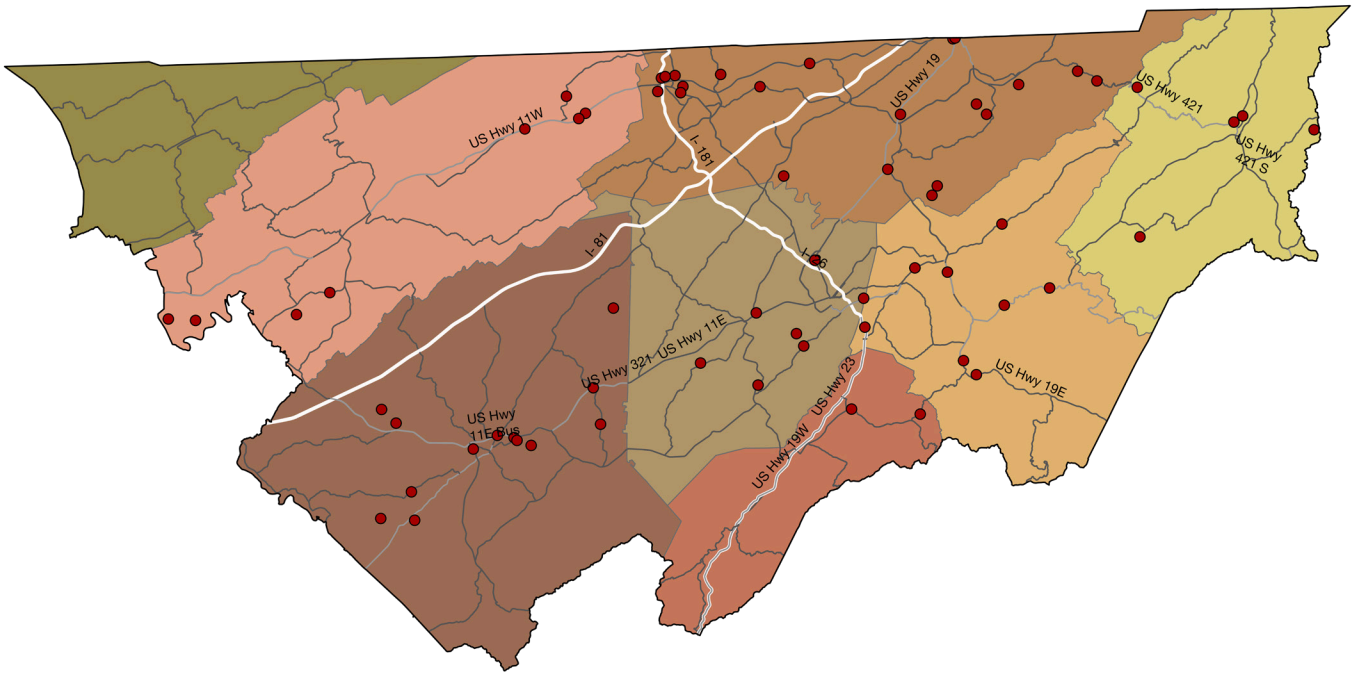


Figure 13 on the following page shows the locations of the motor vehicle accidents when enough information is available for geocoding. It should be noted that interstate mile markers were not able to be geocoded due to software constraints. Major roads are shown on the map for orientation purposes.

