Annual Wisconsin Death Report

2016

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Wisconsin Department of Health Services
Division of Public Health
Office of Health Informatics

FORWARD

The Department of Health Services is mandated by Wis. Stat. § 69.03(9) to prepare annual reports on vital statistics. The *Annual Wisconsin Death Report, 2016*, associated technical notes, and additional tables represent relevant public health information collected by the State Vital Records Office. Additional health-related statistical information for Wisconsin is available through the internet on the Department of Health Services site, at http://dhs.wisconsin.gov/stats/. Wisconsin Interactive Statistics on Health (WISH) is an online data query system, located at http://dhs.wisconsin.gov/wish, which includes death data for multiple years and geographic areas in Wisconsin. Technical notes as well as detailed tables for this report are available at https://www.dhs.wisconsin.gov/stats/deaths/index.htm.

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INTRODUCTION

This report presents information about deaths that occurred in 2016 among Wisconsin residents. Information from previous years (2007 onward) is also presented to show changes over time. This report includes information on the number and rate of deaths, demographic characteristics of the decedents, such as age and race/ethnicity, characteristics of deaths by geographic location, and disposition of bodies.

Mortality data presented in this report are primarily based on the underlying cause of death, which the World Health Organization defines as "the disease or injury that initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury."[1]

State rates in the report are age-adjusted rates per 100,000 standard population. County rates are age-adjusted rates per 10,000 standard population.

Beginning September 1, 2013, Wisconsin began collecting data using a new web-based data entry system for funeral directors, medical examiners, coroners, and certifying physicians. The new system adopted the 2003 U.S. Standard Certificate of Death. Many changes have been made to the data collection process; some information is no longer collected, new information has been added, and some data definitions have been altered. Please refer to the technical notes for a more complete description of these changes.

This report uses resident death certificate files. All data refer to Wisconsin residents unless otherwise noted. Also, the information presented is based on the place of residence, which means that events have been assigned to the area where the person lived (usually legal residence) regardless of where the events occurred.

Note: Due to differences in cutoff dates and out-of-state reporting, U.S. rates for 2016 were from provisional data available from the National Center for Health Statistics. Unfortunately, provisional rate estimates were not available separated by sex.

1 http://www.who.int/topics/mortality/en/

There were 51,788 deaths of Wisconsin residents in 2016.
This is a 1 percent increase from the 50,251 deaths recorded in 2015.

In 2016, there were 51,788 deaths of Wisconsin residents, 537 more than in 2015. Since 2011, the number of deaths increased by over 7 percent, from 48,100 in 2011 to 51,788 in 2016.

In 2016, the Wisconsin crude mortality rate was 898.1 deaths per 100,000 population. The age-adjusted mortality rate was 725.2 per 100,000. Until 2009, age-adjusted mortality rates were decreasing in Wisconsin. During that time, Wisconsin had a significantly lower age-adjusted rate than the U.S. However, Wisconsin's mortality rates began to increase in 2009 while the national rates were decreasing. As a result, the age-adjusted Wisconsin death rate is now nearing the national rate (Figure 1).

Stratified by sex, the 2016 age-adjusted mortality rates in Wisconsin were very similar to the national rates. Overall, males had a higher mortality rate than females. Mortality rates, when adjusted for age, were 38 percent higher for males than females in 2016. The same holds true when comparing males and females at the national level (Figure 2).

Figure 1. Age-adjusted mortality rates for the U.S. and Wisconsin

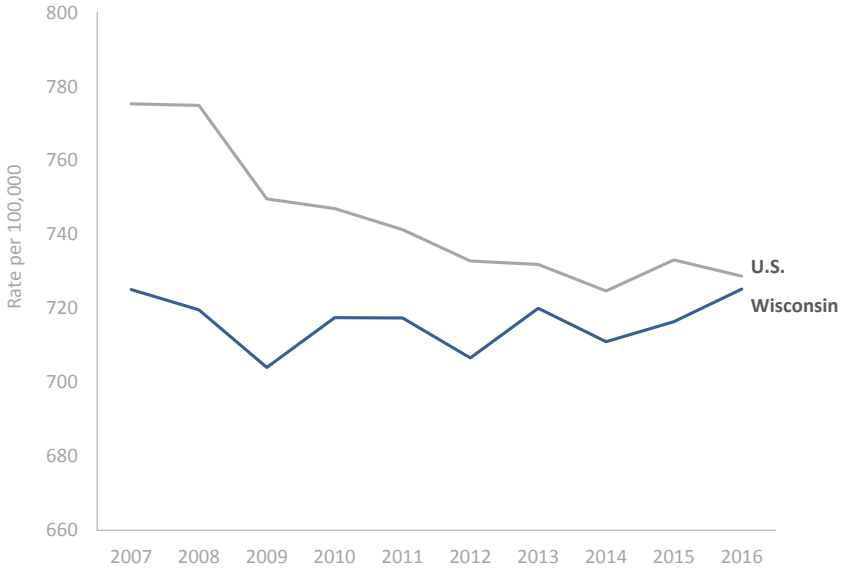
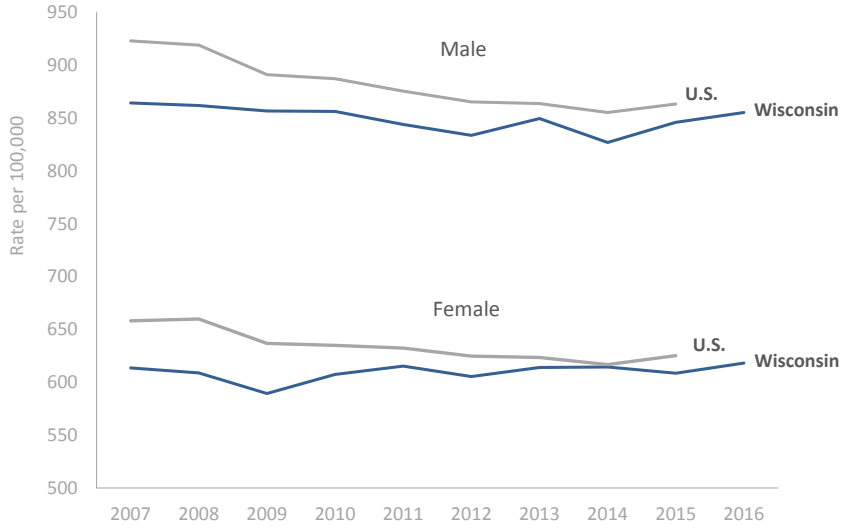


Figure 2. Age-adjusted mortality rates by sex for the U.S. and Wisconsin



KEY FINDINGS

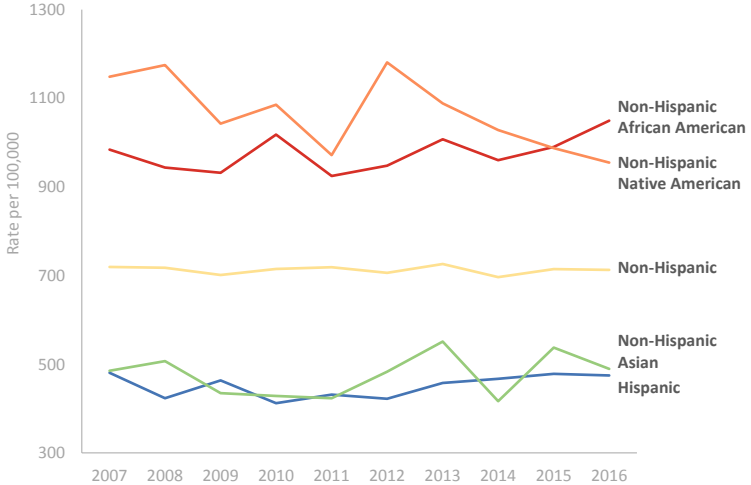
Table 1 shows the total number of deaths and mortality rates by age, sex, race/ethnicity, and Department of Health Services region. As expected, people over the age of 65 experienced a higher mortality rate than younger people and working-age adults. Although females accounted for about 50 percent of the 2016 deaths, the age-adjusted mortality rates show that males tended to die at a younger age than females. Comparing the age-adjusted mortality rates by race/ethnicity demonstrates that non-Hispanic (NH) Native Americans and NH African Americans tended to die at a younger age compared to the NH White population. There is no statistical difference in age-adjusted mortality rates between the regions of the state.

Table 1. Number of deaths and age-adjusted rates by demographics, 2016

Demographics	Total Deaths	Percent of Deaths	Crude rate per 100,000 population	Age-adjusted rate per 100,000 population
Age				
Less than 5	490	0.9	144.4	NA
5 to 17	193	<0.1	20.2	NA
18 to 25	564	1.1	100.9	NA
26 to 64	10,918	21.1	362.9	NA
65 and older	39,623	76.5	4,395.8	NA
Sex				
Female	25,767	49.8	883.3	618.2
Male	26,021	50.2	908.2	855.2
Race/Ethnicity				
Non-Hispanic White	47,451	91.6	994.4	712.9
Non-Hispanic African American	2,725	5.3	698.5	1,049.6
Non-Hispanic Native American	398	0.8	711.8	954.8
Non-Hispanic Asian	395	0.8	249.1	489.6
Hispanic	785	1.5	211.3	474.7
DHS Region				
Northeastern	11,693	22.6	940.7	719.7
Northern	5,163	10.0	1,057.1	723.9
Southeastern	18,556	35.8	875.5	747.9
Southern	9,340	18.0	827.4	697.1
Western	7,028	13.6	893.2	712.5
Total	**51,788**	**100.0**	**898.1**	**725.2**

Age-adjusted mortality rates were higher among NH Native Americans and NH African Americans compared to NH Whites. In 2016, the age-adjusted mortality rates for NH African Americans were the highest for all race/ethnicities for the first time in over a decade. NH Asians and Hispanics experienced lower age-adjusted mortality rates than NH Whites (Figure 3).

