Tazewell County Mortality Report

2023

This report focuses on the leading causes and rates of death among Tazewell County residents.

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Table of Contents

Executive Summary

The 2023 Tazewell County Mortality Report intends to outline the leading causes of death among Tazewell County residents and their contributing factors. The report outlines data on the number of deaths, death rates, and trends by age, sex, race, geography, and cause of death. This information is valuable as it informs public health policy and prevention efforts.

Key Findings

- In 2023, a total of 1,538 deaths were registered among Tazewell County residents. This decreased by 119 deaths compared to 2022 at 1,657.
- The age adjusted death rate was 976.75 per 100,000 people. This decreased by 52.02 compared to 2022.
- The median age at death was 77 years.
- The top 5 leading causes of death in 2023 were:
    1. Cardiovascular Disease
    2. Cancer
    3. Dementia
    4. Respiratory Disease
    5. Accidental Deaths

Key Terms

- Crude Death Rates: Defined as the total number of deaths divided by the midyear population within a specific geographic area (i.e., county, zip code). Crude death rates are calculated in this report for specific age ranges; these are called age-specific death rates because they are a ratio of the number of deaths in each age group to the population of that age group.
- Age Adjusted death rates: These rates are based on population estimates and are standardized to remove any bias that could appear when comparing populations with varying age structures.
- Years of Potential Life Lost: Total years of life lost prior to age 75. Years of potential life lost (YPLL) measures premature mortality in a population. In other words, the higher the YPLL, the more people there are in the population who are dying prematurely (which is estimated to be before age 75).
- Any cell in a table denoted with * indicates data that is suppressed due to being fewer than 10 deaths. Data suppression exists to protect the identities of decedents who could be identified in a small grouping.

Overall Mortality

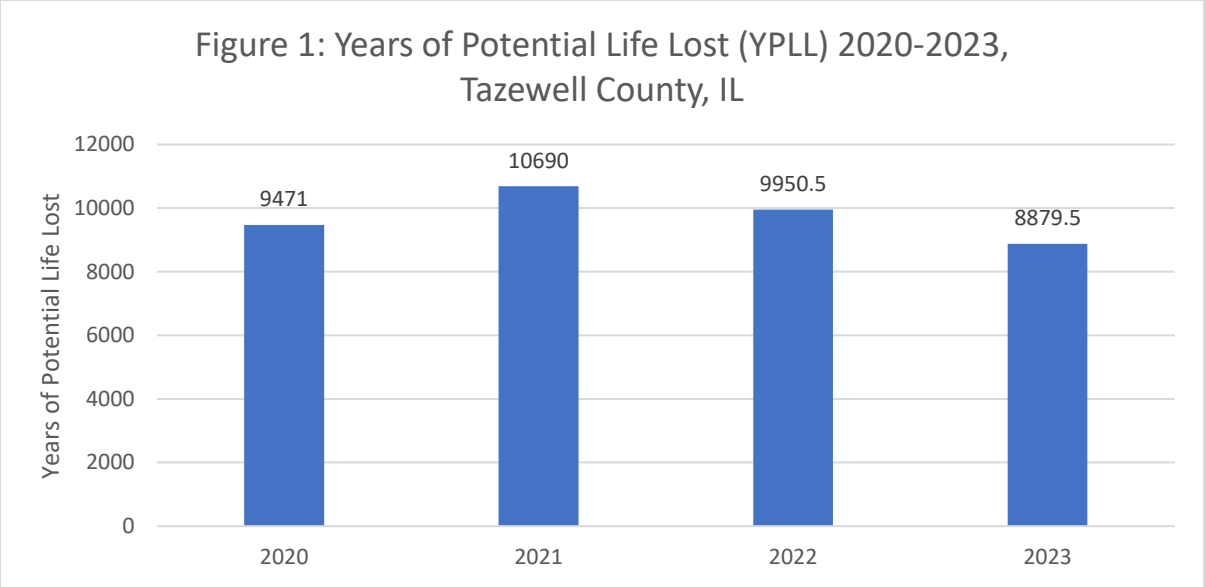
Summary

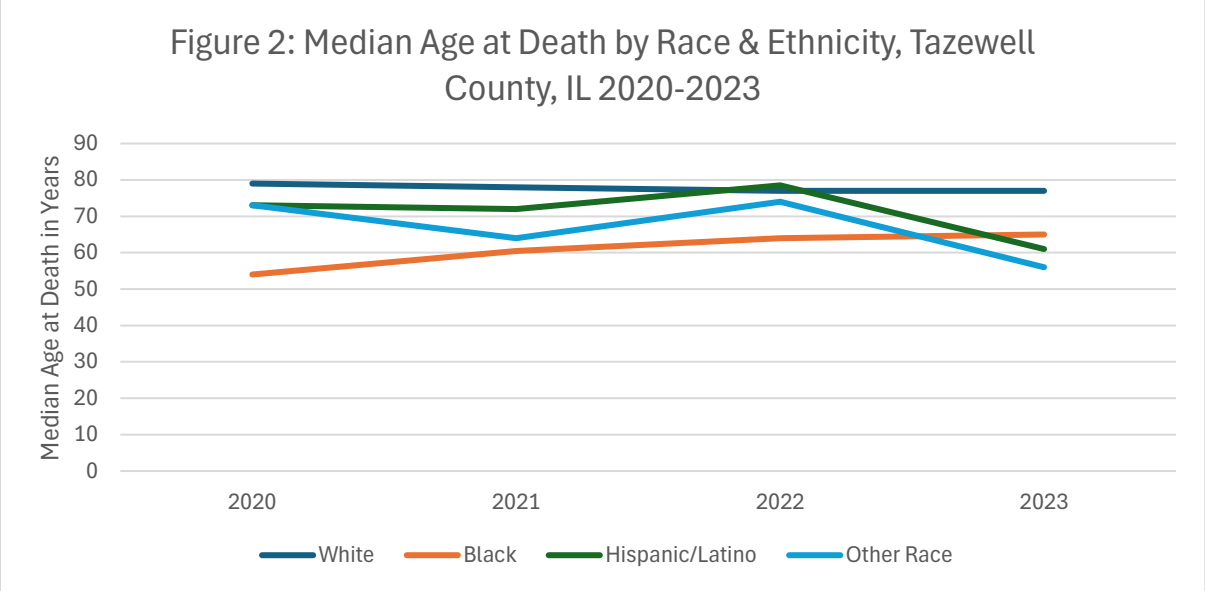
In 2023, the Illinois Vital Records System indicated a total of 1,538 deaths among Tazewell County residents. The crude death rate for 2023 was 1,187.3 deaths per 100,000 people with an age-adjusted death rate of 976.75 per 100,000 people. Of the total deaths, 48.9% were male; females accounted for 51.1% of all deaths (Table 1). The total years of potential life lost (YPLL) was 8,879.5 years. This decreased 1,071 years compared to 2022. The continued decrease in YPLL from 2021 to 2023 likely illustrates the normalization of Tazewell County's mortality data following the impact SARS-CoV-2 had on mortality data and healthcare delivery in 2020 and 2021 (Figure 1).

The overall median age at death was 77 years, meaning half of Tazewell County deaths in 2023 were greater than or equal to 77 years of age, which is lower than in previous years. The median age at death for women is 79 compared to 75 among their male counterparts (Table 1, Figure 2). In other words, women who are residents of Tazewell County are more likely to live longer than their male counterparts. Additionally, whites have a higher cumulative median age at death of 78 compared to 65 years among their Black counterparts (Table 1, Figure 2). The median age at death for Asian, native American, or multi-racial backgrounds is 56 years old, which suggests that individuals of non-white racial or ethnic backgrounds have a lower life expectancy than their white counterparts. This racial group will be categorized as "Other Race" for the remainder of this report. White individuals accounted for 99.4% of all deaths in 2023, while Blacks/African American individuals accounted for 0.65% of deaths, individuals identifying as Hispanic or Latino accounted for 0.39% of deaths, and individuals of other racial backgrounds made up 0.33% of total deaths. The lower life expectancy for non-white racial and ethnic groups is not a significant disparity given the low amount of Black, Hispanic and Latino, and other races deaths in Tazewell County in 2023; however, it is a trend to keep an eye on in future mortality reports.

Table 1. All Causes – Count, Median Age, & Crude Death Rate (per 100,000) by Sex and Race, Tazewell County, Illinois, 2023.

	Count	Median Age	Crude Death Rate
Overall Population	1,538	77	1,187.3
Male	752	75	1,176.0
Female	786	79	1,198.2
White	1529	77	1,272.7
Male	810	77	1,366.6
Female	827	77	1,358.6
Black/African American	10	65	546.4
Other Race	*	56	333.6
Hispanic and Latino	*	61	178.8





Mortality Disparities

Health disparities are defined by the Centers for Disease Control and Prevention (CDC) as a health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group, religion, socioeconomic status, sex, age, geographic location, or other characteristics historically linked to discrimination or exclusion.

Social drivers of health (SDOH) will also be discussed in this report. SDOH are conditions in the environment where people are born, live, work, play, learn, worship, and age that affect health and their quality of life. Some examples of these are poverty, education, and access to health care; all of which are linked to the development of chronic disease. Thus, the identification of SDOH in Tazewell County is

critical to inform public health efforts with the overarching goal of preventing unnecessary morbidity and mortality.

In this report, SDOH will be evaluated in the following ways: place, age, and sex. Analyses will not be available by race and ethnicity because of the small number of deaths in different racial and ethnic groups. Conducting such analyses with a small, non-significant sample size could misrepresent the actual impacts SDOH have on those groups.

Analyses by place or geography are traditionally done by zip code. Because of the small death counts in some Tazewell County zip codes, the county will be evaluated based on regions (Table 2).

Table 2. Regional Groupings of Tazewell County, IL

Region	**Zip Codes included in the region**	**Number of Deaths in each region**	**Population**
Northern Region	61610, 61611, 61571	591	52,814
Eastern Region	61550, 61755, 61568, 61733	271	28,470
Southern Region	61534, 61734, 61747, 61759, 61721	93	7,792
Western Region	61564, 61546, 61554, 61535	580	47,371

Figure 3. Map of Tazewell County with regions.