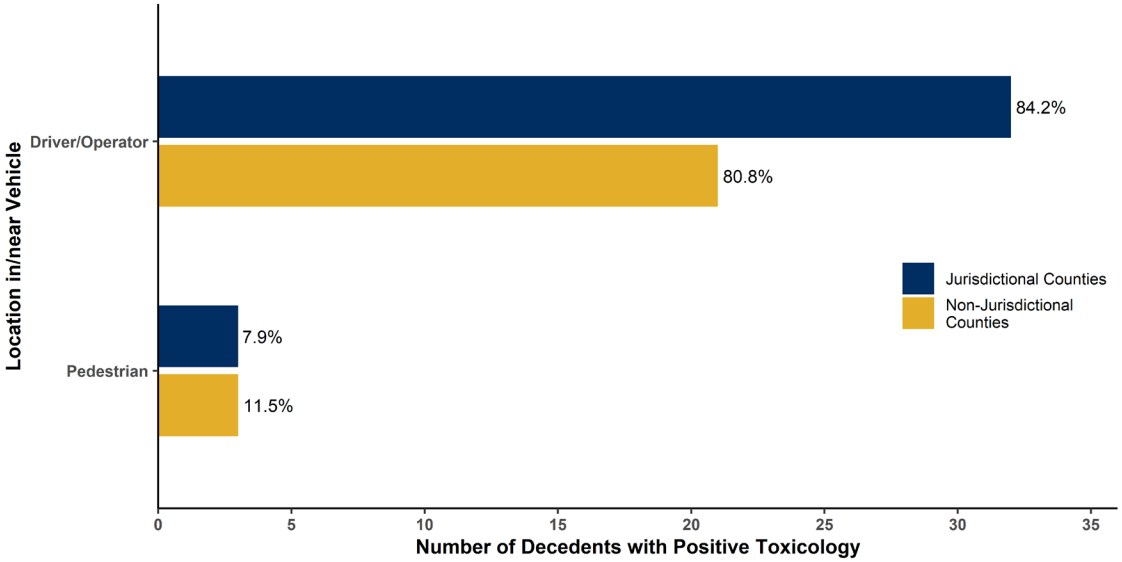
Figure 13. Injury Locations of Motor Vehicle Accidents Involving Fatalities in 2022



Finally, we turn our attention to the involvement of drugs or alcohol in motor vehicle accidents. We considered cases where the vehicle operator or pedestrian had positive toxicology for substances such as alcohol, recreational drugs, and prescription medications that cause impairment.

Figure 14 shows the counts and percentages of MVA deaths considered to involve drugs or alcohol by coverage area. Regardless of jurisdictional status, the majority of decedents who were operating a vehicle in the incident had positive toxicology for one or more substances. Slightly less ten percent of pedestrians had positive toxicology in both jurisdictional and non-jurisdictional counties.

Figure 14. Number and Percentage of MVA Deaths with Positive Toxicology in 2022

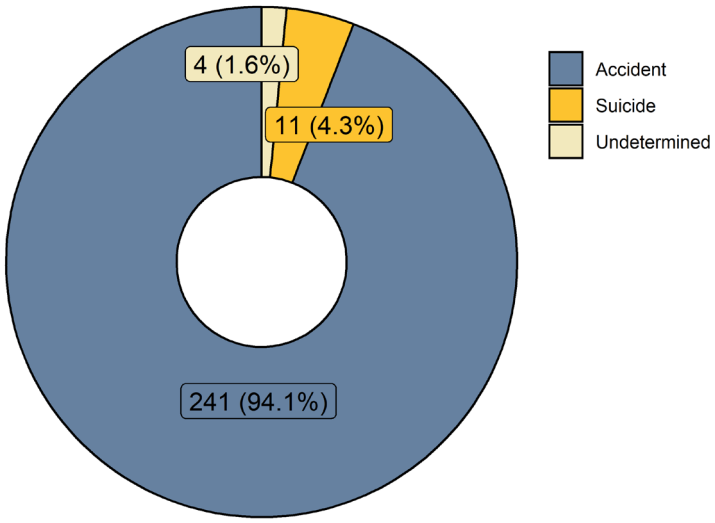


VI. Drug-Related Death Demographics

In 2022, there were 261 drug-related deaths reported to the forensic center, defined as deaths where the circumstances type was stated as a drug death. 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 256.

The majority of them (139 cases, 54.3%) occurred in jurisdictional counties, and the remaining 117 (45.7%) occurred in non-jurisdictional counties. Figure 15 shows the distribution of drug-related deaths by manner. More than ninety percent (94.1%) of drug-related deaths were accidental, followed by suicide (4.3%) and undetermined intent (1.6%). 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 15. Drug-Related Deaths by Manner in 2022



Almost seventy percent (176 cases, 68.8%) were male decedents, and the remaining 80 (31.2%) were female. Females involved in a drug-related death tended to be younger on average than males involved in a drug-related death. Fewer than ten decedents were under the age of 18, and the youngest was 13 years old. Figure 16 on the following page shows the age distribution of drug-related deaths by sex.