Figure 3. Age-adjusted mortality rates by race/ethnicity



KEY FINDINGS

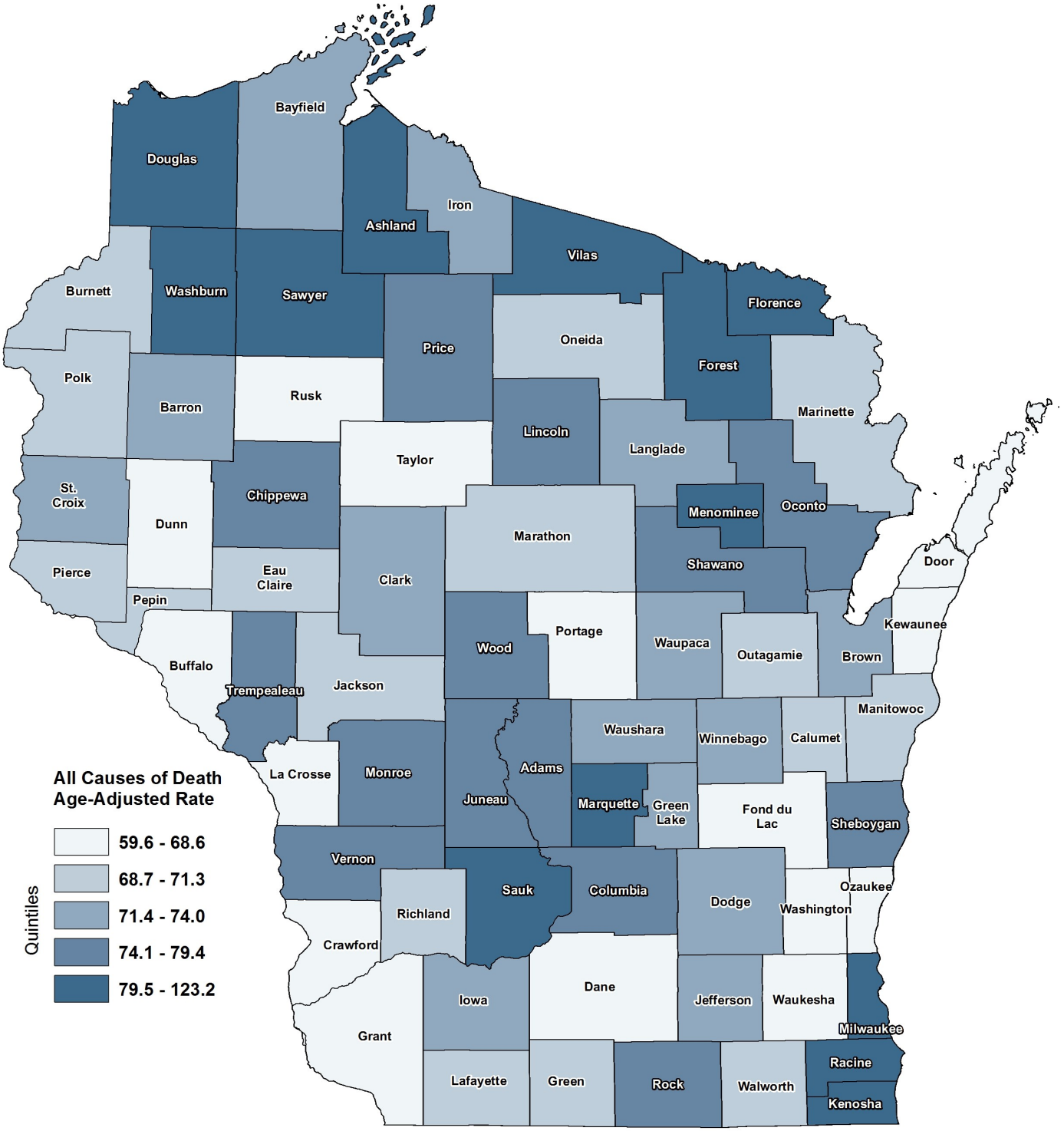
Table 2 below shows the top 10 leading causes of death in Wisconsin in 2016 by age group. Across age groups, heart disease and cancer were the leading causes of death. Unintentional injury has been the third leading cause of death for the past two years. These three causes accounted for a little over 50 percent of all deaths. Chronic lower respiratory diseases and stroke were the fourth and fifth leading causes of death, respectively; together they accounted for 11 percent of all Wisconsin deaths. For infants (<1 year of age), congenital malformations were the leading cause of death. Among people ages 1-44, unintentional injury was the leading cause, while cancer was the leading cause for those ages 45-64. Heart disease was the leading cause of death for those ages 65 and older.

	Infants < 1	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65+	All Ages
1	Congenital Malformations (99) [↑]	Unintentional Injury (24) [↑]	Unintentional Injury (30) [↑]	Unintentional Injury (248) [↑]	Unintentional Injury (388) [↑]	Unintentional Injury (330) [↑]	Cancer (730)	Cancer (2,130)	Heart Disease (9,576)	Cancer (11,495)
2	Short Gestation/ Low Birth Weight (80)	Congenital Malformations (6)	Cancer (11)	Suicide (140) [↑]	Suicide (134)	Cancer (168)	Heart Disease (486)	Heart Disease (1,241)	Cancer (8,359)	Heart Disease (11,487)
3	Pregnancy-Related (19) [↑]	Homicide (5)	Congenital Malformations (8) [↑]	Homicide (59)	Homicide (77)	Suicide (143)	Unintentional Injury (373)	Unintentional Injury (350)	Chronic Lower Respiratory (2,454)	Unintentional Injury (3,502) [↑]
4	Unintentional Injury (17)	Cancer (<5)	Homicide (<5) [↓]	Cancer (25)	Cancer (69) [↑]	Heart Disease (114) [↓]	Suicide (167) [↓]	Chronic Lower Respiratory (243) [↓]	Alzheimer's (2,235)	Chronic Lower Respiratory (2,783)
5	Bacterial Sepsis (13) [↑]	Perinatal (<5)	Chronic Lower Respiratory (<5)	Heart Disease (9) [↓]	Heart Disease (57) [↑]	Homicide (49) [↑]	Chronic Liver Disease (163) [↑]	Diabetes (234)	Stroke (2,202)	Stroke (2,469)
6	Placenta/Cord/ Membrane (12) [↓]	Septicemia (<5) *	Suicide (<5)	Congenital Malformations (8) [↓]	Diabetes (10)	Chronic Liver Disease (36)	Diabetes (108) [↑]	Chronic Liver Disease (231)	Unintentional Injury (1,742)	Alzheimer's (2,256)
7	SIDS (11)	Anemia (<5) *	Septicemia (<5)	Influenza/ Pneumonia (5) *	Chronic Liver Disease (10) [↓]	Diabetes (31) [↓]	Stroke (69) [↑]	Stroke (163) [↓]	Diabetes (1,056)	Diabetes (1,440)
8	Neonatal Hemorrhage (8)	Heart Disease (<5)	Heart Disease (<5) *	Chronic Lower Respiratory (<5) *	Stroke (9) [↑]	Stroke (20) [↓]	Chronic Lower Respiratory (68) [↑]	Suicide (141) [↓]	Kidney Disease (839)	Kidney Disease (959)
9	Respiratory Distress (6)	Stroke (<5)	Stroke (<5)	Pregnancy-Related (<5)	Pregnancy-Related (7) *	Influenza/ Pneumonia (15) *	Influenza/ Pneumonia (40) [↑]	Kidney Disease (79)	Influenza/ Pneumonia (744) [↓]	Influenza/ Pneumonia (888) [↓]
10	Diarrhea/GE (5) *	Influenza/ Pneumonia (<5)	Influenza/ Pneumonia (<5) *	Anemia (<5) *	Septicemia (6) *	Septicemia (11) [↑]	Septicemia (30) *	Influenza/ Pneumonia (76) *	Parkinson's (610)	Suicide (862)

Notes: [↑] = at least a 10% increase since last year; [↓] = at least a 10% decrease since last year; * = new cause in the top 10 leading causes of death

Several counties had relatively high age-adjusted mortality rates. When adjusting for an aging population, mortality rates were highest in Menominee, Forest, and Vilas counties. Menominee's age-adjusted mortality rate was 38 percent higher than Forest county (the second highest county) in 2016 (Map 1).

Map 1. Age-adjusted mortality (per 10,000) for all causes of death by County, 2016



Heart disease, cancer, and unintentional injury are the three major leading causes of death in Wisconsin.

Heart Disease

Heart disease represents disease of the anatomical parts that constitute the heart, endocardium (internal lining of the heart wall and valves), myocardium (heart muscle), and pericardium (external lining of the heart), as well as the internal vessels of the heart, particularly the coronaries that supply blood to the heart.

Heart disease is a consequence of other conditions that affect the heart function. For example, hypertension leads to an increase in heart output and subsequently causes congestive heart failure. Coronary heart disease can also lead to acute myocardial infarction (heart attacks) or congestive heart failure. Some infectious diseases (such as strep throat) that cause immunologic reaction disorders may cause inflammation of the internal and external linings of the heart and subsequently lead to congestive heart failure.

Cancer

Malignant neoplasms, referred to as cancer, represent disorders of the cells that affect primary or secondary organs. Malignant neoplasms can be well-defined or ill-defined as well as specific or not specific to the affected tissue in any anatomical location, including blood and related tissues. Cancer mortality does not include in-situ neoplasms where the cancer hasn't expanded to the supporting structure of the organ where it originated.

Unintentional Injury

Injuries represent any harm or damage to the body resulting from an external force, which can be physical (e.g., fire, blast, shock) or chemical (e.g., poison, prescription). The definition excludes psychological trauma. The intent of injuries is classified as unintentional, self-inflicted, assaults, or undetermined (when the intent is unknown or unclear).