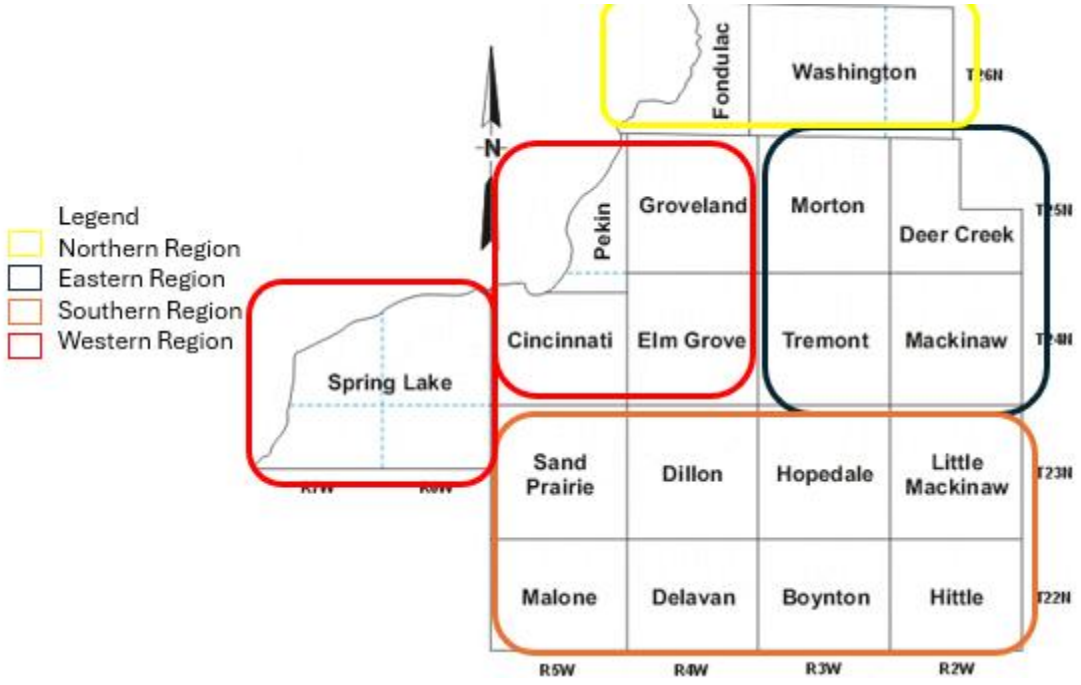
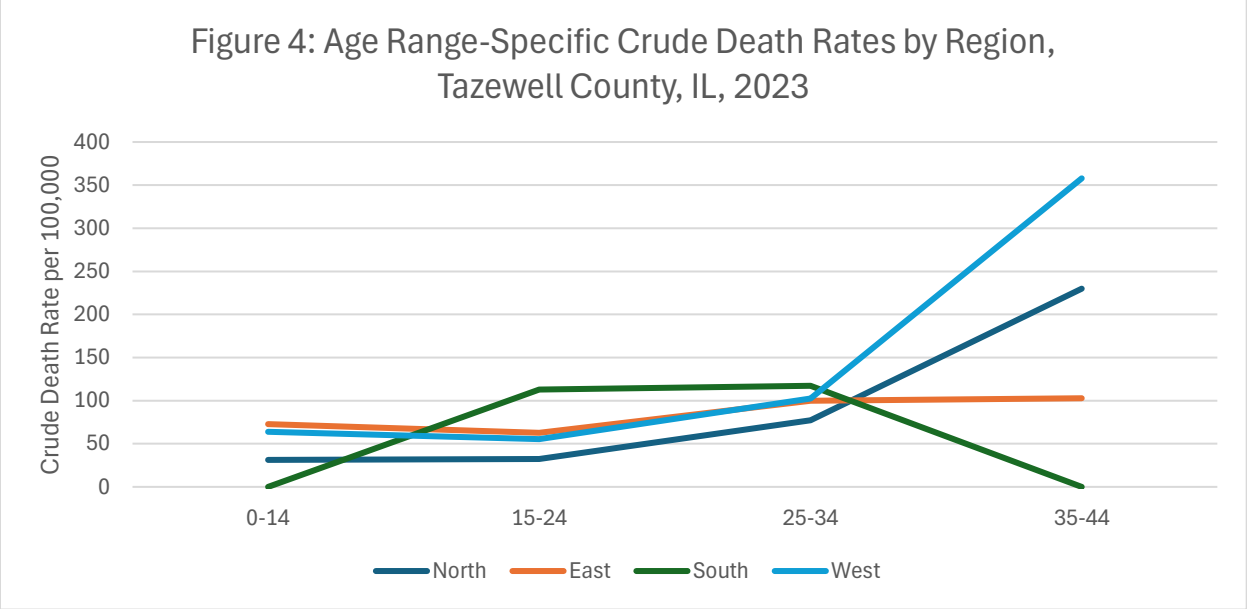


Table 3, Figure 4, and Figure 5 show the crude death rate by age for each region of Tazewell County. The eastern region of the county has higher mortality rates among individuals under 15 years, when compared to the rest of the county. The southern region of the county has the highest crude mortality rate for individuals aged 15-24 years. The western region has the highest mortality rates among individuals ages 35-44, which could be attributed to the high number of accidental deaths that occurred in that region in 2023. Additionally, the northern and western regions of the county have similar crude death rates for the 45-54 and 65-74 age groups. It is also worth noting that the northern and western regions of the county have significantly higher population counts than the eastern and southern regions.

Table 3. Age-Range Specific Crude Death Rates per 100,000 by Region, Tazewell County, IL, 2023

Age Range	Northern Region	Eastern Region	Southern Region	Western Region
0-14	31.3	72.8	0	63.9
15-24	32.3	62.7	112.9	55.4
25-34	77.3	99.9	117.3	102.6
35-44	229.9	102.8	0	357.8
45-54	386.0	245.8	438.1	340.0
55-64	719.9	910.5	828.0	888.5
65-74	2,134.3	1,538.9	1,927.7	2,696.9
75 and older	8,547.4	6,415.7	7,533.4	8,409.7



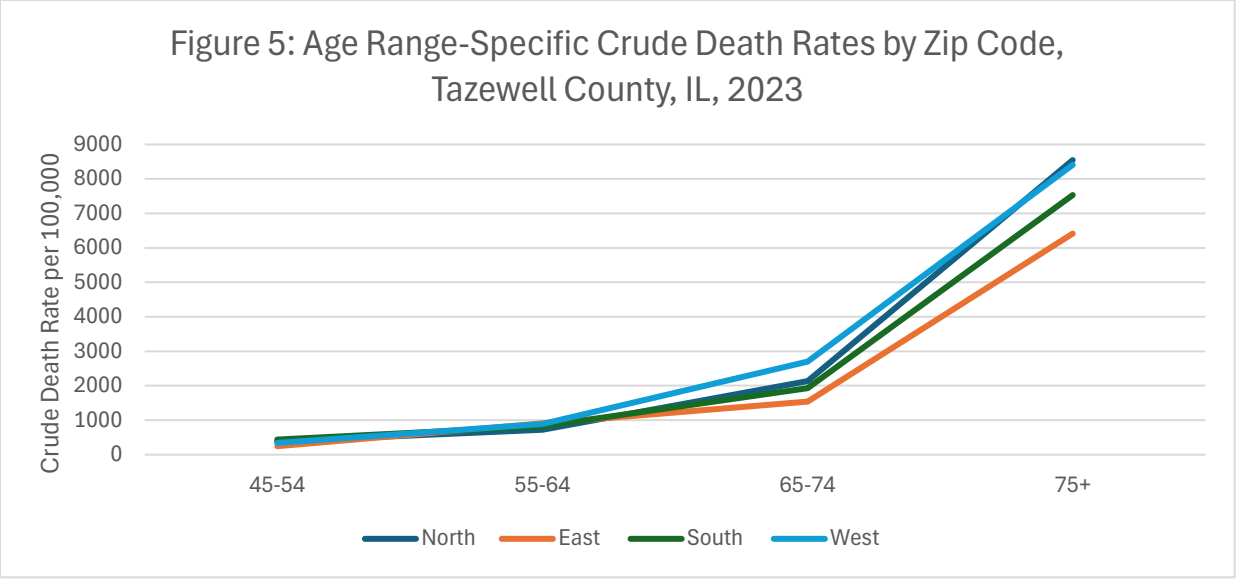
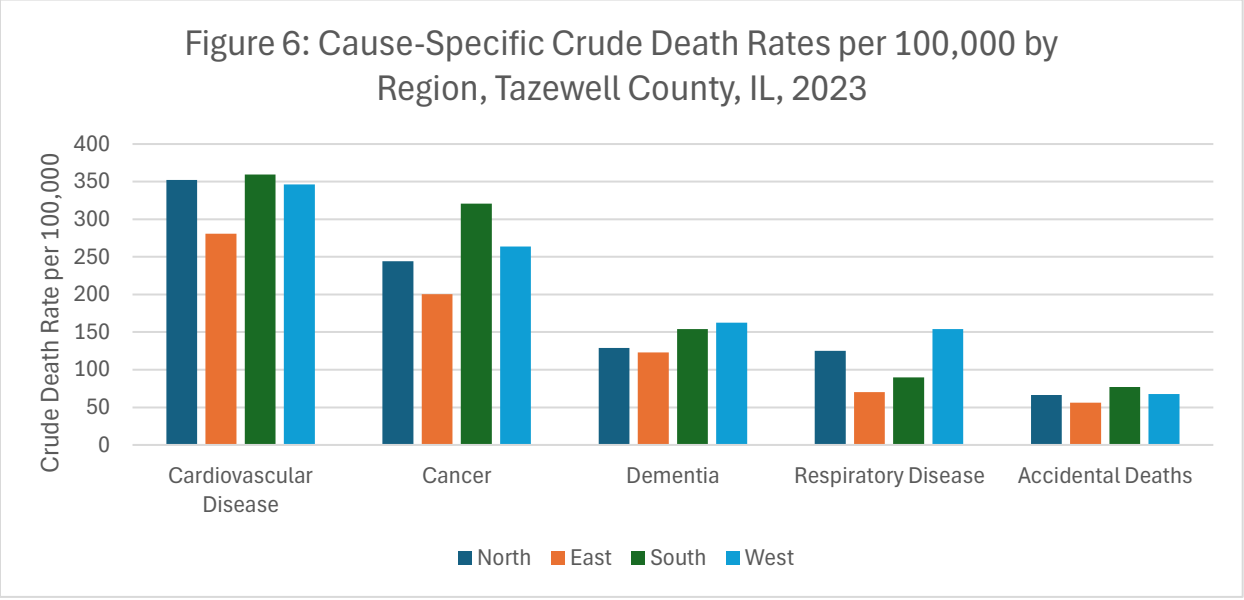


Table 4 and Figure 6 show the crude death rates for the five leading causes of death in Tazewell County by region. Cardiovascular disease, cancer, and accidental deaths are the most prevalent in the southern region. Respiratory disease and dementia are the most prevalent in the western region in the county.

Table 4. Cause-Specific Crude Death Rates per 100,000 by Region, Tazewell County, IL 2023

Cause of Death	Northern Region	Eastern Region	Southern Region	Western Region
Cardiovascular Disease	352.2	280.99	359.3	346.2
Cancer	244.3	200.2	320.8	263.9
Dementia	128.8	122.9	154.0	162.5
Respiratory Disease	124.96	70.2	89.8	154.1
Accidental Deaths	66.3	56.2	77.0	67.6



Mortality by Leading Causes

Summary

The leading causes of death by count among Tazewell County residents in 2023 were heart disease, cancer, dementia, respiratory disease, and accidental deaths (Table 5). Specific leading causes of death by age range are provided in Table 6.