Figure 16. Drug-Related Deaths by Age by Sex in 2022

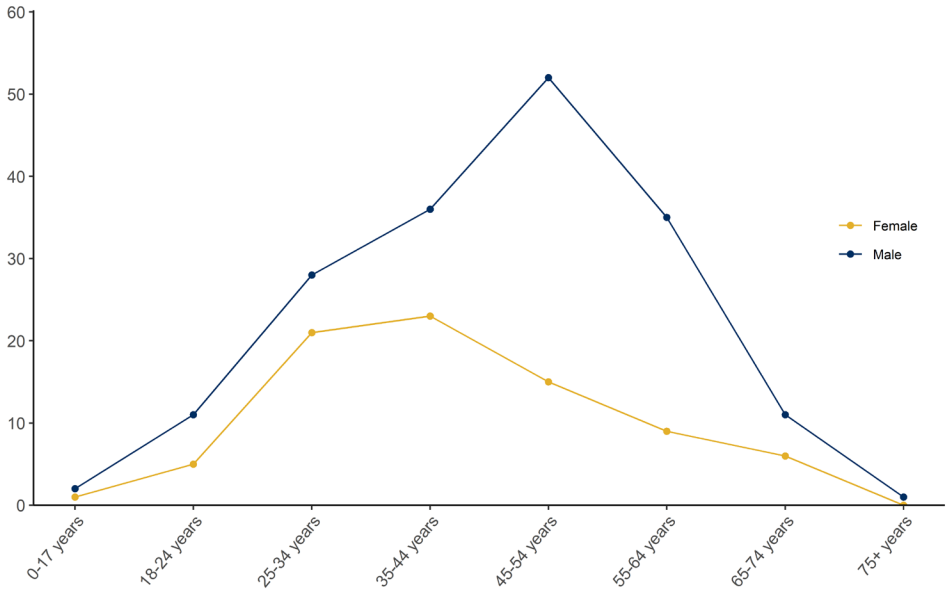
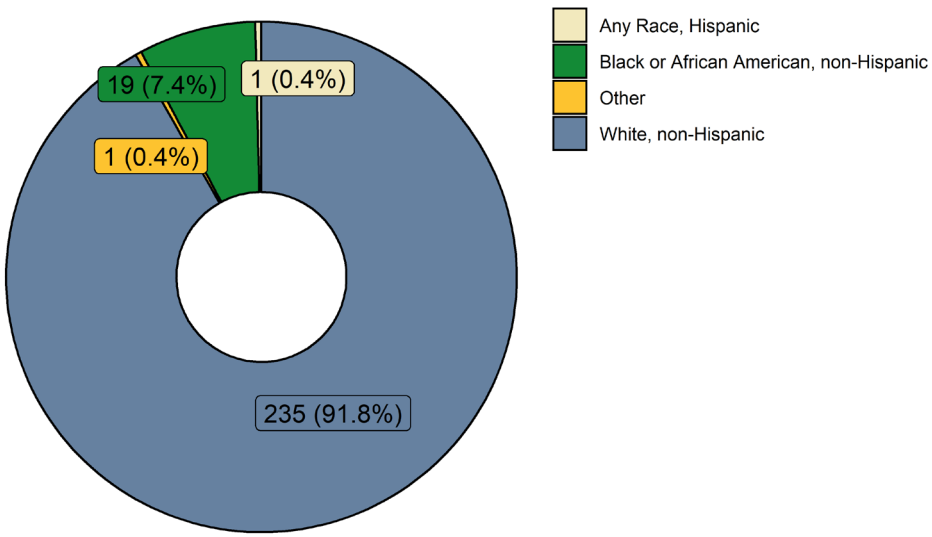


Figure 17 below shows the race and ethnicity information for individuals who were involved in drug-related deaths. About ninety-two percent (91.8%) of decedents were white, non-Hispanic.