Figure 4. Number of deaths by the three leading causes of death

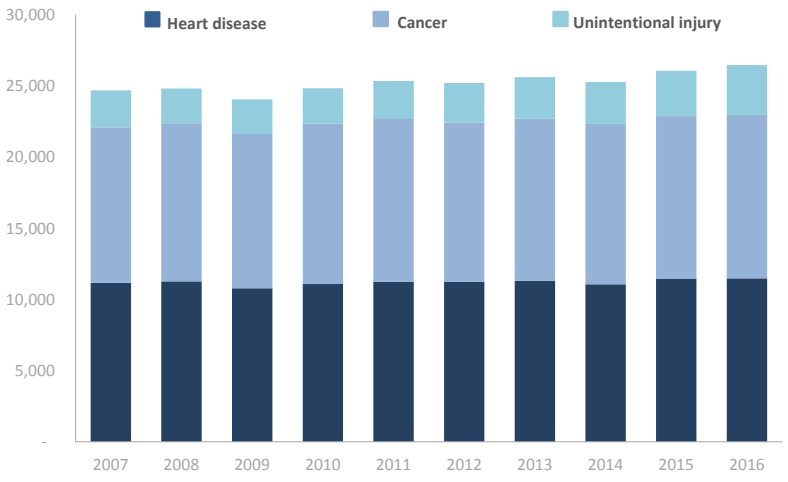
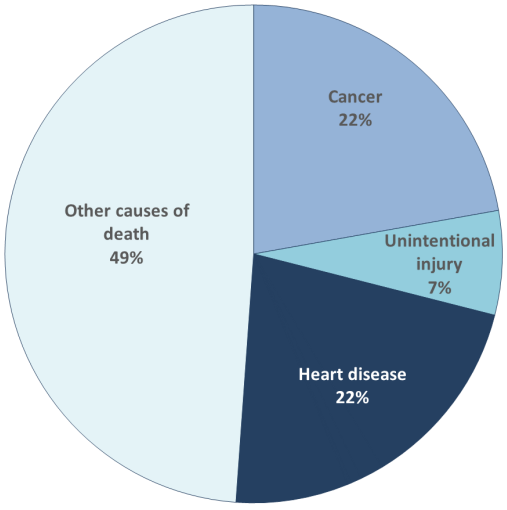
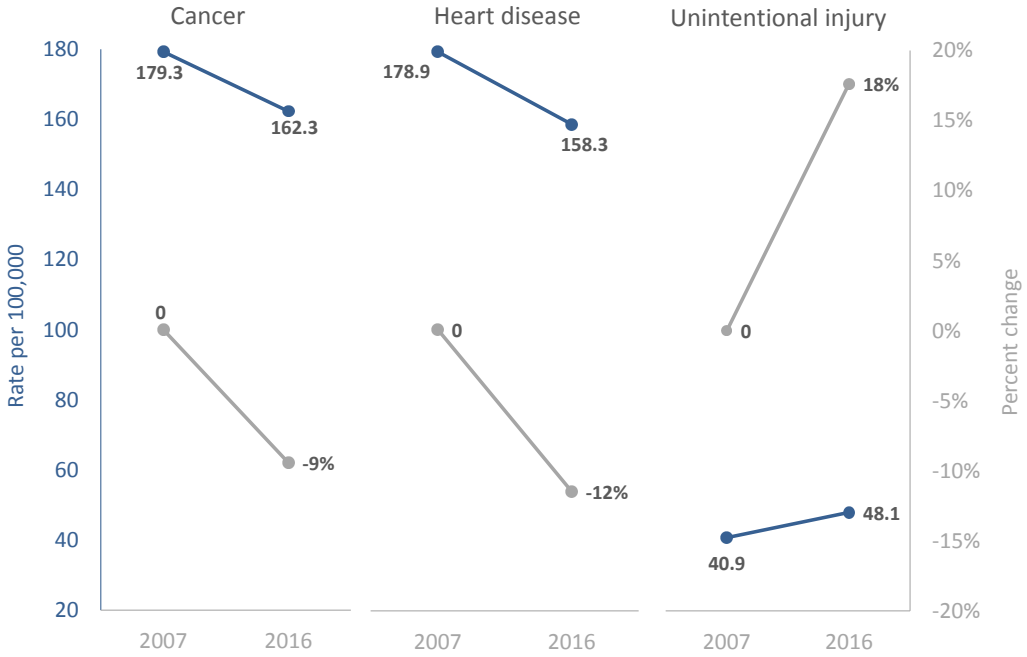


Figure 5. Distribution of the three leading causes of death, 2016



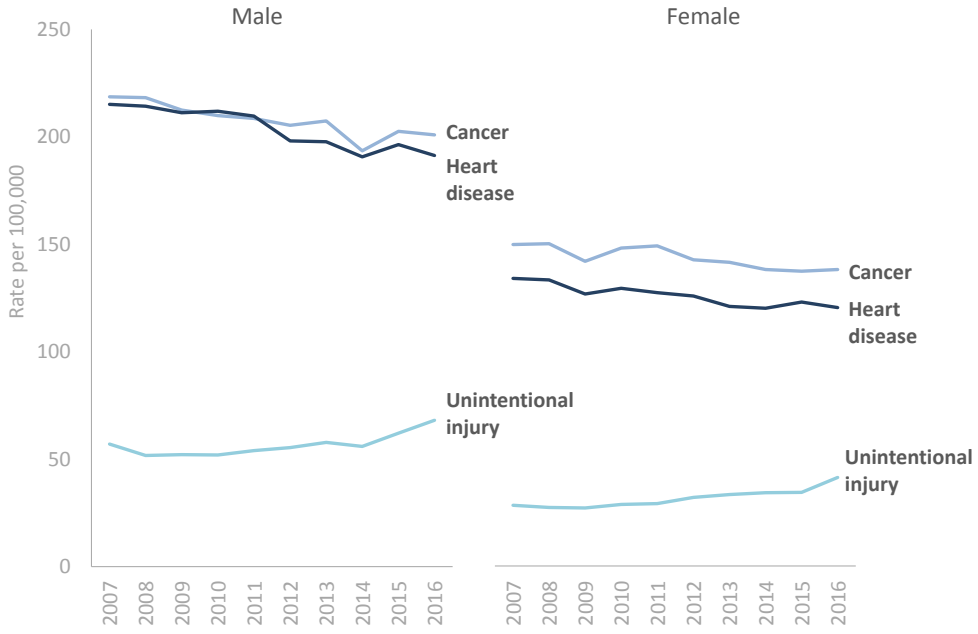
Age-adjusted mortality rates of heart disease and cancer were similar from 2007 to 2016. However, the decrease in mortality rates from 2007 to 2016 was greater for heart disease (12 percent) compared to cancer (9 percent). While the age-adjusted mortality rates for cancer and heart disease were decreasing, unintentional injury mortality rates increased 18 percent from 40.9 per 100,000 in 2007 to 48.1 per 100,000 in 2016 (Figure 6).

Figure 6. Age-adjusted rates and percent change for the top three causes of death



Adjusting for age, males had nearly twice as high of a risk of dying from cancer, heart disease, and unintentional injuries than females. Males had similar cancer and heart disease age-adjusted mortality rates. In contrast, females experienced a higher mortality rate for cancer than heart disease (Figure 7).

Figure 7. Age-adjusted mortality rates for the top three causes of death, by sex



In 2016, heart disease was the second leading cause of death overall, and the leading cause among the population ages 65 and older. The Wisconsin age-adjusted heart disease mortality trend decreased at a slower rate than the national rate. In 2007, adjusting for the difference in age distribution, the risk for heart disease mortality was 14 percent lower in Wisconsin compared to the U.S. In 2015, Wisconsin's age-adjusted heart disease mortality rate of 158.3 per 100,000 was still below the U.S. rate of 168.5 per 100,000, but the difference narrowed to 6 percent.

Figure 8. Age-adjusted rate of heart disease deaths for the U.S. and Wisconsin

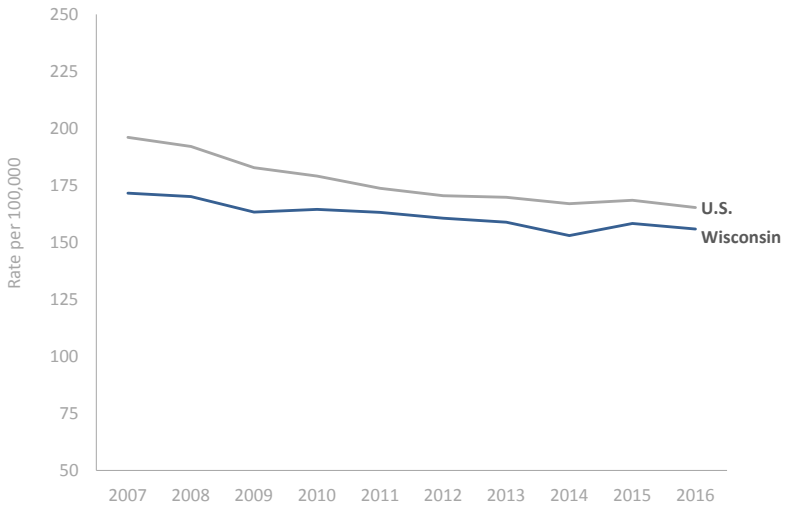


Table 3. Number of heart disease deaths and age-adjusted rates by demographics, 2016

Demographics	Total Heart Disease Deaths	Percent of Heart Disease Deaths	Crude rate per 100,000 population	Age-adjusted rate per 100,000 population
Age				
Less than 5	<5	-	-	NA
5 to 17	<5	-	-	NA
18 to 25	12	0.1	1.9	NA
26 to 64	1,895	16.5	63.0	NA
65 and older	9,576	83.4	1,062.4	NA
Sex				
Female	5,339	46.5	187.0	120.4
Male	6,148	53.5	214.6	200.9
Race/Ethnicity				
Non-Hispanic White	10,677	93.0	223.7	155.2
Non-Hispanic African American	545	4.7	139.7	231.5
Non-Hispanic Native American	65	0.6	116.3	176.3
Non-Hispanic Asian	59	0.5	37.2	87.5
Hispanic	136	1.2	36.6	107.0
DHS Region				
Northeastern	2,656	23.1	213.7	158.4
Northern	1,150	10.0	235.5	154.0
Southeastern	4,182	36.4	197.3	163.9
Southern	2,005	17.5	177.6	145.5
Western	1,492	13.0	189.6	147.4

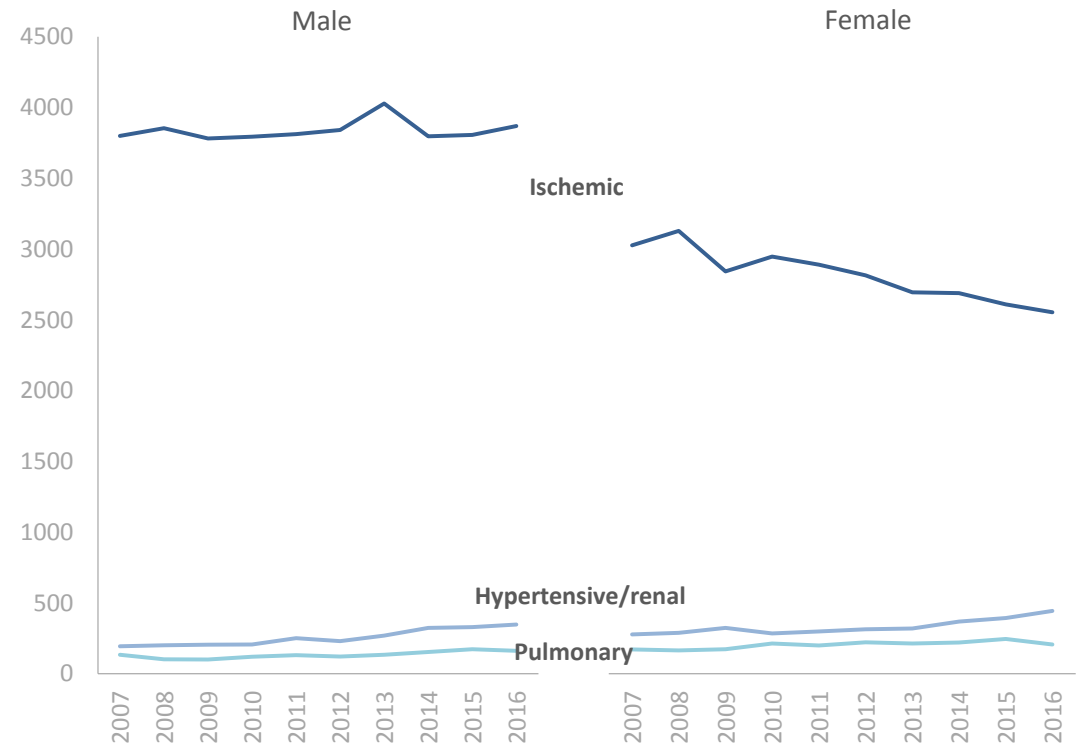
The leading cause of heart disease death is ischemic heart disease (blockage of coronary vessels followed by myocardial infarction) followed by hypertensive heart disease (effect of high blood pressure). Ischemic heart disease constituted 48 percent of all heart disease deaths for females, while it represented 63 percent of all heart disease deaths for males. Other types of heart disease represented 28 percent of all heart disease deaths in males and 38 percent in females (Table 4). Although, there were no major changes in the percent distribution of heart disease type causes of death by sex compared to 2015, the total number of hypertensive and rheumatic deaths increased 10 percent (from 722 to 791) and 18 percent (from 101 to 119), respectively.