The causes of death outlined in Tables 5 and 6 are grouped based on ICD-10 codes. Cardiovascular disease (also called heart disease) includes conditions such as myocardial infarction (heart attack), coronary artery disease, peripheral vascular disease, congestive heart failure, stroke, and cardiac arrhythmias. Dementia includes dementia of all types including Alzheimer's Disease, Lewy Body Dementia, and Parkinson's Disease. The grouping of respiratory disease includes chronic lower respiratory conditions such as chronic obstructive pulmonary disease (COPD), emphysema, and acute conditions such as respiratory failure and pneumonia. Additionally, the grouping of accident/injury includes deaths relating to substance use (illicit substances, alcohol-related deaths, and prescription medication overdoses), motor vehicle accidents, and deaths directly related to trauma (i.e. falls, drownings, etc.)

The leading causes of death are similar to what they have been in previous years; however, dementia has risen from the fifth leading cause of death to the third leading cause of death. Interestingly, cardiovascular disease, cancer, and respiratory disease related deaths are equally distributed by sex. Accidental deaths, dementia related deaths, and deaths related to suicide are not equally distributed by sex. Disparities by sex, age, or race/ethnicity will be identified further and discussed in the following sections.

Table 5. Leading Cause of Death – Count (%), Overall and by Sex, Tazewell County, IL, 2023

Leading Cause	Overall	Sex	
		Male	Female
All Deaths	1538	752	786
Cardiovascular Disease	458 (29.8%)	227	231
Cancer	337 (21.9%)	162	175
Dementia	192 (12.5%)	78	114
Respiratory Disease	167 (10.9%)	77	90
Accident/Injury	89 (5.8%)	60	29
Gastrointestinal Disease	58 (3.8%)	30	28
Renal Failure	44 (2.9%)	21	23
Suicide	14 (0.91%)	10	*

Leading Cause of Death by Age

When stratified by age, the leading causes of death differ. The leading cause of death among Tazewell County residents between the ages of 25-44 in 2023 is related to substance use. Deaths relating to

substance use and motor vehicle accidents account for over 60% of the deaths in young people aged 15-34 in Tazewell County.

The deaths related to substance use were the leading cause of death among individuals ages 25-34; this definition includes all substances including alcohol, prescription medications, opioids, illicit drugs, etc. **3 out of 4 deaths among this age group in 2023 were related to substances.** Additionally, about 1 in 15 deaths among individuals ages 25-34 were deaths by suicide. This illustrates the continued need for substance use prevention efforts, suicide prevention efforts, and increased access to behavioral health care in Tazewell County.

Cancer and heart disease remain the leading causes of death among individuals 45 years of age and older. Comparatively to 2022, the prevalence of heart disease related deaths has increased significantly. **In the following age groups 45-54- and 55-64-years heart disease related deaths have doubled in a year's time (Figures 7, 8).** Respiratory disease has also increased significantly in the 45-54, 55-64, and 65-74 age groups (Figures 7, 8, 9). Research shows that respiratory diseases, such as chronic obstructive pulmonary disease (COPD), are independently associated with cardiovascular diseases, specifically heart failure.[1] This illustrates the need for community health programming for adults surrounding the healthy habits both the Centers for Disease Control and Prevention (CDC) and American Heart Association (AHA) state prevent heart disease, which includes choosing healthy food and drinks, keep a healthy weight, get regular physical activity, and stopping tobacco use.[2,3]

Among individuals 75 years and older, dementia accounts for 17% of deaths. The increase in the prevalence of dementia, the capacity of long term care facilities, the impact dementia can have on caregivers, and dementia's subsequent mortality is an issue of public health significance and should continue to be monitored.

When comparing the leading causes of death by age from 2021 to 2023, COVID-19, alone, is no longer present in the top 10 leading causes of death in Tazewell County. An additional concern that is resulting in mortality among individuals 55 years and older is ground level falls; falls accounted for 37 deaths in that age range in 2023. Additionally, in 2022, falls were not a significant cause of death in individuals between ages 55-64 years; however, in 2023, it accounted for 3.2% of deaths in that age group. Additionally, as medical complexity and chronic disease become more prevalent in younger age groups, an increase in falls would be expected. This illustrates an opportunity to increase fall prevention education in Tazewell County.

Table 6. Leading Causes of Death (% of total deaths within age category) by Age Range, Tazewell County, IL, 2023

RANK	Age Range							
	0-14	15-24	25-34	35-44	45-54	55-64	65-74	75+
1	Congenital Abnormalities & Prematurity (53.8)	Accidental Deaths (25)	Substance Use Related (73)	Substance Use Related (45.2)	Cancer (31)	Heart Disease (47)	Heart Disease (28.5)	Heart Disease (32)
2	Blunt Force Trauma (15.4)	Cancer (25)	Lung Disease (13)	Cancer (14.3)	Heart Disease (27.6)	Cancer (23)	Cancer (27.3)	Cancer (18.3)
3	Asphyxia (15.4)	Heart Disease (25)	Suicide (6.7)	Heart Disease (14.2)	Substance Use Related (13.8)	Lung Disease (18.4)	Lung Disease (15.6)	Dementia (17.4)
4	Heart Disease (15.4)	Suicide (12.5)	Motor Vehicle Accident (6.7)	Motor Vehicle Accident (7.1)	Lung Disease (12.1)	Liver Disease (3.9)	Dementia (5.5)	Lung Disease (10.8)
5		Infectious Disease (12.5)		Lung Disease (4.8)	Suicide (3.4)	Falls (3.3)	Renal Disease (2)	Renal Disease (3.1)
6				Suicide (2.4)	Motor Vehicle Accident (3.4)	Renal Disease (2.6)	Falls (2)	Falls (2.8)
7				Infectious Disease (2.4)				
Total Number of Deaths	13	8	15	42	58	152	347	909

Figure 7: Age Range 45-54 Years: Leading Causes of Death (% of total deaths within age category) Over Time, Tazewell County, IL, 2021-2023

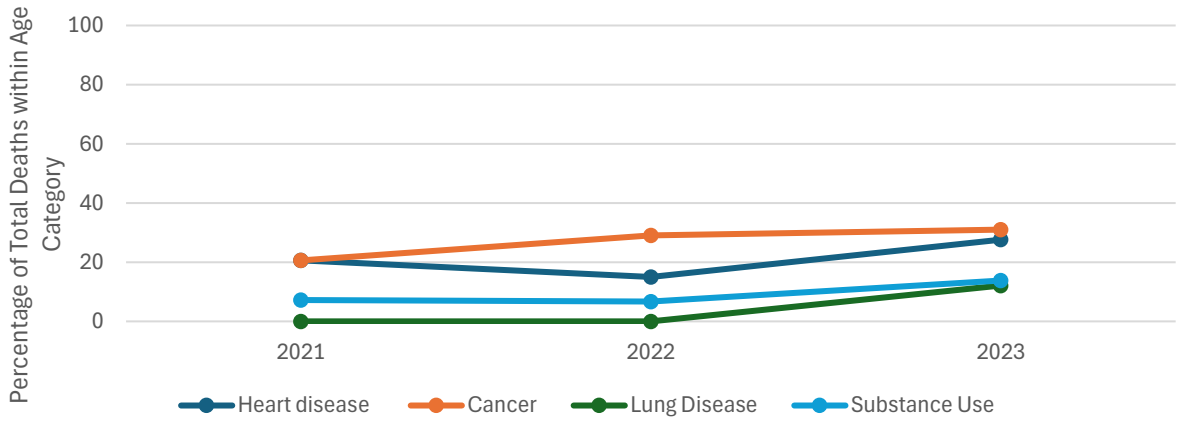


Figure 8: Age Range 55-64 Years: Leading Causes of Death (% of total deaths within age category) Over Time, Tazewell County, IL, 2021-2023

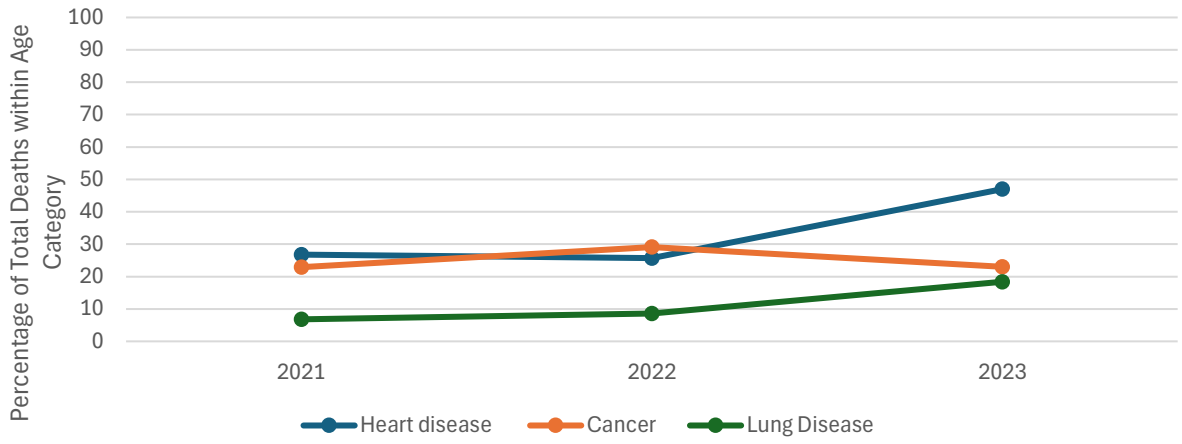
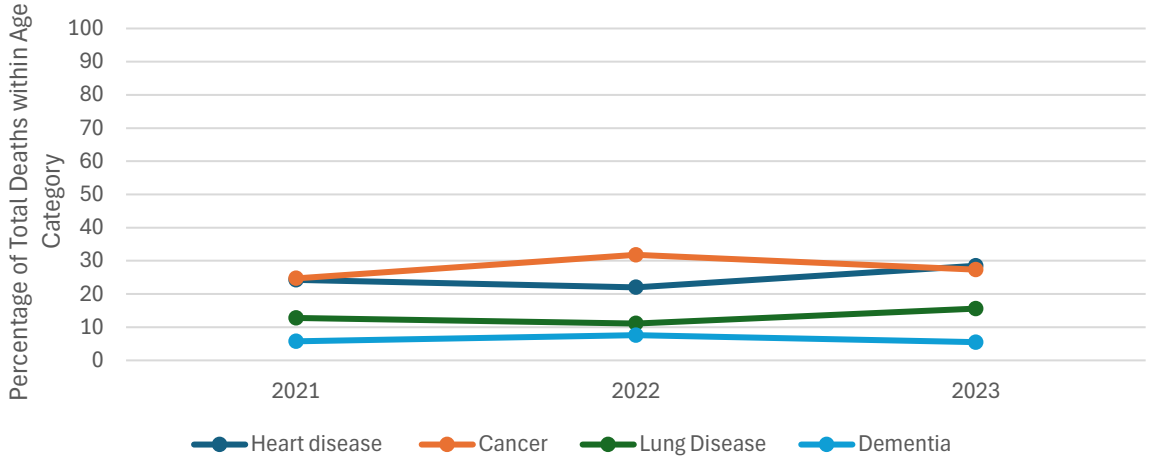


Figure 9: Age Range 65-74 Years: Leading Causes of Death (% of total deaths within age category) Over Time, Tazewell County, IL, 2021-2023



Contributing Factors

Contributing factors are conditions that may directly increase the risk for death and are obtained from individual death certificates. Table 7 provides information on 6 different factors that contributed to deaths of Tazewell County residents in 2023. The column labeled COPD consists of cases where COPD was not the primary cause of death, but played a role, because those cases would not have been included in the deaths due to respiratory disease.