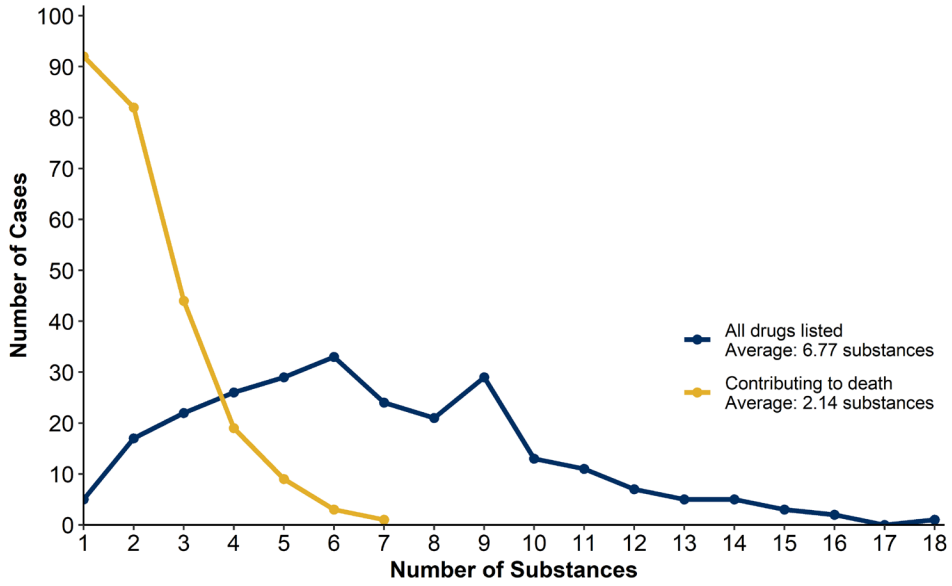
Figure 17. Race and Ethnicity of Drug-Related Deaths in 2022



We now turn our attention to the toxicology information available for drug-related deaths. Manual review shows that two decedents were record review cases, so the forensic center did not do any toxicological testing. Another decedent 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 253 cases.

Figure 18 shows the distribution of the number of positive substances on the toxicology results for the 216 cases with available information. 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 fentanyl may test positive for 1) fentanyl alone, 2) fentanyl and norfentanyl, 3) fentanyl, norfentanyl, and morphine. This may be further impacted by residual metabolites of substances taken on a chronic basis. Because of this, we consider the number of

Figure 18. Number of Substances Present on Toxicology in Drug-Related Deaths in 2022



substances present on toxicology (blue line), but also the substances indicated as contributing to death by the team completing the investigation (yellow line). This not only addresses the potential "overcounting" due to metabolites, but also eliminates substances like caffeine that will show up on toxicology but are rarely of analytic interest.

We note here that an additional 3 cases had no substances indicated as contributing to death. In one 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 another, the single substance found was not endorsed as contributing to death in the system but was listed on the death certificate. In the final case, the substance was sufficiently novel that it had to be tested for separately and the result in the system was too general to be endorsed.

We can see in Figure 18 above that the number of drugs showing positive (average number is 6.77 substances) is much higher on average than the number of drugs listed as contributing to death (average number is 2.14 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 250 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 fifty-eight drug-related deaths (63.2%) were polydrug, and 92 (36.8%) were single-drug. The substances contributing to death are listed in Table 10 on the next page.

Table 10. Substances Contributing to Death in Drug-Related Deaths in 2022

(a) Single-Drug Deaths	Count	Percent
Methamphetamine	53	57.6
Fentanyl	22	23.9
Cocaine	3	3.3
Methadone	2	2.2
Oxycodone — Free	2	2.2
Oxymorphone — Free	2	2.2
Acetaminophen	1	1.1
Clonadine	1	1.1
Cyclobenzaprine	1	1.1
Diphenhydramine	1	1.1
Ethanol	1	1.1
Memantine	1	1.1
Metragynine	1	1.1
Morphine — Free	1	1.1
Total Number of Decedents	92	

(b) Polydrug Deaths	Count	Percent
Fentanyl	126	79.7
Methamphetamine	101	63.9
Cocaine	18	11.4
Buprenorphine — Free	17	10.8
Ethanol	17	10.8
Alprazolam	12	7.6
Gabapentin	10	6.3
Hydrocodone — Free	10	6.3
Oxycodone — Free	10	6.3
Xylazine	10	6.3
Diazepam	7	4.4
Diphenhydramine	7	4.4
Morphine — Free	7	4.4
para-Fluorofentanyl	7	4.4
Amphetamine	6	3.8
6-Monoacetylmorphine — Free	5	3.2
7-Amino Clonazepam	5	3.2
Clonazepam	5	3.2
Oxymorphone — Free	5	3.2
Total Number of Decedents	158	

The majority of single-drug deaths were due to methamphetamine (57.6%), with the second most common substance being fentanyl (23.9%). 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 (79.7%), although methamphetamine was present in a majority of deaths as well (63.9%). For 81 of the 158 polydrug decedents (51.3%), both fentanyl *and* methamphetamine were present. No other substances were present in such a high percentage of decedents, but cocaine and buprenorphine were the next most common substances.