Table 4. Number of heart disease deaths and percent distribution by heart disease type and sex, 2016

Heart disease types	Male		Female		Total Deaths
	N	%	N	%	
Ischemic heart	3,870	62.9	2,552	47.8	6,422
Hypertensive heart/renal	347	5.6	444	8.3	791
Pulmonary heart	162	2.6	207	3.9	369
Rheumatic heart	33	0.5	86	1.6	119
Other types	1,736	28.2	2,050	38.4	3786
Total	**6,148**	**100.0**	**5,339**	**100.0**	**11,487**

From 2007 to 2016, the total number of ischemic heart disease deaths slightly increased in males, but steadily decreased in females. The total number increased 2 percent among males, from 3,800 in 2007 to 3,870 in 2016, and decreased 16 percent among females, from 3,024 to 2,552 (Figure 9).

Figure 9. Number of heart disease deaths, by type and sex



The highest age-adjusted heart disease mortality rates were in Forest (23.9 per 10,000 people), Washburn (22.7 per 10,000 people), and Waushara (20.7 per 10,000 people) counties. The three counties with the lowest heart disease mortality rates were Lafayette, Crawford, and Kewaunee (Map 2).

Map 2. Age-adjusted mortality rate (per 10,000) for heart disease by County, 2016

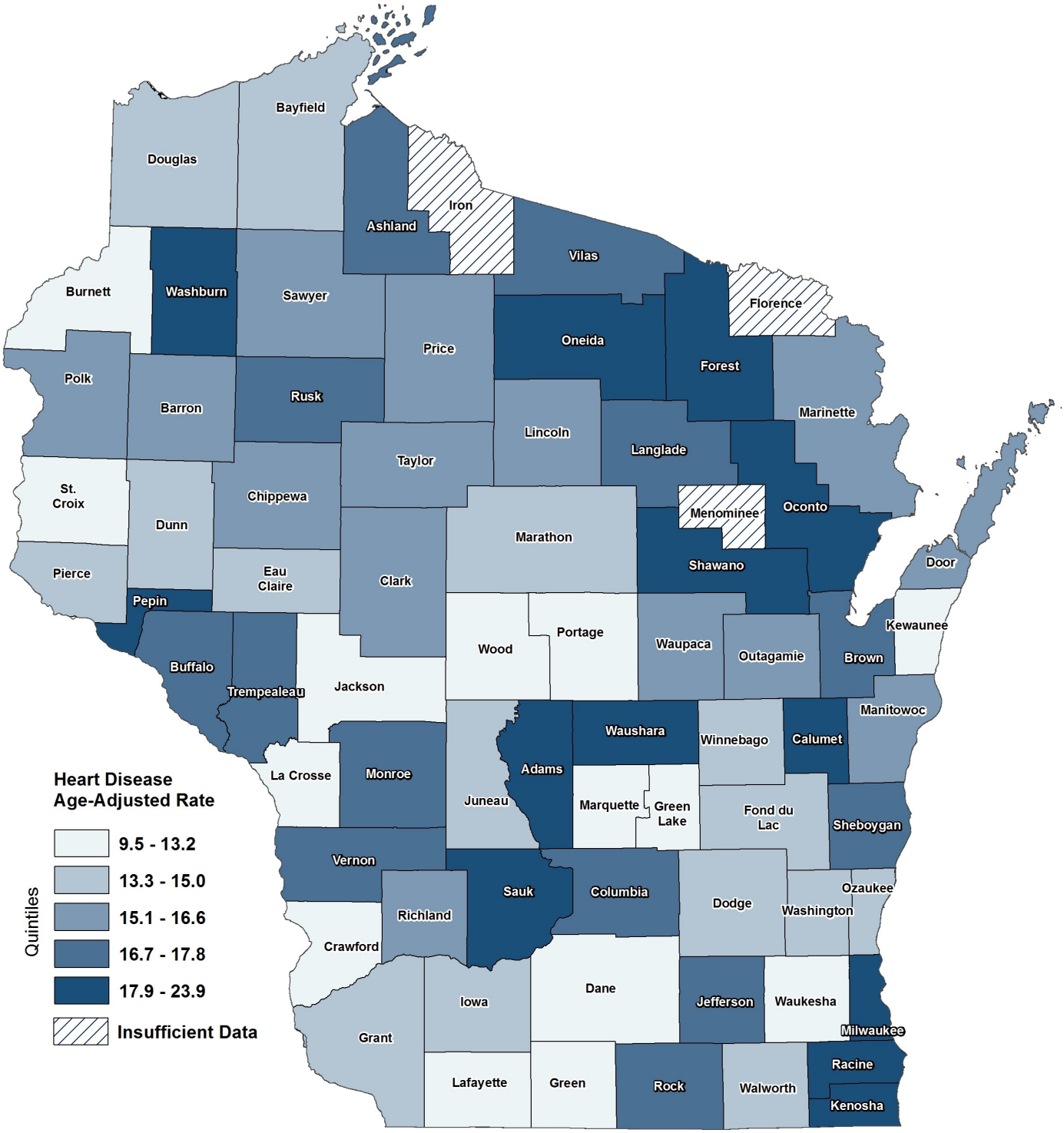
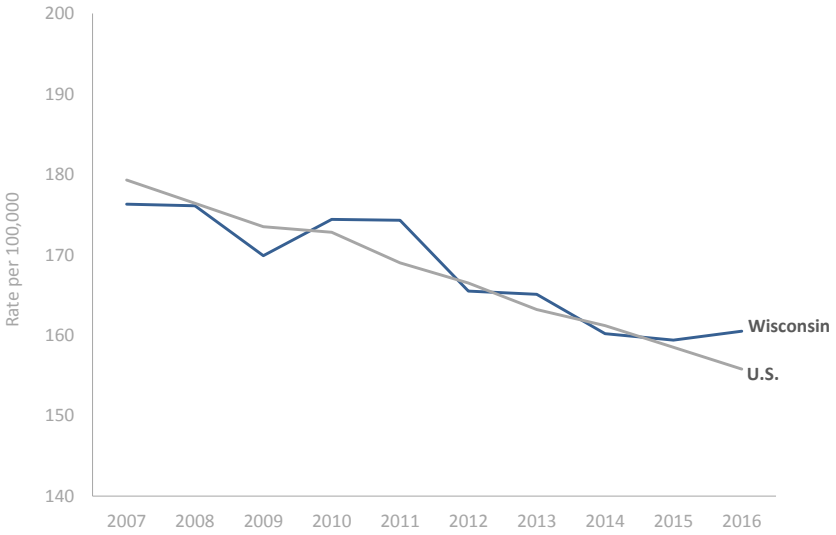


Figure 10. Age-adjusted rate of cancer deaths for the U.S. and Wisconsin



There were 11,495 cancer deaths in Wisconsin in 2016, compared to 10,940 in 2007. However, age-adjusted cancer mortality rates declined during this period, going from 176.3 per 100,000 in 2007 to 160.5 per 100,000 in 2016. The cancer mortality rates were relatively stable from 2014 to 2016 (Figure 10).

Cancer mortality rates were highest among those 65 and older, constituting 73 percent of all cancer deaths. The population 65 years and older had nine times the rate of cancer deaths compared to those ages 25 to 64 (Table 5).

Table 5. Number of cancer deaths and age-adjusted rates by demographics, 2016

Demographics	Total Cancer Deaths	Percent of Cancer Deaths	Crude rate per 100,000 population	Age-adjusted rate per 100,000 population
Age				
Less than 5	<5	-	-	NA
5 to 17	21	0.1	2.2	NA
18 to 25	19	0.2	3.4	NA
26 to 64	3,093	26.9	102.8	NA
65 and older	8,359	72.7	927.3	NA
Sex				
Female	5,412	47.1	186.5	137.4
Male	6,083	52.9	212.3	196.4
Race/Ethnicity				
Non-Hispanic White	10,563	91.9	221.5	157.2
Non-Hispanic African American	611	5.3	155.3	211.3
Non-Hispanic Native American	79	0.7	140.4	161.6
Non-Hispanic Asian	91	0.8	54.8	123.4
Hispanic	139	1.2	36.5	107.4
DHS Region				
Northeastern	2,590	22.5	208.4	160.0
Northern	1,195	10.4	244.7	165.0
Southeastern	4,023	35.0	189.8	162.7
Southern	2,129	18.5	188.6	157.2
Western	1,557	13.6	197.9	157.3

Compared to females, males experienced a higher cancer mortality rate. The crude rate ratio of male and female cancer mortality showed a 14 percent higher rate in males, and the age-adjusted cancer mortality rate ratio was 43 percent higher for males. Therefore, males were more likely to die from cancer than females and at a younger age (Table 5).

NH African Americans and NH Native Americans had the highest age-adjusted cancer mortality rates, followed by NH Whites. The cancer age-adjusted mortality rates increased 16 percent for NH African Americans and 20 percent for NH Native Americans from 2015 to 2016. For Hispanics, the age-adjusted cancer mortality rate decreased 16 percent from 107.4 per 100,000 in 2015 to 90.2 per 100,000 in 2016 (Table 5).