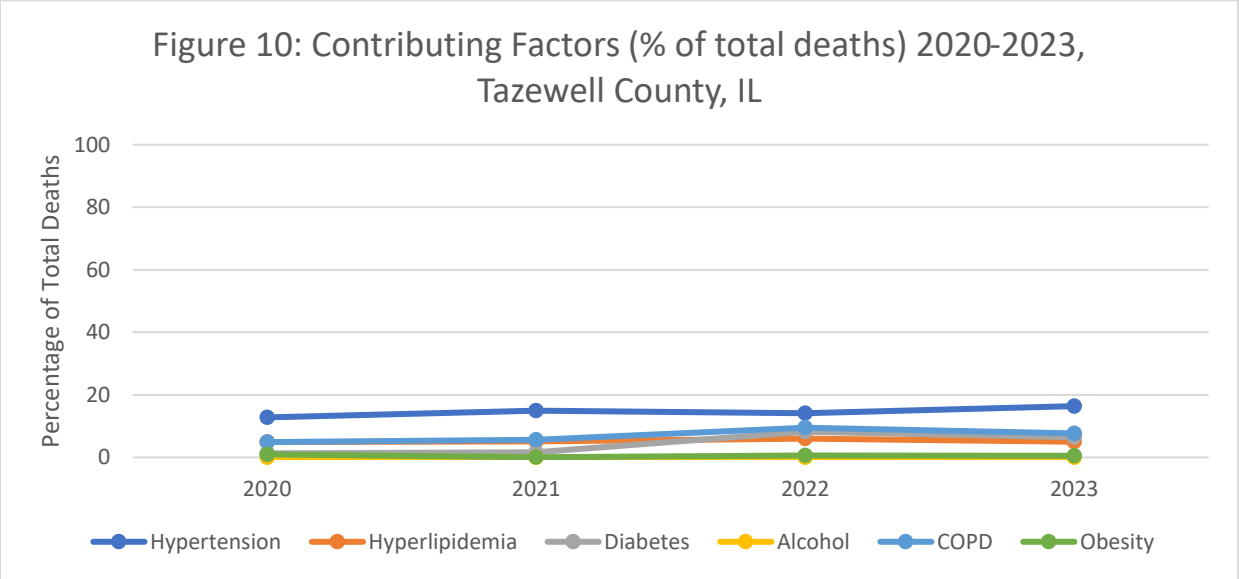
Hypertension, also known as high blood pressure, and hyperlipidemia, also known as high cholesterol, are known risk factors for heart disease and cancer. Hypertension was the most prevalent risk factor found in individuals over the age of 45. Like 2022's mortality report, this correlates with the increase in heart disease and cancer-related deaths in older age groups. COPD was the second most prevalent contributing factor. Studies show that individuals with COPD are more susceptible to viral respiratory infections and viral-induced exacerbations of COPD commonly caused by influenza, rhinoviruses (common cold), and

SARS-CoV-2.[4] Further, the incidence of hospitalization and disease severity in patients with a known chronic disease of the respiratory tract (i.e. emphysema, COPD) are much higher in patients with COVID-19 than with other seasonal respiratory viruses.[4] This serves as a probable explanation for the increase in deaths involving COPD. The prevalence of Type 2 Diabetes remains elevated compared to previous years. According to the Centers for Disease Control and Prevention (CDC), the United States has experienced a 3% increase in type 2 diabetes prevalence since 2004; given the data in Table 7, Tazewell County mortality data also reflects that increase.[5]

From a public health perspective, this data highlights the importance of preventing the development of high blood pressure and high cholesterol, as well as managing the conditions with medication and lifestyle changes as necessary.

Table 7. Contributing Factors – Count (%), Overall, Sex, Race, and Age (per 100,000) Tazewell County, IL 2023

	Hypertension	**Hyperlipidemia**	**Diabetes**	**Alcohol**	**COPD**	**Obesity**
Overall	253	77	100	*	119	*
Percentage of total deaths	16.4%	5.0%	6.0%	0	7.7%	0.5%
Male	127	39	51	*	52	*
Female	115	38	49	0	67	*
Age Group						
0-14	0	0	0	0	0	0
15-24	*	0	0	0	0	0
25-34	0	0	0	0	0	0
35-44	*	*	*	0	*	0
45-54	*	*	*	0	*	*
55-64	34	*	13	0	18	*
65-74	56	19	27	0	34	*
75 and older	156	49	57	*	64	0



Cardiovascular Disease

Cardiovascular Disease was the leading cause of death in 2023 accounting for 29.8% of deaths among Tazewell County residents. The median age at death was 79 years, which decreased by two years compared to 2022**; thus, younger individuals are dying of cardiovascular disease in Tazewell County than in previous years.** This can be visualized in Figures 7-9, which shows increase in cardiovascular disease in the 45-54, 55-64, and 65-74 age groups. The crude death rate was 353.6 deaths per 100,000 (Table 8). Heart disease deaths are evenly distributed by sex. However, the median age at death for males dying of heart disease is 8 years younger than their female counterparts. **Further, the median age at death for males has decreased from 83 years in 2022 to 76 years in 2023, which is a significant difference of 7 years.** Table 8 also shows the prevalence of heart disease by age group; noticeably, heart disease-related mortality is most prevalent in individuals aged 55 and older. It is important to correlate the prevalence of heart disease with the contributing factors discussed in the previous section (Figure 10, Table 7). As risk factors such as hypertension, hyperlipidemia, diabetes, obesity, and COPD become more prevalent in younger age groups, the crude death rates for cardiovascular disease will become increased in the younger age brackets.[6]

Table 8. Cardiovascular Disease – Count, Median Age, & Crude Death Rate (per 100,000) by Sex & Age. Tazewell County, IL, 2023.

	Count	Median Age	Crude Death Rate
Overall Population	458	79	353.6
Male	227	76	355.0
Female	231	84	352.2
Age Group			
0-14	*	[redacted]	8.98
15-24	*		13.0
25-34	0		0
35-44	*		17.3
45-54	*		53.44
55-64	54		320.7
65-74	99		666.62
75 and older	291		2,571.1

Table 9 shows the types of cardiovascular disease that are the most prevalent in the deaths of Tazewell County residents in 2023. Congestive Heart Failure (CHF) has numerous types, which are all included in this definition; CHF is defined by the American Heart Association as a chronic, progressive condition in which the heart muscle is unable to pump enough blood to meet the body's needs for blood and oxygen.[7] CHF is the second most common type of heart disease deaths in 2023. The third most prevalent type of heart disease in 2023 was coronary artery disease (CAD), which accounted for 16.8% of heart disease deaths. CAD occurs when plaque (a combination of fat, cholesterol, calcium, and other substances in the blood) builds up in the arteries of the heart; this reduces the amount of oxygen-rich blood getting to the heart.[7] CAD is the precursor to myocardial infarction (MI), also known as a heart attack. Thus, it is interesting that in Tazewell County, the prevalence of both CAD and MI deaths are similar.

Table 9 also includes strokes (also known as cerebrovascular accidents) and cerebrovascular disease (CVD), which is the precursor to a stroke. Strokes and CVD cause impact on the functioning of the nervous system; however, stroke and CVD occur because of disease in the cardiovascular system that results in the improper delivery of oxygen-rich blood to the brain. Thus, they are included in this section. Additionally, stroke and CVD are analogous to MI and CAD in their pathology; the differentiating piece is the organ impacted. Stroke and CVD impact the brain, whereas MI and CAD impact the heart. Additionally, the contributing factors of stroke and CVD are identical to heart disease and are listed in Table 7. **Stroke and CVD are the most prevalent cause of cardiovascular disease related death in Tazewell County in 2023.** Early identification of CVD and proper management can reduce subsequent mortality or the development of a stroke.

Arrhythmias, or irregular heartbeat, account for almost 7% of cardiovascular disease related deaths. Interestingly, atrial fibrillation is the most common arrhythmia listed on death certificates (81%). Atrial fibrillation is documented to cause an irregular and rapid heart rhythm that can result in blood clots. Further, untreated atrial fibrillation doubles an individual's risk of heart-related death and is associated with a fivefold increased risk of stroke.[7] Thus, delineating the type of arrythmia and ensuring proper management of it is relevant to reducing cardiovascular disease mortality.

Table 9. Leading Causes of Cardiovascular Disease Deaths – Count & Percent of Deaths, Tazewell County, IL, 2023

Type of Cardiovascular Disease	Count	Percent of Cardiovascular Disease Deaths
Congestive Heart Failure (CHF)	93	20.31%
Myocardial Infarction (MI)	77	16.8%
Coronary Artery Disease (CAD)	77	16.8%
Stroke/Cerebral Vascular Disease	98	21.4%
Arrythmia	32	6.98%

Cancer

Cancer was the second leading cause of death in 2023; this accounted for 21.9% of deaths among Tazewell residents. The median age at death was 74 years, which is 3 years younger than the median age at death for all deaths in 2023. Therefore, a cancer diagnosis lowers Tazewell County residents' life expectancy. Females make up 50.8% of cancer deaths and males make up the remaining 49.2% (Table 10).

Table 10. Cancer – Count, Median Age, & Crude Death Rate (per 100,000) by Sex & Age. Tazewell County, IL, 2023.

	Count	Median Age	Crude Death Rate
Overall Population	337	74	260.15
Male	162	75	253.3
Female	175	73	266.8
Age Group			
0-14	0	[redacted]	0
15-24	*		13.0
25-34	0		0
35-44	*		34.6
45-54	20		118.8
55-64	50		296.9
65-74	95		639.7
75 and older	166		1,466.7

Table 11 illustrates the different types of cancer that contributed to the total number of cancer deaths. Lung cancer was the leading type of cancer with 81 deaths (24.0% of total cancer deaths). In other words, 1 in 4 cancer deaths are related to lung cancer. Lung cancer causes a significantly higher amount of cancer deaths when compared to its counterparts. Lung cancer, colorectal cancer, pancreatic cancer, and breast cancer make up the top 4 causes of cancer death, respectively. **Deaths related to colorectal cancer increased by 200% in a year's time**. Additionally, the category of female reproductive tract includes cervical, ovarian, uterine, endometrium, and fallopian tube cancers.