VII. Natural Death Overview

In 2022, there were 271 natural deaths reported to the forensic center. The majority of them (186 cases, 68.6%) occurred in jurisdictional counties, and the remaining 85 (31.4%) occurred in non-jurisdictional counties.

Table 11 shows the counts of the mechanism of death for these cases by coverage area. In both coverage areas, the majority of natural deaths were due to a cardiac-related cause. No other category had a substantial proportion of deaths.

Table 11. Mechanism of Natural Deaths by Coverage in 2022

	Jurisdictional Counties		Non-Jurisdictional Counties	
	Count	Percent	Count	Percent
Asphyxia	0	0	1	1.2
Aneurysm	1	0.5	0	0
Cardiac	120	64.5	58	68.2
Chronic Alcoholism	14	7.5	3	3.5
Diabetes	10	5.4	4	4.7
Dementia — NOS	1	0.5	0	0
Drug Death — Chronic Abuse	4	2.2	1	1.2
GI Tract Disease	1	0.5	0	0
Hematologic Disorder	1	0.5	0	0
Heritable, Genetic, or Congenital Disease	0	0	1	1.2
Infection	7	3.8	5	5.9
Infection — COVID-19	4	2.2	1	1.2
Infection — HIV-AIDS	1	0.5	0	0
Neoplasm	7	3.8	2	2.4
Nervous System	6	3.2	3	3.5
Obesity	1	0.5	1	1.2
Pancreatitis	0	0	1	1.2
Pulmonary	4	2.2	3	3.5
Renal Disease	1	0.5	0	0
Thromboembolism	3	1.6	1	1.2
Total	186		85	

VIII. Undetermined Death Overview

In 2022, there were 37 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. In our discussion of undetermined deaths, it is also appropriate to discuss infant death, as due to the difficulty in ascertaining a cause of death in the very young, the majority of infant deaths are undetermined.

We identified 14 deaths where the decedent was an infant, defined as less than one year old. Twelve of these (85.7%) are undetermined deaths. The remaining two are accidental; one involved an unsafe sleeping environment and the other was a motor vehicle accident. In the cases of the 12 undetermined infant deaths, no additional information on the cause of death is available.

For the remaining 25 undetermined deaths, all of individuals aged 18 and older, 13 have no additional cause of death information available, 4 were drug deaths of undetermined intent, 3 were firearm deaths of undetermined intent, and the remaining 5 cases were complex cases in which multiple manners of death were potentially compelling to a degree that is difficult to summarize concisely.

IX. Staff-Specific Data

In our final section, we turn our attention to statistics related to forensic center operations. Table 12 shows the distribution of case turnaround times for JA cases excluding record reviews. The majority of cases are completed in under 30 days (69.9%).

Table 12. Case Turnaround Time in 2022

	Count	Percent
Less than 30 days	662	69.9
Between 30 and 60 days	136	14.4
Between 60 and 90 days	19	2.0
More than 90 days	3	0.3
Unknown turnaround	127	13.4
Total	947	

We next look at statistics pertaining to individual pathologists. Table 13 looks at the actions completed by the forensic center pathologists in 2022 and Table 14 looks at the average turnaround time by autopsy type for each pathologist. In Table 14, we also note that 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. For example, one pathologist had an average turnaround time of 23.3 days for full autopsies based on the 86.8% of cases that had a turnaround time available.