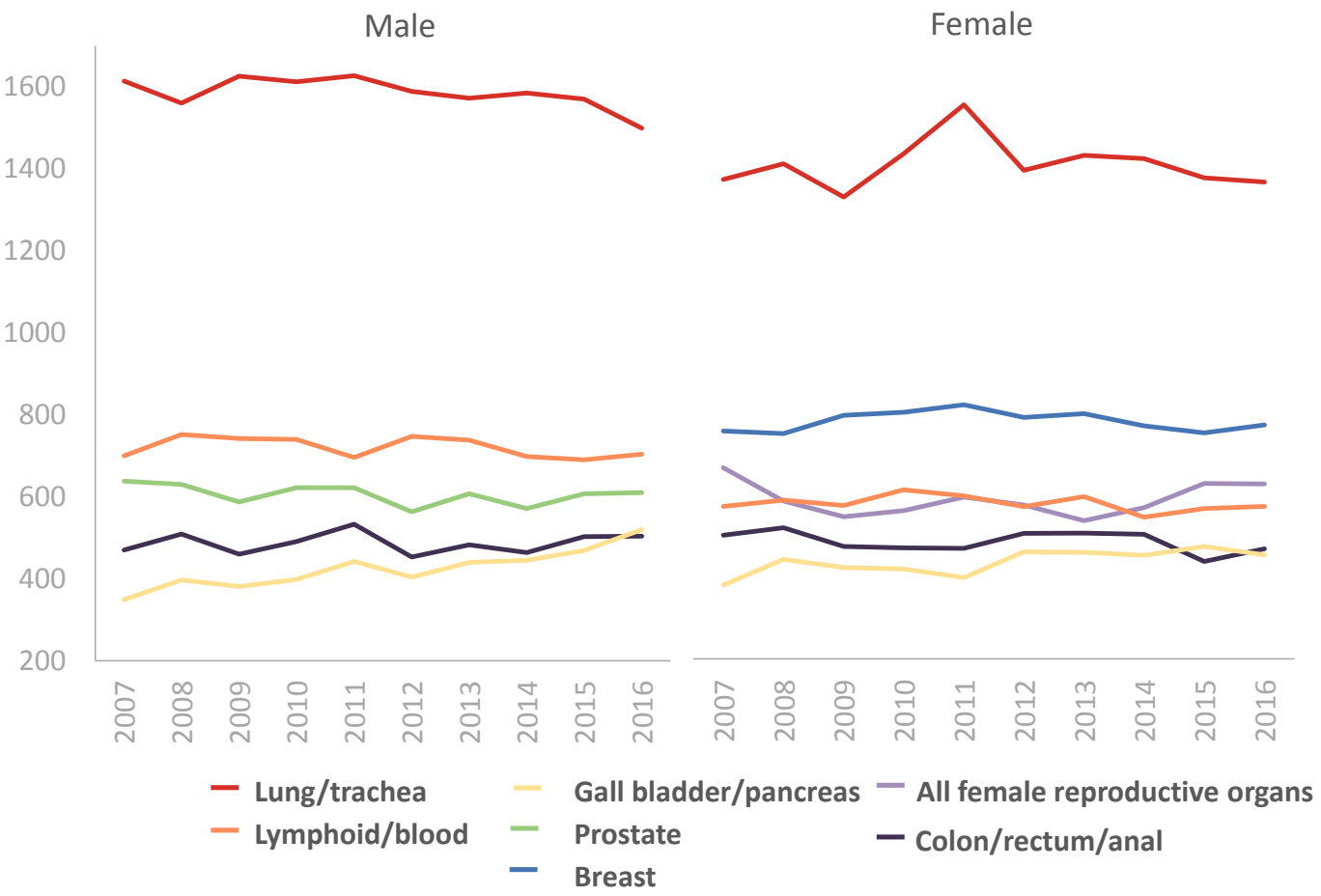
Table 6. Number of cancer deaths by cancer type and sex, 2016

Cancer Types	Male		Female		All cancer deaths
	N	%	N	%	
Lung/trachea	1,499	24.6	1,290	23.8	2,789
Lymphoid and blood	704	11.6	549	10.1	1,253
Gall bladder/pancreas	520	8.5	438	8.1	958
Colon/rectum/anal	504	8.3	452	8.4	956
Breast	13	0.2	735	13.6	748
Prostate	610	10.0	-	-	610
Female reproductive organs	-	-	600	11.1	600
Liver	299	4.9	141	2.6	440
Esophagus	278	4.6	69	1.3	347
Brain and nervous system	205	3.4	143	2.6	348
Melanoma/skin	161	2.6	85	1.6	246
Oral cancers	123	2.0	57	1.1	180
Stomach	98	1.6	75	1.4	173
Small intestine	17	0.3	19	0.4	36
Other types	1,052	17.3	759	14.0	1,811
Total	**6,083**	**100.0**	**5,412**	**100.0**	**11,495**

Table 6 shows lung and tracheal cancers, which represent 24 percent of all cancer deaths, were the leading cause of cancer deaths among both males and females in 2016. Lymphoid and blood cancers (such as leukemia) were the second leading cause of cancer deaths among males (12 percent), followed by prostate (10 percent), and gallbladder/pancreas cancers (9 percent).

For females, breast cancer was the second leading cause of cancer death (14 percent) followed by cancers of the reproductive organs (11 percent) and lymphoid and blood cancers (10 percent).

Figure 11. Number of cancer deaths, by type and sex



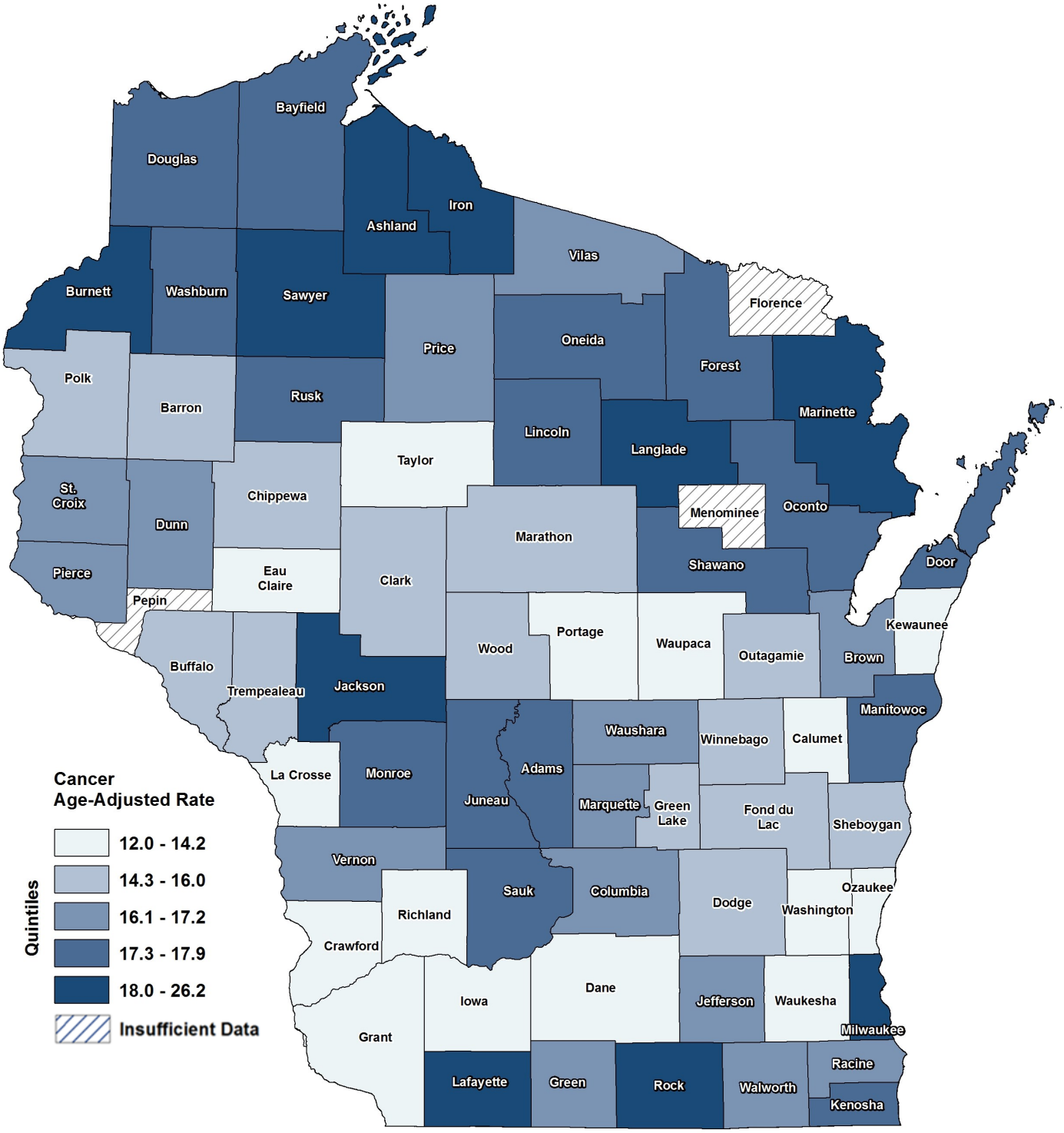
Both males and females experienced a decrease in lung/trachea cancer from 2007 to 2016. However, males had a 7 percent decrease (from 1,614 deaths to 1,499 deaths) while females had less than a 1 percent decrease (from 1,296 deaths to 1,290 deaths). As seen in Figure 11, the trend in lung/trachea cancer deaths for males has been declining, while the trend has been sporadic but relatively stable among females.

Among sex-specific cancers, males had a 4 percent decrease in prostate cancer (from 638 deaths in 2007 to 610 deaths in 2016). Women had a 2 percent increase (from 721 deaths to 735 deaths) in breast cancer and a 6 percent decrease (from 637 deaths to 600 deaths) in cancers of the female reproductive organs from 2007 to 2016.

Males had a 49 percent increase in gall bladder and pancreas cancer from 2007 to 2016 (349 to 520 deaths). The largest single year increase in male gall bladder and pancreas deaths was from 2015 to 2016, an 11 percent increase. Among women, gall bladder and pancreas cancer increased 19 percent from 2007 to 2016 (369 to 438 deaths), although there was a 4 percent decrease from 2015 to 2016.

The age-adjusted cancer mortality rates were highest in Lafayette, Ashland, and Sawyer counties in 2016. The age-adjusted cancer mortality rates were lowest in Taylor, Calumet, and Richland counties (Map 3).