Table 11. Cancer – Count & Percent of Cancer Deaths Tazewell County, IL, 2023.

Cancer Type	**Count**	**Percent of Cancer Deaths**
Lung	81	24.0%
Breast	24	7.1%
Colorectal	69	20.5%
Lymphoma	20	5.93%
Female Reproductive Tract	16	4.74%
Pancreas	26	7.72%
Prostate	15	4.45%

Dementia

Dementia accounted for 12.5% of Tazewell County deaths in 2023. Dementia is more prevalent in the Southern and Western regions of Tazewell County (Table 4). Dementia is most common among the 75 and older age group, as expected. The sex disparity among dementia deaths in Tazewell County is interesting; women are 1.5 times more likely to die of dementia when compared to their male counterparts. Studies surrounding dementia development have identified a wide variety of risk factors for dementia and a cumulative effect with increasing numbers of risk factors.[8] *Anstey et al* conducted a population based cohort study looking at the difference in sex and the likelihood to develop memory decline; the study found that depression, cognitive and physical activity were associated with memory change in older women compared to their male counterparts.[8] Further, the onset of midlife hypertension was also associated with greater memory decline in women.[8] These could be potential explanations for the sex disparity found in dementia prevalence in Tazewell County. Additionally, women in Tazewell County have a longer life expectancy than their male counterparts; thus, a valid hypothesis or potential explanation could be that females live longer than males resulting in a higher incidence of dementia.

Table 12. Dementia – Count, Median Age, & Crude Death Rate (per 100,000) by Sex & Age. Tazewell County, IL, 2023.

	Count	Median Age	Crude Death Rate
Overall Population	192	83	148.2
Male	67	82	121.9
Female	154	84	173.8
Age Group			
0-14	--	[redacted]	--
15-24	--		--
25-34	--		--
35-44	*		11.5
45-54	*		18.2
55-64	*		17.82
65-74	26		175.1
75 and older	158		1396.0

Respiratory Disease

The category of respiratory disease includes chronic lower respiratory conditions such as chronic obstructive pulmonary disease (COPD), emphysema, and acute conditions such as respiratory failure and pneumonia. Respiratory disease accounted for 167 deaths in 2023; deaths are more prevalent among females than males (Table 13).

The number of deaths caused by respiratory disease has remained stable compared to 2022. **The overall median age at death for respiratory deaths has decreased by 2 years from 2022. Thus, more individuals are dying of respiratory diseases at a younger age in Tazewell County.** Figures 7-9 illustrate this. Additionally, this mirrors the decrease in the median age at death seen in cardiovascular disease, which further illustrates the close relationship between cardiovascular disease and chronic respiratory disease.[1]

It will be important to monitor the incidence of respiratory disease deaths in correlation to the severity of respiratory illness season in future years, given the increased morbidity associated with individuals with chronic respiratory diseases and infections such as COVID-19, respiratory syncytial virus (RSV), and influenza. These illnesses are becoming more prevalent due to continued decrease in seasonal respiratory vaccination uptake among all age groups.

The leading cause of respiratory death is Chronic Obstructive Pulmonary Disease (COPD) (Table 14). COPD accounts for 48.5% of the deaths related to respiratory disease in Tazewell County in 2023. Emphysema is a type of COPD but is broken out specifically here because emphysema is primarily caused by smoking and indoor or outdoor air pollution.[9] The prevalence of deaths attributed specifically to emphysema illustrates the potential morbidity and mortality associated with tobacco use and regular exposure to pollution.

Table 13. Respiratory Disease – Count, Median Age, & Crude Death Rate (per 100,000) by Sex & Age. Tazewell County, IL, 2023.

	Count	Median Age	Crude Death Rate
Overall Population	167	77	128.9
Male	77	77	120.4
Female	90	77	137.2
Age Group			
0-14	--	[redacted]	--
15-24	*		6.52
25-34	--		--
35-44	*		11.53
45-54	*		24.29
55-64	16		95.02
65-74	45		303.01
75 and older	99		874.7

Table 14. Leading Causes of Respiratory Disease Deaths– Count & Percent of Respiratory Disease Deaths Tazewell County, IL, 2023.

Respiratory Disease Type	Count	Percent of Respiratory Disease Deaths
COPD	81	48.5%
Pneumonia	24	14.4%
Interstitial Lung Disease	17	10.2%
Emphysema	14	8.38%
Respiratory Failure	*	2.4%

Accidental Deaths

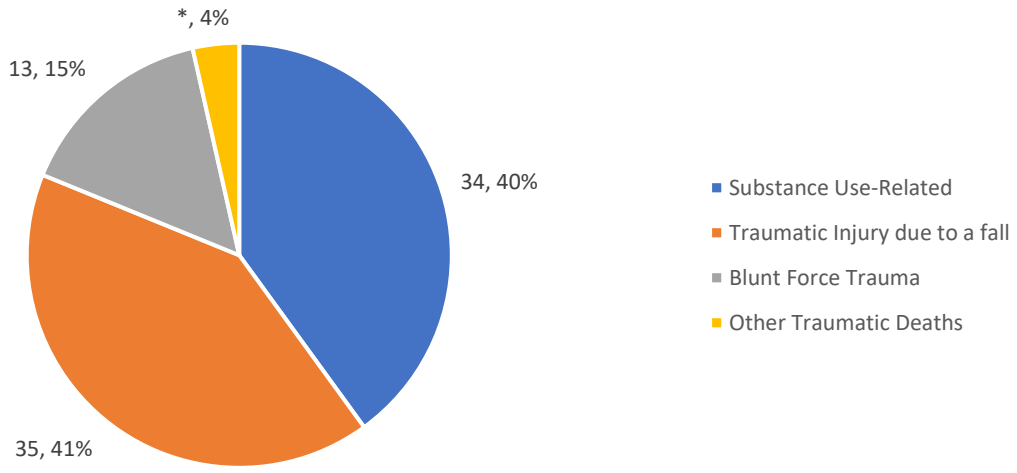
Accidental deaths include numerous subcategories including motor vehicle accidents, traumatic incidents resulting in death, and substance use-related deaths, provided there was no intent to do self-harm or cause death of another person. Table 15 shows the count, median age, and crude death rate (per 100,000) for accidental deaths in 2023. The types of death will be divided further into substance use-related deaths and

deaths related to traumatic injury. **The median age at death for all accidental deaths has decreased from 60 to 58 years in 2023.**

Table 15. Accidental Deaths – Count, Median Age, & Crude Death Rate (per 100,000) by Sex & Age. Tazewell County, IL, 2023.

	Count	Median Age	Crude Death Rate
Overall Population	89	58	68.7
Male	60	46	93.8
Female	29	85	44.2
Age Group			
0-14	*		13.5
15-24	*		13.03
25-34	12		79.5
35-44	17		97.97
45-54	*		53.45
55-64	*		35.6
65-74	12		80.8
75 and older	29		256.2

Figure 11. Count (%) Accidental Deaths by Type, Tazewell County, IL 2023



Substance Use-Related Deaths

In 2023, Tazewell County reported 34 unintentional substance use-related deaths. This is equal to the number of substance use-related deaths in 2022. Most of the substance use related deaths in 2023 were among males (85%) and 15% were females. Additionally, majority (97%) of Tazewell County overdose deaths in 2023 involved individuals who identified racially and ethnically as Non-Hispanic/Latino and White; 3% of overdose deaths involved individuals identifying as Other Race. The crude death rate for all

substances and all age groups for 2023 was 25.76 per 100,000 (Table 16). Deaths related to substance use are concentrated among individuals ages 25-74 years; the median age at death was 37 years, which is 5 years younger than in 2022. This correlates with the highest crude rates being concentrated on the 25-34 and 35-44 age groups. Further, in Table 6, substance use-related deaths are the leading cause of death for individuals 25-44 years.

Table 16. Age Range-Specific Overdose Death Counts & Crude Rates (CR) per 100,000 for all Substances by Sex, Tazewell County, IL 2023

Age Range	Total		Male		Female	
	Count	CR	Count	CR	Count	CR
Overall	34	25.76	29	44.72	*	7.62
0-14	0	--	--	--	--	--
15-24	0	--	--	--	--	--
25-34	11	72.9	*	118.8	*	26.6
35-44	13	74.9	11	120.99	*	24.2
45-54	*	42.5	*	71.7	*	12.4
55-64	*	11.9	*	24.9	--	--
65-74	*	6.7	*	14.6	--	--
75 and older	0	--	--	--	--	--

Table 17 illustrates the different substances and mixtures of substances that were involved in deaths in 2023. Fentanyl is a synthetic opioid that is manufactured for the legal treatment of pain; it is also produced illicitly and is sold through illegal drug markets for its heroin-like effect. Fentanyl is often an adulterant or mixed in with other substances with or without the user's knowledge. Fentanyl is like morphine but 50-100 times more potent, hence its high prevalence in substance use-related deaths. **In 2023, fentanyl was involved in 65% of substance use-related deaths among Tazewell County residents.**

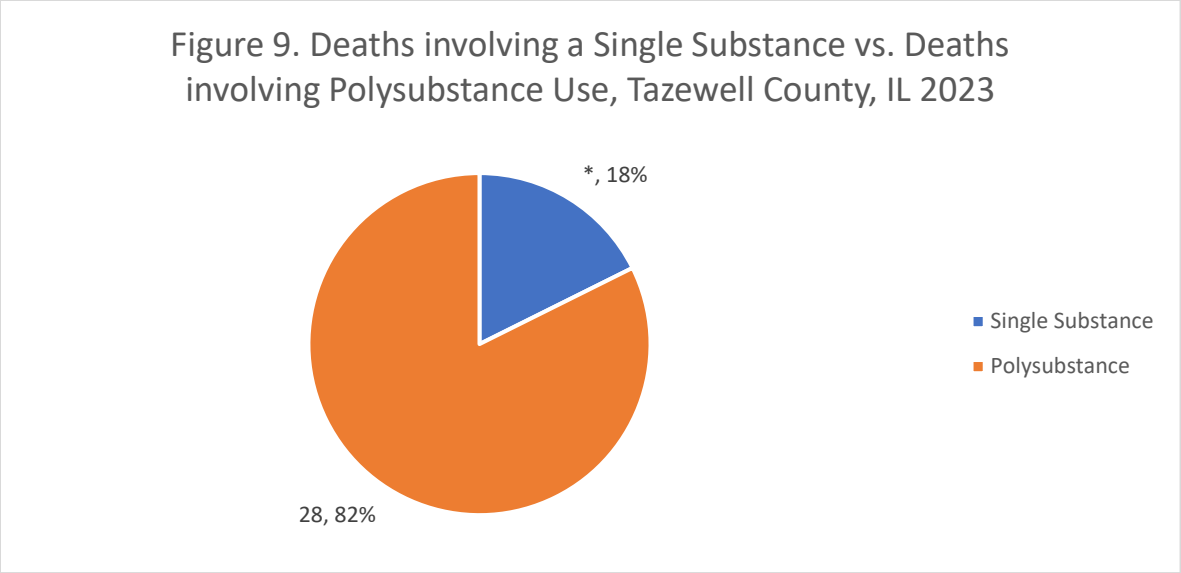
Xylazine is a medication commonly used in veterinary medicine to tranquilize or sedate animals. Xylazine is not approved for use in humans and is increasing in the illicit drug supply in the United States. Xylazine is life-threatening to humans when paired with opioids like fentanyl because xylazine will not respond to an opioid antagonist like naloxone; thus, the sedating effect, respiratory depression, and depression of the central nervous system cannot be reversed. **Compared to 2022, Xylazine-related deaths have increased by 200%.** This supports the continued need for harm reduction items like xylazine test strips and receiving information from agencies that conduct drug checking.