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

Table 13. Activities Completed by Pathologists in 2022

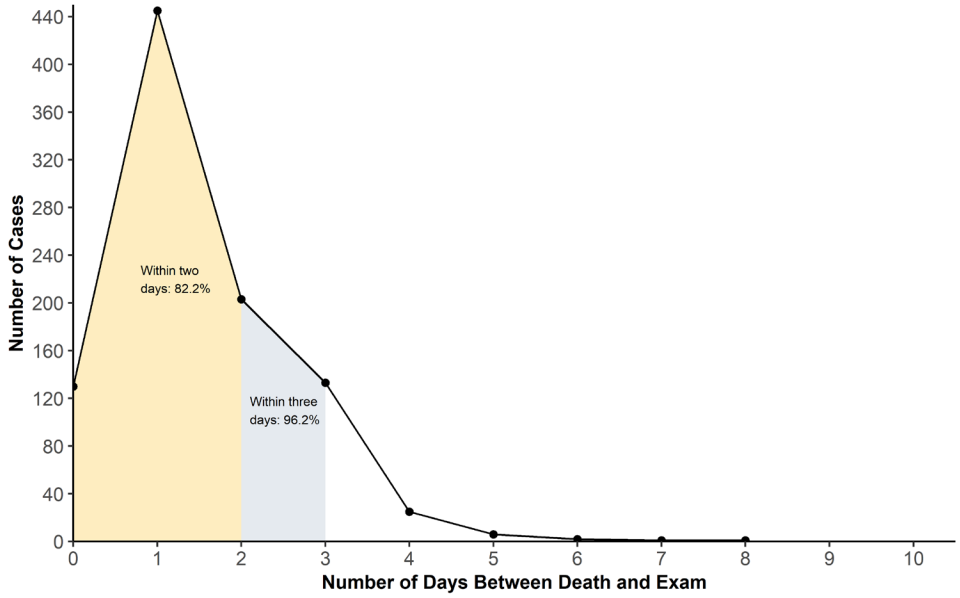
	Cremation Permit	Jurisdiction Declined	Jurisdiction Accepted				Total Number Reported to RFC
			Full Autopsy	External Exam	Limited Exam	Record Review	
Andrea Orvik, MD	347	210	155	58	1	23	794
Emilie Cook, DO	405	344	219	100	2	14	1084
Ellen Wallen, MD	108	175	120	57	4	7	471

Table 14. Average Pathologist Turnaround Time by Autopsy/Exam Type in 2022

	Full Autopsy		External Exam		Limited Exam	
	Average Days	Percentage of Available Cases	Average Days	Percentage of Available Cases	Average Days	Percentage of Available Cases
Andrea Orvik, MD	21.2	85.2	20.7	36.2	21	100
Emilie Cook, DO	23.3	86.8	23.5	52	28	100
Ellen Wallen, MD	23.4	95	24.3	45.6	N/A	0

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, 82.2% of autopsies and exams are completed within two days of the date of death, and 96.2% are completed within three days, as shown in Figure 19.

Figure 19. Number of Days Between Death and Exam or Autopsy in 2022



Finally, we consider activities performed by the medicolegal death investigators. Table 15 shows the actions completed for each investigator and administrator working at WLJFC in 2022.

Table 15. Activities Completed by Investigators and Staff in 2022

			Jurisdiction Accepted			
	Cremation Permit	Jurisdiction Declined	Sent to Facility : Storage	Sent to Autopsy Facility	Record Review	Total Number Reported to RFC
Investigators						
Kevin Brown, F-ABMDI	92	161	7	206	10	476
Katrina Kokko, D-ABMDI	43	151	9	195	11	409
Laura Scala, D-ABMDI	69	118	6	138	6	337
Amber Zeigler, D-ABMDI	95	173	4	211	15	498
Tiffany Gasperson, D-ABMDI	58	112	3	161	7	341
Staff						
Laura Parsons, F-ABMDI	7	73	7	37	1	125
Penny Rutledge	17	0	0	0	0	17
Jennifer Poux	236	0	0	0	0	236
Miranda Roberts	297	0	0	0	0	297

Report prepared by:

Laura Beth Parsons, F-ABMDI
Director of Operations
William L. Jenkins Forensic Center
(423) 439-6788
parsonsl@etsu.edu

Molly Golladay
Epidemiologist II
Tennessee Office of the State Chief Medical Examiner
(615) 339-3163
molly.golladay@tn.gov