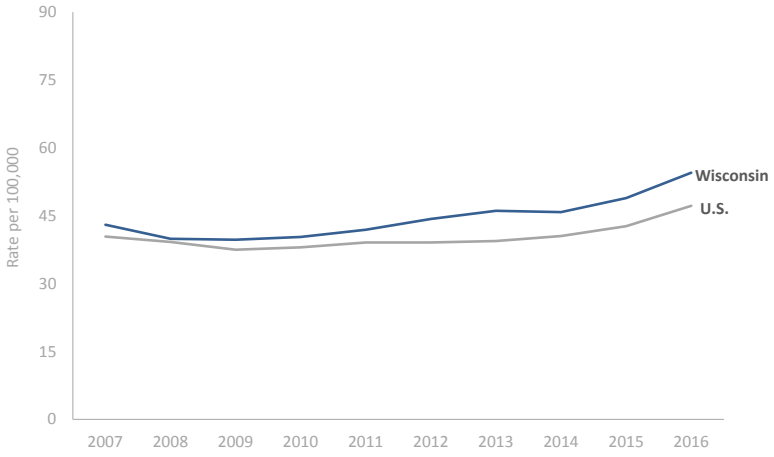
Map 3. Age-adjusted mortality rate (per 10,000) for cancer by County, 2016



Unintentional injuries were the leading cause of death among people ages 1 to 44 years and the third leading cause of death overall. The total number of unintentional injury deaths in Wisconsin has been increasing since 2009. Wisconsin age-adjusted unintentional injury mortality rates have been higher than the U.S. rate for the past eight years (Figure 12).

As seen in Table 7, the crude unintentional injury mortality rate was four times higher among the 65 and older population than both the 26 to 64 population and the 18 to 25 population.

Figure 12. Age-adjusted rate of unintentional injury deaths for the U.S. and Wisconsin



The age-adjusted mortality rate for males was 65 percent higher than for females. NH Native Americans had the highest age-adjusted mortality rates compared to NH African Americans and NH Whites. When looking by region, the southern and southeastern regions had the highest unintentional injury mortality rates.

Table 7. Number of unintentional injury deaths and age-adjusted rates by demographics, 2016

Demographics	Total Injury Deaths	Percent of Injury Deaths	Crude rate per 100,000 population	Age-adjusted rate per 100,000 population
Age				
Less than 5	41	1.2	12.1	NA
5 to 17	66	1.9	6.9	NA
18 to 25	257	7.3	46.0	NA
26 to 64	1,396	39.9	46.4	NA
65 and older	1,742	49.7	193.3	NA
Sex				
Female	1,535	43.8	52.9	41.3
Male	1,967	56.2	68.7	68.1
Race/Ethnicity				
Non-Hispanic White	3,117	89.0	65.3	54.8
Non-Hispanic African American	218	6.2	55.4	66.1
Non-Hispanic Native American	48	1.4	85.3	96.2
Non-Hispanic Asian	21	0.6	12.7	17.0
Hispanic	97	2.8	25.4	34.7
DHS Region				
Northeastern	627	17.9	50.4	43.6
Northern	297	8.5	60.8	50.2
Southeastern	1,421	40.6	67.0	62.0
Southern	752	21.5	66.6	60.8
Western	402	11.5	51.1	45.5

The leading causes of death due to unintentional injuries were falls, poisoning, motor vehicle crashes, suffocation, drowning, and fire. Table 8 shows the total number of unintentional injuries by external causes from 2007 to 2016. Falls were the leading cause of unintentional injury death during the entire period. Beginning in 2011, poisoning surpassed motor vehicle crashes as the second leading cause of unintentional injury death. This was driven by the increase in drug overdose deaths, which were counted among poisonings. Figure 13 shows that until 2008, motor vehicle crashes were the leading cause of unintentional injury deaths among males, but were surpassed by falls starting in 2009 and poisoning in 2011. Among females, falls have been the leading cause of unintentional injury deaths for the past 10 years. Females had on average a 30 percent higher age-adjusted mortality rate for falls than males.

Table 8. Number of unintentional injury deaths, 2007-2016

Cause of injury	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Fall	891	918	954	978	1,026	1,091	1,166	1,211	1,342	1,483
Poisoning	529	481	515	507	580	615	748	752	774	970
Motor vehicle crash (MVC)	730	581	531	567	566	566	547	486	569	600
Suffocation	94	101	94	94	99	103	93	120	104	98
Drowning	41	59	49	65	60	61	52	43	60	48
Fire/flame	64	46	44	38	43	53	46	44	47	40
All others	236	249	244	243	237	298	266	279	282	257
Total	**2,593**	**2,443**	**2,432**	**2,496**	**2,615**	**2,789**	**2,927**	**2,940**	**3,186**	**3,502**

Starting in 2012, unintentional injury by chemical poisoning was the second leading cause of unintentional injury deaths among males. Poisoning refers to the ingestion of any natural or synthetic toxic substance (plant, metal, gaseous, venom, or other chemical byproducts/ medicines), either by mouth, by skin contact, inhalation, or parental injection, that interferes with normal body functions.

Among females, there has been a significant, steady increase in deaths due to falls, especially in recent years. Poisoning rates surpassed motor vehicle crashes as the second leading cause of unintentional injury death starting in 2009.

Figure 13. Age-adjusted rate for unintentional injury death (external causes), by type and sex

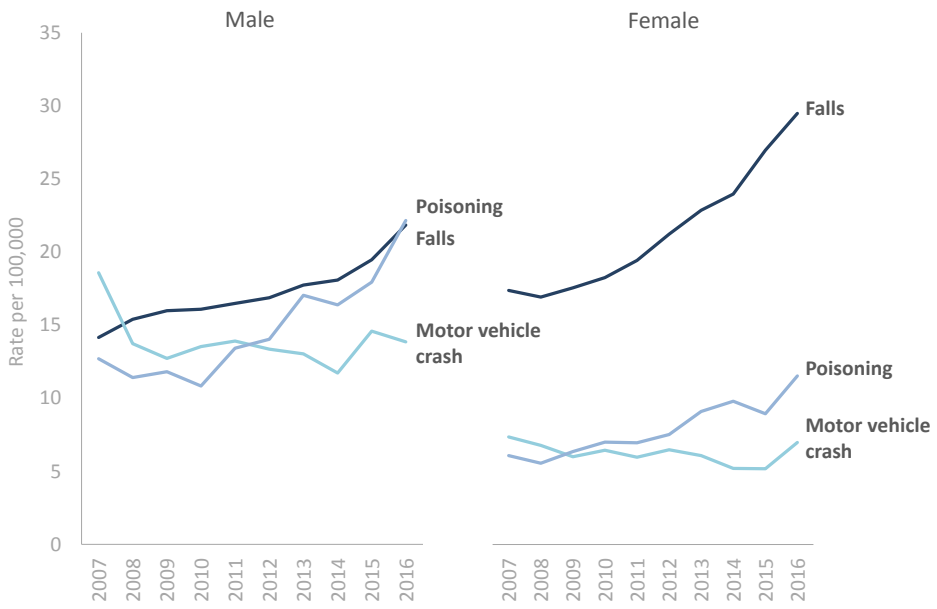


Table 9 presents the number and percent distribution of physical and anatomical locations of injuries that resulted in death. Nearly 24 percent of unintentional injury deaths were due to multiple injuries. Head and neck injuries represented 16 percent of all unintentional injury deaths and, stratified by sex, represented the second leading type of unintentional injury deaths for males. Lower extremity injuries were the second leading type of unintentional injuries among females. Drug overdose deaths are included in the "Other" category. However, drug overdose deaths are examined in more detail in the next section of this report.

Table 9. Number of unintentional injury deaths by injury location and sex, 2016

Injury Location	Male		Female		Total
	N	%	N	%	
Multiple injuries	454	23.1	372	24.2	826
Head/neck	333	16.9	238	15.5	571
Lower extremities	166	8.4	309	20.1	475
Chest	33	1.7	24	1.6	57
Abdomen/spine/pelvis	11	0.6	46	3.0	57
Upper extremities	13	0.7	22	1.4	35
Other/foreign/frostbite	957	48.7	524	34.1	1,481
Total	**1,967**	**100.0**	**1,535**	**100.0**	**3,502**

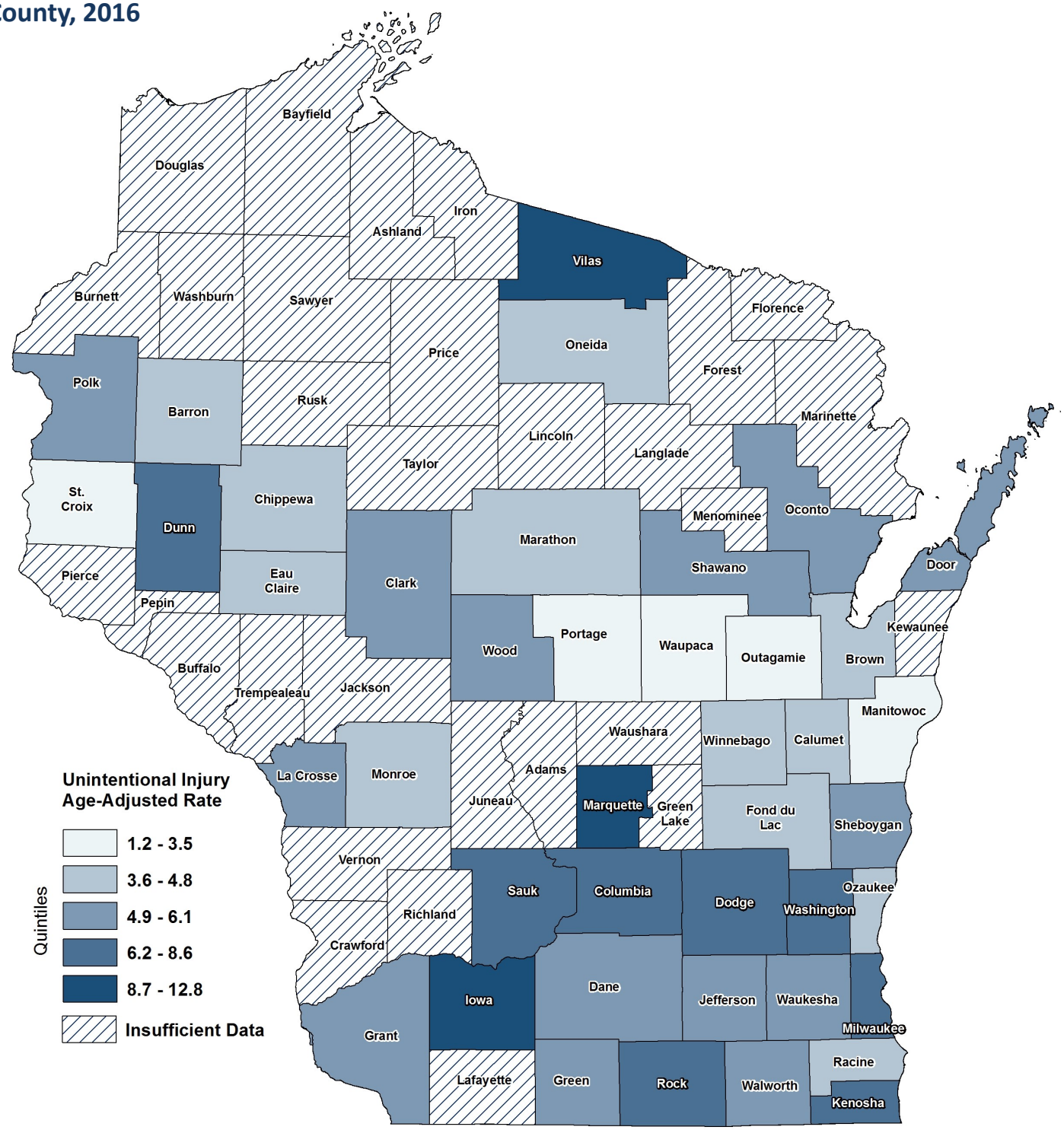
From 2007 to 2016, multiple injuries as a cause of death increased by 23 percent from 670 deaths to 826 deaths. The large increase seen in the "Other" category is likely due to drug overdose deaths being included in this group, as mentioned above. Lower extremity injuries had a relatively consistent increase over time. These injuries have increased 40 percent, from 339 deaths in 2007 to 475 deaths in 2016 (Table 10).