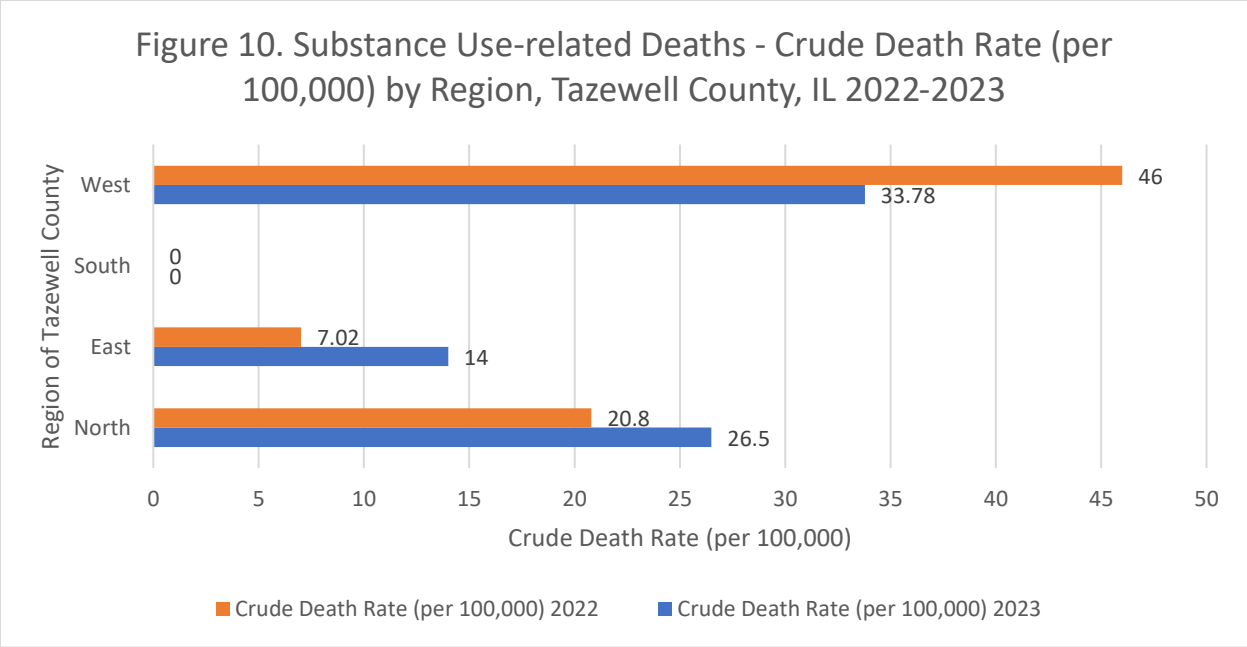
Mitragynine (also known as kratom) is an opioid receptor agonist, meaning that it is a substance that binds to and activates opioid receptors in the central and peripheral nervous system and is a naturally occurring compound.[10] It is produced by a plant, *Mitragyna speciosa,* that is naturally found in Southeast Asia. The plant has been advertised as "a safe treatment for opioid dependence as well as opioid withdrawal symptoms."[11] Currently, kratom is not a scheduled drug in the United States and can be legally acquired and consumed in most states.[11] Kratom was involved in 18% of substance use-related deaths in Tazewell County in 2023; this is an emerging trend that needs to be monitored closely. In 2023, the kratom-related fatality rate for Tazewell County (3.81 per 100,000) is about 10 times higher than the rate for the entire state of Illinois (0.38 per 100,000).[12] For additional information on kratom and kratom deaths, please see the literature review in Appendix A.

Table 17. Count & Crude Rate (per 100,000) of Substance Use-related deaths by substance type, Tazewell County, IL 2023

	Count	**Crude Rate (per 100,000)**
Fentanyl-related*	22	16.98
Xylazine-related*	6	4.63
Mitragynine*	6	4.63
Any Opioid (i.e. heroin, hydrocodone) *	25	19.3
Methamphetamine-related*	17	13.1
Cocaine-related*	3	2.32
Alcohol-involved*	4	3.09
*Denotes that each of these substance categories overlaps		

Figure 9 shows the difference between individuals dying of an overdose that relates to a single substance versus those who die of an overdose relating to multiple substances, which is also referred to as polysubstance use. Polysubstance use is involved in most Tazewell County substance use-related deaths (79%). Further, of the deaths related to poly-substance use, 64.2% of them involved fentanyl. The high number of deaths related to polysubstance use is likely related to the high number of adulterants present in the illicit drug supply of Central Illinois. This is further supported by the 15 deaths that involved fentanyl and cocaine; fentanyl and methamphetamines; heroin, fentanyl, and methamphetamines; or fentanyl, xylazine, and methamphetamines. Each of these groupings involve an illicit substance (methamphetamines or cocaine) that would not normally have fentanyl or xylazine present in it. Figure 10 shows the crude death rate of substance use related deaths by region and compares 2022 rates to 2023 rates. Of note, significant overdose prevention work has been implemented in the Western region of Tazewell County, which includes numerous naloxone distribution locations, naloxone training for community members, and leave behind naloxone programs by first responders. Significant increases in substance use-related deaths were seen in the Eastern and Northern regions of Tazewell County in one year's time; this trend will need to be monitored in future years to inform prevention efforts.





Traumatic Deaths

Traumatic deaths can be divided into numerous categories based on the mechanism involved; for the sake of this report, traumatic deaths will be categorized into blunt force trauma caused by a motor vehicle accident, traumatic injuries related to a fall, pedestrian versus a motor vehicle, and other traumatic injuries. Each one of these categories has been evaluated in the following tables and figures for any sex and age disparities. **Traumatic injuries related to falls account for 67.3% of accident deaths of Tazewell County residents in 2023.** Blunt force trauma caused by a motor vehicle makes up 13.5%, pedestrian versus motor vehicle makes up 11.5%, and other traumatic injuries accounted for 7.7% of accidental deaths among Tazewell County residents in 2023.

A sex disparity is present among traumatic deaths related to accidents involving motor vehicles; males are more likely to be involved in and die in a motor vehicle collision than their female counterparts in Tazewell County. Interestingly, the most current study looking at motor vehicle accident deaths in the United States concludes that female vehicle occupants are at a 20% higher risk of moderate and series injuries compared to males when controlling for a variety of factors.[13] Comparatively, a similar study that looked at all injury mortality within the United States from 1981-2007 concludes that boys and men are more likely than girls and women to die of an injury.[14]

Table 18 also shows a disparity related to age; traumatic injuries related to a fall are more likely to occur and result in death in individuals 65 years and older. In 2023, falls in individuals over age 65 who live in Tazewell County resulted in 2,982 emergency department visits. The prevalence of fall related emergency department visits has increased significantly, by 35.5%, since 2020.[15] The relationship between falls resulting in emergency department visits and falls as a cause of death will need to be monitored in future mortality reports.

Table 18. Count of Traumatic Deaths by Type, Sex, & Age Group, Tazewell County, IL 2023

	Blunt Force Trauma by a Motor Vehicle Accident	**Traumatic Injuries Related to a Fall**	**Pedestrian vs. Motor Vehicle**	**Other Traumatic Injuries**
Overall	7	35	6	4
Sex (%)				
Male	85.7%	45.7%	100%	100%
Female	14.2%	54.3%	0%	0
Age Group				
0-14		--	*	--
15-24		--		--
25-34	*	--		--
35-44	*	--		*
45-54		*	*	*
55-64		*	*	--
65-74	*	*	*	*
75 and older	*	26		*

Violent Deaths in Tazewell County

In 2023, there were 13 violent deaths among Tazewell County residents. Violent deaths will be divided into two categories: homicide and suicide. Homicide is defined as the killing of one human being by another. Suicide is the act of intentionally ending one's own life.

Homicide accounted for 23% of Tazewell County violent deaths in 2023. Homicidal deaths included male and female decedents with a median age at death of 35 years. Homicides have not previously been included in Tazewell County Mortality Reports and the prevalence of homicides in Tazewell County will need to be monitored.

Suicide deaths accounted for 76.9% of violent deaths in 2023. There were 10 suicide deaths in Tazewell County in 2023; this is a 44% decrease from 18 deaths the previous year (2022). Among the 10 suicide

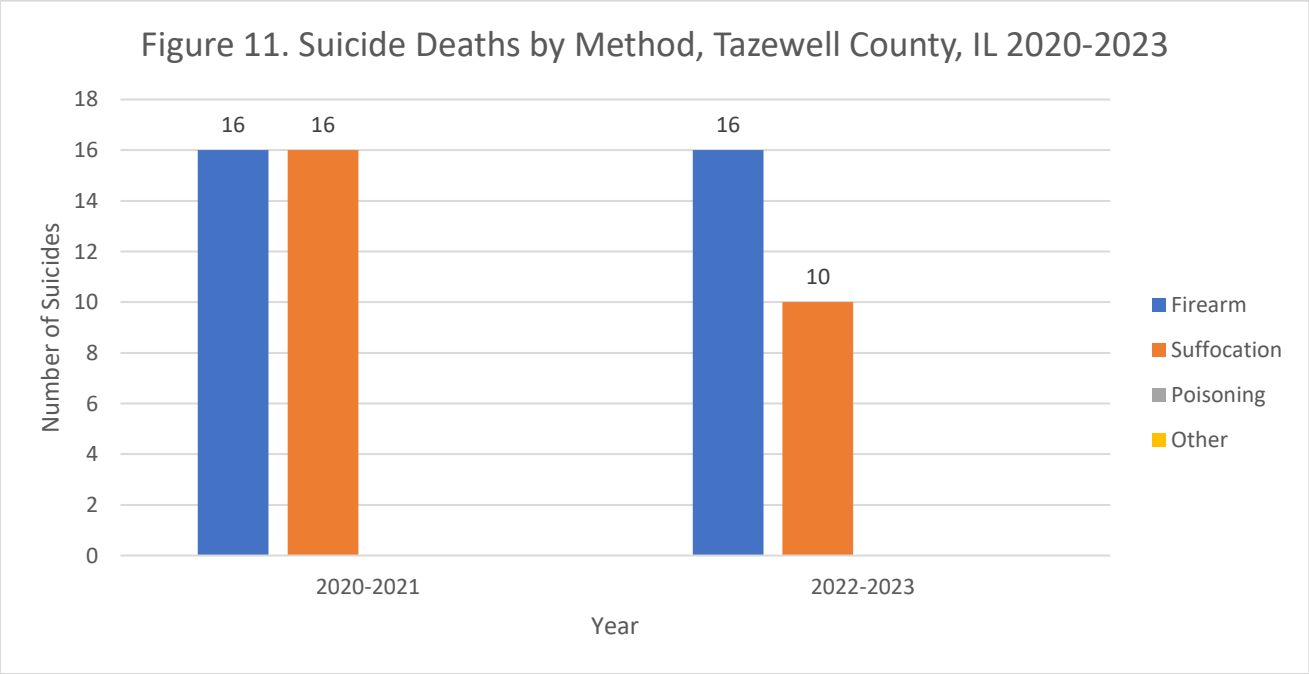
deaths, 80% were male and 20% were female. All individuals who died by suicide in Tazewell County in 2023 identified as Non-Hispanic/Latino and white. The median age at death due to suicide was 56.5 years, which is 11 years older than the median age at death for 2022 (45.5 years). 60% of deaths were by the method of firearms, 30% by asphyxiation, and 10% by poisoning.