Table 10. Number of unintentional injury deaths by injury location, 2007-2016

Injury Location	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Multiple injuries	670	596	597	587	637	642	649	616	717	826
Head/neck	548	488	472	512	515	544	603	530	547	571
Lower extremities	339	343	349	350	347	392	383	435	460	475
Chest	69	75	56	63	56	59	53	61	81	57
Abdomen/spine/pelvis	39	46	41	45	39	62	53	48	55	57
Upper extremities	15	20	8	17	16	26	23	19	30	35
Other/foreign/frostbite	913	875	909	922	1,005	1,064	1,163	1,231	1,296	1,481
Total	**2,593**	**2,443**	**2,432**	**2,496**	**2,615**	**2,789**	**2,927**	**2,940**	**3,186**	**3,502**

In 2016, the highest unintentional injury mortality rates were in Marquette, Vilas, and Iowa counties. The lowest unintentional injury mortality rates were in Manitowoc, Portage, and St. Croix counties (Map 4).

Map 4. Age-adjusted mortality rate (per 10,000) for unintentional injury cause of death by County, 2016



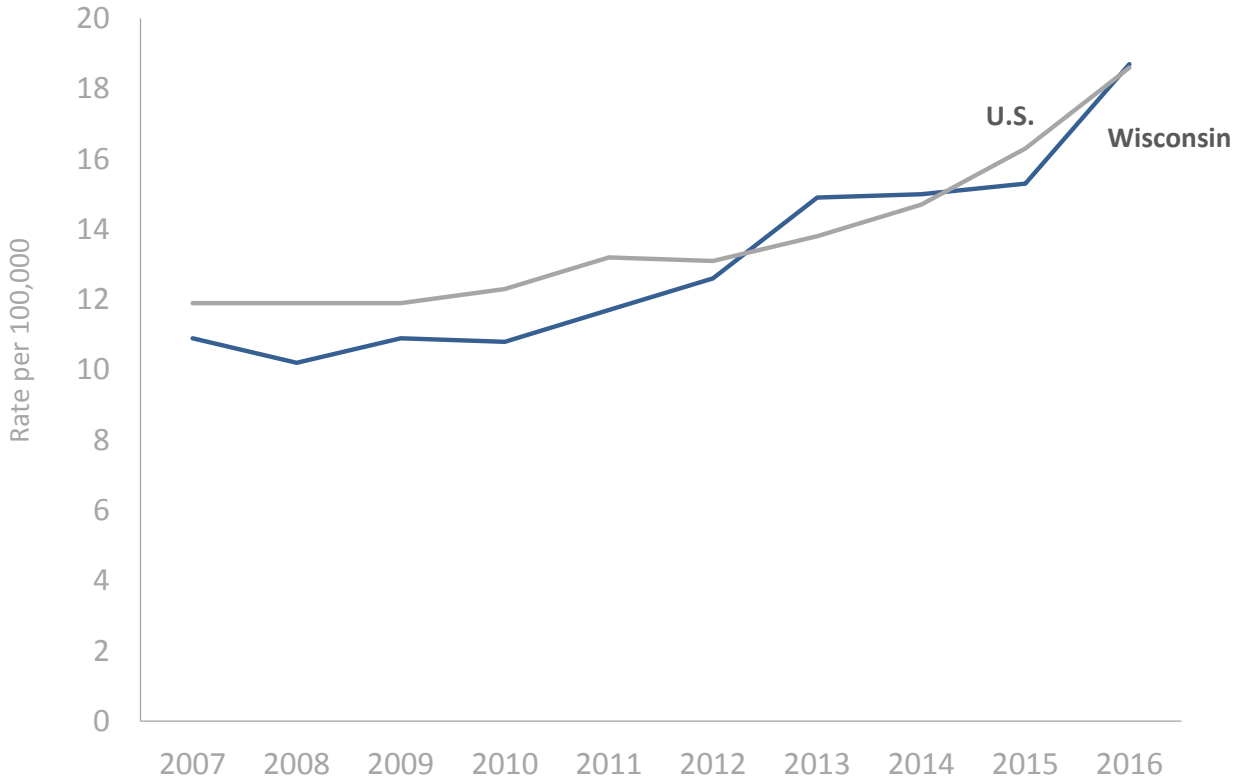
Working-age adults, males, non-Hispanic Native Americans, and non-Hispanic African Americans have higher rates of drug overdose deaths than other population groups.

A drug overdose is a poisoning by drugs or medicine that is taken in an amount that is higher than normally used or is prescribed independently of the intent. These drugs are byproducts of natural substances (e.g. opiates) or semi-synthetics/synthetics (e.g. opioids) used legally or illegally. For example, morphine is a byproduct of opium (opiate), which is harvested from naturally occurring poppy plants, while oxycodone is semi-synthetic (opioid) where the chemical structure resembles and acts like morphine.

The drug overdose death epidemic continues in the U.S., fueled by prescription drugs and heroin. The Wisconsin drug overdose age-adjusted mortality rates were not statistically different than the U.S. rates. The average percent change of the age-adjusted rates from 2010 to 2015 was similar for Wisconsin (42 percent) and the U.S. (49 percent).

Overall, in Wisconsin, the age-adjusted rates of drug overdose deaths increased 72 percent from 2007 to 2016 (Figure 14). The total number of drug overdose deaths significantly increased from 872 deaths in 2015 to 1,031 deaths in 2016. This corresponds with a 22 percent increase in the age-adjusted mortality rates from 2015 to 2016.

Figure 14. Age-adjusted rate of drug overdose deaths for the U.S. and Wisconsin



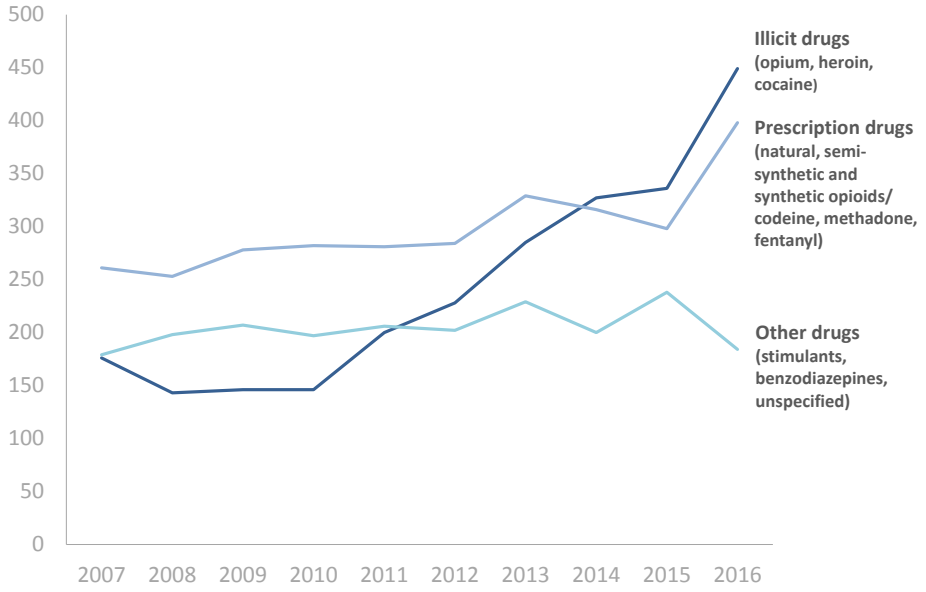
The demographic distribution for drug overdose deaths shows that working-age adults experienced a higher burden of drug overdose deaths. The drug overdose mortality rate was five times higher among people ages 26 to 64 compared to those ages 65 and older, and almost twice as high compared to those ages 18 to 25 years. Males experienced 69 percent higher age-adjusted mortality rates for drug overdose than females. NH African Americans had a higher age-adjusted mortality rate for drug overdose compared to NH Whites. NH Native Americans had the highest crude mortality rate. The Southeastern region had the lowest crude mortality rate in the state but also had the highest age-adjusted mortality rate (Table 11). This indicates that deaths due to drug overdose are occurring in younger age groups in the Southeastern region compared to the rest of the state.

Table 11. Number of drug overdose deaths and age-adjusted rates by demographics, 2016

Demographics	Total Drug Overdose Deaths	Percent of Drug Overdose Deaths	Crude rate per 100,000 population	Age-adjusted rate per 100,000 population
Age				
Less than 5	<5	-	-	NA
5 to 17	7	0.7	0.7	NA
18 to 25	122	11.8	21.8	NA
26 to 64	846	82.1	28.1	NA
65 and older	52	5.0	5.8	NA
Sex				
Female	386	37.4	13.3	13.7
Male	645	62.6	22.5	23.1
Race/Ethnicity				
Non-Hispanic White	862	83.9	18.1	18.9
Non-Hispanic African American	100	9.7	25.4	29.3
Non-Hispanic Native American	16	1.6	28.4	-
Non-Hispanic Asian	<5	-	-	-
Hispanic	49	4.8	12.9	13.8
DHS Region				
Northeastern	156	15.2	12.6	13.1
Northern	56	5.4	11.5	12.2
Southeastern	504	49.0	3.8	24.3
Southern	235	22.8	20.8	21.2
Western	78	7.6	9.9	10.2