The most affected were those aged 45-54 and 65-74 years (Table 19). Compared to 2022, suicide was more prevalent among older age groups. Among all age groups, males are more likely to die by suicide than their female counterparts.

Table 19. Count, Median Age, & Crude Death Rates for Suicide Deaths by Sex, Tazewell County, IL 2023

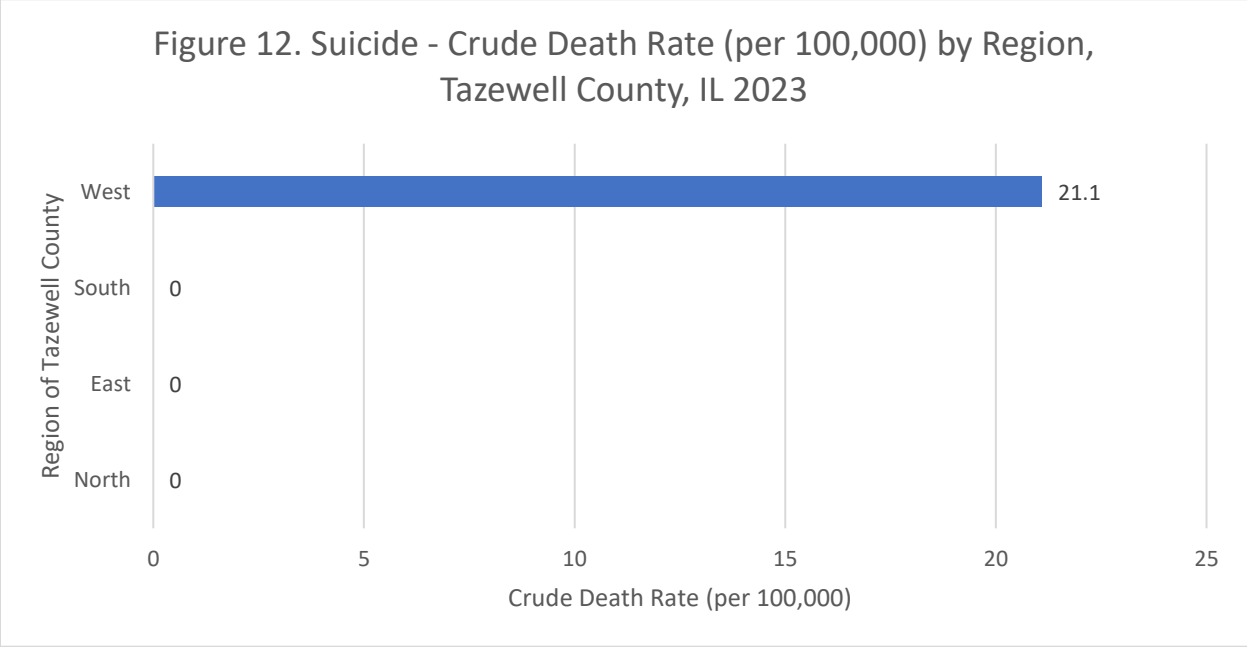
	Count (%)	Median Age	Crude Death Rate
Overall Population	10	56.5	7.72
Male (%)	*(80%)	66	12.5
Female (%)	* (20%)	42.5	3.05

Figure 11 shows the methods of suicide over time. Years were grouped together into 2-year blocks to ensure anonymity of the decedents and follow data suppression rules. Poisonings and Other suicide deaths were present in 2022-2023 but cannot be added to the figure due to their quantity being less than 10 deaths. For the 2022-2023 timeframe. 9.67% of suicide deaths involved poisoning and 6.45% were categorized as other.



In evaluating disparities, geography should also be accounted for. Figure 12 shows the crude death rates for suicide by region of Tazewell County. All suicide deaths in 2023 were in the Western Region of Tazewell County. Comparatively in previous years, suicide deaths have been prevalent in both the

Western and Northern Regions of Tazewell County. This illustrates a large disparity and potential target area for prevention work.



Conclusion

This concludes the 2023 Tazewell County Mortality Report. This report is meant to inform the community regarding the leading causes of death and contributing factors; however, TCHD hopes that it might also motivate readers to further evaluate the health conditions that are impacting the community and any inequalities that may be contributing to unnecessary mortality. Research shows that social determinants of health such as economic resources, occupation, education, and racial/ethnic groups prove to be accurate predictors of health status and longevity. Inequities in these social and economic factors can contribute to long-term stress, difficulty in accessing the health care systems and consequently reduce health and cause premature mortality. Any disadvantages should be a priority for action to reduce unnecessary mortality and improve the overall well-being of our community.

Any questions or requests for additional information may be sent to:

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Data Sources

Tazewell County Mortality Data:
This report represents information on the causes of death among Tazewell County residents as compiled by the Illinois Department of Public Health Vital Records Division. Classification and coding of the causes of death utilize the Internation Classification of Diseases Version 10 (ICD-10).

Population Data:
Crude death rates were calculated using population estimates from the U.S. Census Bureau's 2020-2025 American Community 5-Year estimates. Information includes estimates on total population, sex, race, and age groups for Tazewell County, Illinois, United States and specific zip codes. Age adjusted rates were calculated using the year 2000 standard.

Limitations:
Raw death data analyzed for the purpose of this report is based on information from a decedent's death certificate. The death certificate is compiled by the coroner and the funeral directors based on information provided by physicians. The information included on the death certificate is dependent on known medical conditions, history of illness, risk factors, and professional discretion. This report was completed in October 2025, so it does not reflect the current state of health in Tazewell County but a historic one.

References

1. Carter P, Lagan J, Fortune C, et al. Association of Cardiovascular Disease with Respiratory Disease. *J Am Coll Cardiol*. 2019;73(17):2166-2177. doi:10.1016/j.jacc.2018.11.063
2. Centers for Disease Control and Prevention (CDC). Preventing Heart Disease. 2024.
3. American Heart Association (AHA). Life's Essential 8. Published January 8, 2025. https://www.heart.org/en/healthy-living/healthy-lifestyle/lifes-essential-8
4. Awatade NT, Wark PAB, Chan ASL, et al. The Complex Association between COPD and COVID-19. *J Clin Med*. 2023;12(11):3791. doi:10.3390/jcm12113791
5. National Diabetes Statistics Report. Centers of Disease Control and Prevention. Published May 15, 2024. Accessed on July 2, 2024. https://www.cdc.gov/diabetes/php/data-research/index.html
6. Yusuf S, Joseph P, Rangarajah S. Modifiable risk factors, cardiovascular disease, and mortality 155,722 individuals from 21 high-income, middle-income, and low-income countries: a prospective cohort study. *Lancet.* 2019; 395 (10226): 795-808. doi: 10.1016/S0140-6736(19)32008-2
7. American Heart Association (AHA). 2024.
8. Anstey, K.J., Peters, R., Mortby, M.E. *et al.* Association of sex differences in dementia risk factors with sex differences in memory decline in a population-based cohort spanning 20–76 years. *Sci Rep*. 2021; 11. doi:10.1038/s41598-021-86397-7
9. American Lung Association. 2025. https://www.lung.org/lung-health-diseases/lung-disease-lookup/emphysema
10. Perananthan V, Buckley N. Opioids and antidepressants: which combinations to avoid. *Aust Prescrip.* 2021;44:41-44. Doi: 10.18773/austprescr.2021.004
11. Overbeek DL, Abraham J, Munzer B. Kratom (Mitragynine) ingestion requiring Naloxone reversal. *Clin Practice Cases Em Med.* 2019; 3:24-26. doi: 10.5811/cpcem.2018.11.40588
12. Illinois Department of Public Health. 2024. Division of Vital Statistics.

13. Abrams MZ, Bass CR. Female vs. male relative fatality risk in fatal motor vehicle crashes in the US, 1975-2020. *PLoS One*. 2024;19(2):e0297211. doi:10.1371/journal.pone.0297211
14. Sorenson SB. Gender disparities in injury mortality: consistent, persistent, and larger than you'd think. *Am J Public Health*. 2011;101 Suppl 1(Suppl 1):S353-S358. doi:10.2105/AJPH.2010.300029
15. ESSENCE – Syndromic Surveillance.

Appendix A. Kratom (Mitragynine) Deaths in Tazewell County Literature Review

Prevalence of Kratom-Related Fatalities - Tazewell County vs. State of Illinois

In 2023, Tazewell County had six overdose deaths that involved kratom (Mitragynine). This accounts for about 18% of Tazewell's overdose deaths for 2023, which is a 150% increase from Tazewell County's kratom-related deaths in 2021 (Illinois Department of Public Health). Historically, Tazewell County had three kratom-related deaths in 2018 and two kratom-related deaths in 2021. Each of the 2023 deaths had multiple substances come back in their post-mortem toxicology; none of the toxicology reports included a prescription opioid or other illicit substance (i.e. cocaine, methamphetamines). The Tazewell County Coroner's Office utilizes NMS Labs in Horsham, PA for their post-mortem toxicology. NMS Labs uses the following standards as a reference for Mitragynine as it appears in post-mortem toxicology reports: "Over a 27-month period, Mitragynine was reported in 1,001 blood specimens submitted during the course of medicolegal investigations; concentrations ranged from 5.6-29,000 ng/mL. In three cases which ruled Mitragynine as the sole drug in the cause of death, postmortem peripheral blood concentrations ranged from 1,590-3,420 ng/mL."[1] This quote provides a reference when interpreting toxicology results involving Mitragynine. Thus, based on toxicology results, if the Mitragynine concentration is above 1,000 ng/mL, toxicologists can interpret that Mitragynine has contributed significantly to the decedent's death.[1] Three out of the five Tazewell County overdose deaths that involved Mitragynine in 2023 had post-mortem concentrations greater than 1,000 ng/mL.

According to the Illinois Department of Public Health (IDPH), statewide deaths involving kratom have reduced since peaking in 2021. In 2023 at the county level, Tazewell County had the highest percentage of drug overdose fatalities that involved kratom in the state. Further, as seen in the Table below, the kratom-related fatality rate for Tazewell County is about 10 times higher than the rate for the entire state of Illinois.

Year	Number of Deaths involving Kratom in Illinois	Illinois Kratom Death Rate (per 100,000)	Number of Deaths involving Kratom in Tazewell County	Tazewell County Kratom Death Rate (per 100,000)
2018	34	0.27	3	2.29
2019	52	0.41	0	0
2020	64	0.50	0	0
2021	72	0.56	2	1.52
2022	46	0.36	0	0
2023	49	0.38	6	3.81

It is also worth noting that a study utilized to establish the lethal range for Mitragynine conducts a retrospective review of cases similar to how the Tazewell County Health Department has evaluated their kratom-related deaths.[2] Thus, all kratom-related deaths and toxicology in Tazewell County were evaluated in an evidence-based way that is standardized per the scientific literature. Furthermore, the same combination of medications, as seen in the literature, is identified in Tazewell County decedents' post-mortem toxicology: mixtures of Mitragynine and benzodiazepines as well as Mitragynine and numerous serotonin and norepinephrine reuptake inhibitors (SNRIs).[2] Therefore, the overarching question is what can be done to prevent kratom-related mortality and these lethal mixtures?

Benzodiazepines & SNRIs

As discussed above, each of the Tazewell County kratom-related deaths in 2023 involved benzodiazepines and/or SNRIs. These medications are commonly prescribed to manage disorders impacting the central nervous system including anxiety, depression, insomnia, and seizures.[3] Benzodiazepines are a class of drugs that are primarily used for treating anxiety and seizures; common benzodiazepines include Xanax, Valium, Versed, and Ativan.[3] Administration of benzodiazepines can cause the following adverse effects: respiratory depression, respiratory arrest, drowsiness, confusion, headache, syncope, nausea, vomiting, and diarrhea.[3] Benzodiazepines can interact with alcohol, other benzodiazepines, and sedatives resulting in increased respiratory depression via a synergistic effect.[3] Benzodiazepines can also have a synergistic effect, or a multiplying effect, resulting in respiratory depression when paired with an opioid; this can occur if a person who uses drugs is prescribed a benzodiazepine and then uses an opioid or if they use illicitly manufactured opioids purchased off the street that can be laced with benzodiazepines.[4] Additionally, because kratom is an opioid-like substance that binds to the mu opioid receptor in the human brain, a synergistic effect when paired with benzodiazepines would also be expected and result in respiratory depression, and if not treated respiratory arrest and death. Epidemiologic data surrounding overdose deaths involving benzodiazepines and kratom are incredibly limited.[5] Studies do show an increase in the rates of benzodiazepine-involved overdose deaths increased from 2000-2020.[4,5] Prescription and illicit benzodiazepine-involved overdose deaths in the United States increased 21.8% and 519.6%, respectively, from 2020 to 2021.[5] The Tazewell County kratom-related deaths discussed above are not documented to be related to illicit benzodiazepine use; however, given the increase in illicit benzodiazepine use in the United States, overdose deaths involving illicit benzodiazepines and kratom are likely to increase.

SNRIs are clinically indicated as the first-line agents for the management of depression, anxiety, and as analgesics in the treatment of chronic pain.[6] The greatest concern with SNRIs and opioids interacting is the potential for serotonergic effects; some opioids inhibit the serotonin transporter, which

in combination with a SNRI, whose purpose is to make serotonin more available and inhibit reabsorption, increases the concentrations of serotonin within the synaptic cleft leading to potential serotonin syndrome or toxicity.[7]

Among the scientific research community, a direct relationship between Mitragynine and benzodiazepines or SNRIs is yet to be defined. However, when evaluating the mechanism of action of benzodiazepines, SNRIs, opioids, and Mitragynine, it is a likely hypothesis that a synergistic effect resulting in respiratory depression described above occurs in these overdose deaths. Additionally, the potential for an individual to become chemically dependent on kratom, as discussed in the next section, further displays the importance of public health policy surrounding this substance.

Mitragynine (Kratom)

Kratom (drug name: Mitragynine) is an opioid receptor agonist, meaning that it is a substance that binds to and activates opioid receptors in the central and peripheral nervous system and is a naturally occurring compound.[7] It is produced by a plant, *Mitragyna speciosa,* that is naturally found in Southeast Asia. The plant has been advertised as "a safe treatment for opioid dependence as well as opioid withdrawal symptoms."[8] Currently, kratom is not a scheduled drug in the United States and can be legally acquired and consumed in most states.[8]

The overarching question when looking at overdose deaths involving kratom would be: is kratom capable of causing an opioid-like overdose? Further, is kratom capable of causing a physiologic dependence that would result in withdrawal, like other opioids? If a kratom overdose occurs, does it respond to naloxone? *Overbeek et al* conducted a case study evaluating these questions.[8] The physiologic effects of kratom vary from stimulating effects at low doses (<5g), opioid-like effects (5 to 15g), and sedating effects at high doses (>15g); this is due to the agonist effects on the mu opioid receptor in humans.[8,9,10] A patient presented to the emergency department with altered mental status and respiratory depression; due to the clinical presentation and potential for opioid toxidrome with respiratory depression, the patient was given 2 doses of 0.4 mg of naloxone. The patient's depressed mental status resolved, and respiratory rate increased; the patient then became agitated and showed symptoms indicative of opioid withdrawal. The patient's toxicology results during the admission were positive for kratom, bupropion, and venlafaxine; the latter two drugs were prescribed to the patient. Additionally, no other opioids were present in the patient's system.[8] Thus, this study concludes that a person who uses drugs can become dependent on kratom and exhibit symptoms of opioid withdrawal; also, kratom is responsive to naloxone.

Olsen et al synthesized the unintentional overdose deaths involving kratom in the United States between July 2016-December 2017.[9] The study utilizes post-mortem data that is deposited with the Centers of Disease Control and Prevention (CDC) in the State Unintentional Drug Overdose Reporting

System (SUDORS). 27,338 overdose deaths were reported to SUDORS during July 2016-December 2017; 152 (0.56%) of those decedents tested positive for kratom in their post-mortem toxicology.[9] Approximately 90% of the kratom-involved deaths were decedents who had no evidence that they were currently receiving medically supervised treatment for pain.[9] This is concerning given the potential for chemical dependency that kratom has been shown to have and the open access to the substance.[8,10]

In February 2018, the Food and Drug Administration issued a warning on kratom's addictive potential.[10] However, the addictive potential of kratom remains debated. Kratom is naturally occurring in Southeast Asia; in that region, kratom dependence is common among those who use kratom regularly.[10] The largest difference between those who use kratom regularly in Southeast Asia and those who use it in the United States is that people in Southeast Asia maintain high levels of social functioning.[10] Studies show that a likely explanation of this is that the patterns of use and supply of kratom in the United States could have a higher level of toxicity, which could be due to the presence of adulterants or higher doses among people who use kratom in the United States.[10] Two case studies published in the Journal of Addiction Medicine described individuals who developed a chemical dependence on kratom and were successfully transitioned to buprenorphine, which is an evidence-based treatment method for opioid use disorder.[10] Patient A admitted after several months of follow-up that, "she had been unable to stop using kratom due to rebound pain and withdrawal symptoms when she attempted to decrease her dose."[10] Patient B had chronic pain and switched to kratom after his provider would not prescribe opioids for his pain. The patient "quickly developed a tolerance to kratom, with escalating use and inability to stop using was spending approximately $2,500 per month on kratom purchases; he reported withdrawal when without kratom and had used diazepam to treat it."[10] After initiating buprenorphine, both individuals had remained kratom- and opioid-free at their nine month follow-ups.[10] Studies like these suggest that given kratom's increased use for self-treatment and lack of regulation, there is a need for more safety studies and evidence on the addictive potential of kratom. Studies on mice have shown that Mitragynine has a similar addictive potential to morphine and methamphetamines that results in memory and learning impairments.[10] Further research surrounding kratom, its impairment potential, and addictive nature is needed.

Conclusion

The studies and data discussed in the above literature review illustrate the importance of continued research surrounding the toxicity of kratom, its potential for chemical dependence, and potentially lethal effects when combined with other substances, specifically benzodiazepines and SNRIs. This literature review uses local, state, and national data to illustrate the need to reduce kratom-related

morbidity and mortality. Furthermore, the Illinois state legislature can play a critical role in reducing morbidity and mortality by creating public health policy surrounding kratom use and kratom access.

References

1. NMS Labs; Horsham, PA
2. Schmitt J, Bingham K, Knight L. Kratom-associated fatalities in Northern Nevada – What Mitragynine level is fatal? *Am J Forensic Med Pathol.* 2021; 42(4): 341-349. doi: 10.1097/PAF.0000000000000695
3. Bounds C, Patel P. Benzodiazepines. *Stat Pearls Publishing.* Updated January 30, 2024. Accessed June 28, 2024. https://www.ncbi.nlm.nih.gov/books/NBK470159/
4. Liu S, O'Donnell J, Gladden R, et al. Trends in nonfatal and fatal overdoses involving benzodiazepines – 38 states and the District of Columbia, 2019-2020. *MMWR.* 2021;70(34):1136-1141.
5. Kleinman RA, Weiss RD. Benzodiazepine-involved overdose deaths in the USA: 2000-2019. *J Int Med.* 2022; 37: 2103-2109. doi: 10.1007/s11606-021-07035-6
6. Fanelli D, Weller G, Liu H. New serotonin-norepinehrine reuptake inhibitors and their aesthetic and analgesic considerations. *Neurol Int.* 2021;13(4):497-509. doi: 10.3390/neurolint13040049
7. Perananthan V, Buckley N. Opioids and antidepressants: which combinations to avoid. *Aust Prescrip.* 2021;44:41-44. Doi: 10.18773/austprescr.2021.004
8. Overbeek DL, Abraham J, Munzer B. Kratom (Mitragynine) ingestion requiring Naloxone reversal. *Clin Practice Cases Em Med.* 2019; 3:24-26. doi: 10.5811/cpcem.2018.11.40588
9. O'Malley Olsen E, O'Donnell J, Mattson C, et al. Unintentional Drug Overdose Deaths with Kratom detected – 27 States, July 2016-December 2017. *MMWR*. 2019;68(14):326-327.
10. Buresh M. Treatment of Kratom dependence with buprenorphine-naloxone maintenance. *J Addict Med.* 2018;12(6):481-483. doi: 10.1097/ADM.0000000000000428