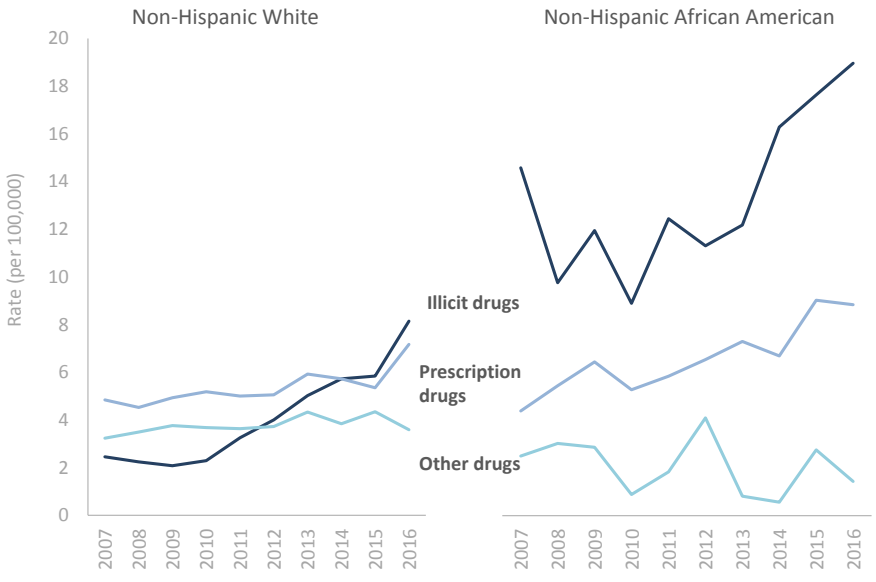
Illicit drugs (heroin and cocaine) were the leading cause of drug overdose deaths followed by prescription opioids. Together, they represented over 80 percent of all drug overdose deaths (Figure 15). Before 2012, illicit drugs were the third leading cause of drug overdose deaths in Wisconsin, but they have been steadily increasing each year since then. After 2014, illicit drug deaths surpassed prescription drug deaths and became the leading cause of drug overdose deaths. From 2015 to 2016, both illicit drug and prescription drug deaths increased by 34 percent (from 336 to 449 deaths and from 298 to 398 deaths, respectively).

Figure 15. Number of drug overdose deaths by type of drug



Although the number of NH Whites that died from an illicit drug overdose was greater, the age-adjusted mortality rate by illicit drug overdose was two times higher among NH African Americans than among NH Whites (Figure 16). Although not depicted here, NH Native Americans had the greatest crude mortality rate.

Figure 16. Age-adjusted drug overdose deaths, by drug type and race/ethnicity



For prescription drug overdose mortality rates, NH African Americans were 24 percent higher than NH Whites. From 2007 to 2016, illicit drug overdose mortality rates increased by over 200 percent among NH Whites. During this same time, prescription drug overdose mortality rates increased 50 percent for NH Whites. In contrast, among NH African Americans, illicit drug overdose mortality rates increased 30 percent while prescription drug overdose mortality rates increased over 100 percent between 2007 and 2016.

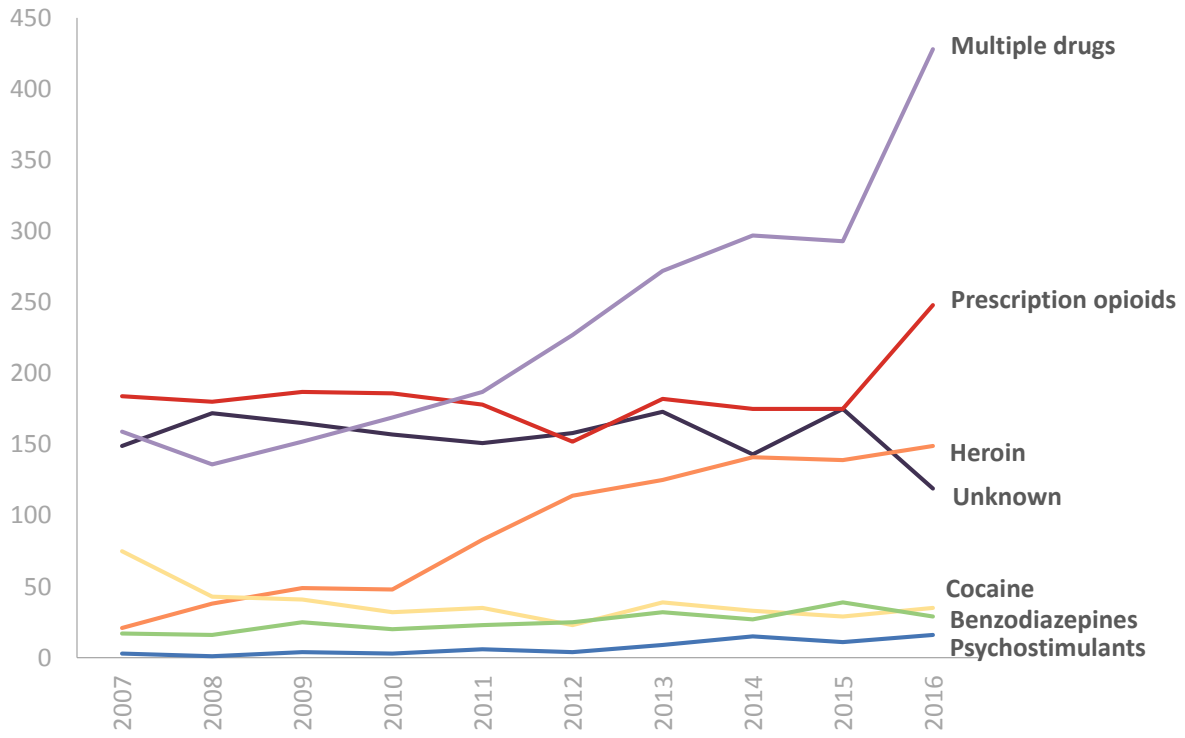
For both males and females, multiple drugs was the leading cause of death, followed by prescription opioids alone, and heroin alone. Prescription opioid-only deaths made up a greater proportion of the overdose deaths for females than males (26 percent vs. 23 percent). However, 63 percent of all drug overdose deaths were males (Table 12).

Table 12. Number of drug overdose deaths by drug type and sex, 2016

Drug Type	Male		Female		Total	
	N	%	N	%	N	%
Prescription opioid only	148	22.9	100	25.9	248	24.1
Heroin only	104	16.1	45	11.7	149	14.5
Multiple drugs	272	42.2	156	40.4	428	41.5
Benzodiazepines only	19	2.9	10	2.6	29	2.8
Cocaine only	28	4.3	7	1.8	35	3.4
Psychostimulants only	9	1.4	7	1.8	16	1.6
Narcotics (unspecified)	<5	-	<5	-	7	0.7
Unknown	61	9.5	58	15.0	119	11.5
Total	**645**	**100.0**	**386**	**100.0**	**1,031**	**100.0**

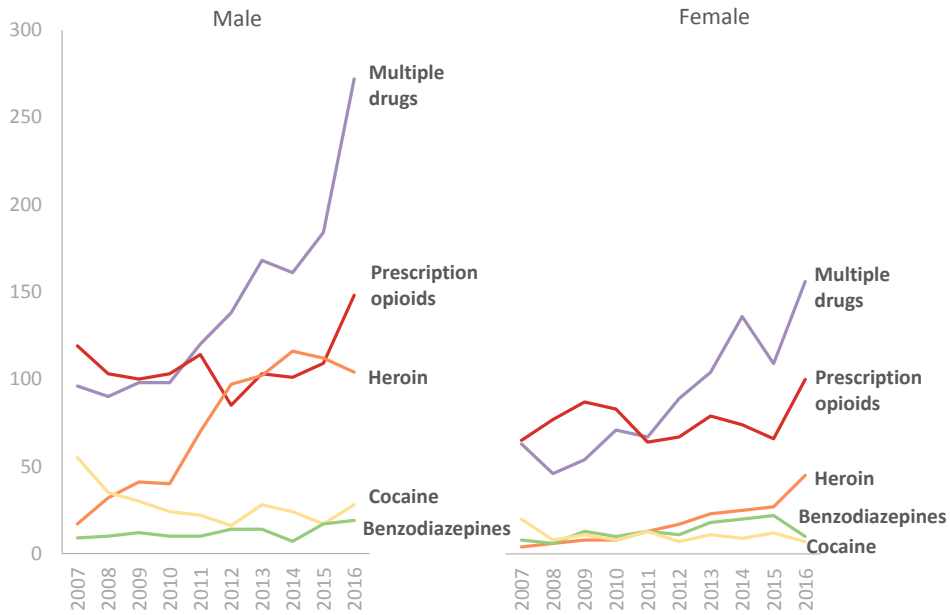
There was a sharp increase in multiple drugs as a cause of drug overdose deaths in 2016. There has also been an increase in prescription opioid deaths since 2015. Heroin deaths have been on the rise since 2010. In contrast, drug overdose deaths from cocaine, benzodiazepines, and psychostimulants have been relatively low and stable for many years.

Figure 17. Number of drug overdose deaths by type



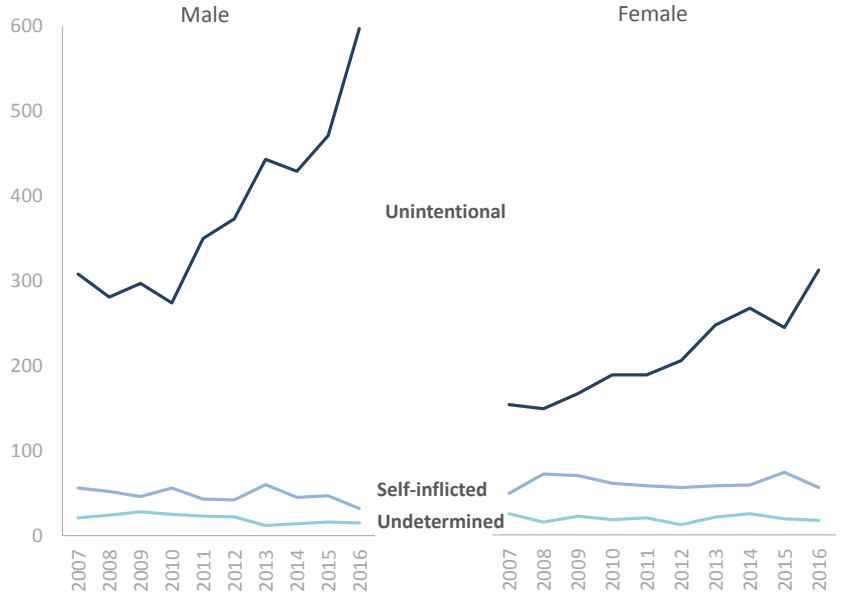
The total number of drug overdose deaths, particularly from multiple drugs, has been on the rise for both males and females. In Wisconsin, the rise of multiple drugs, heroin, and prescription opioid deaths among males has been increasing faster than among females. The number of deaths due to benzodiazepine alone and cocaine alone were stable in Wisconsin in both males and females (Figure 18).

Figure 18. Number of drug overdose deaths, by type and sex



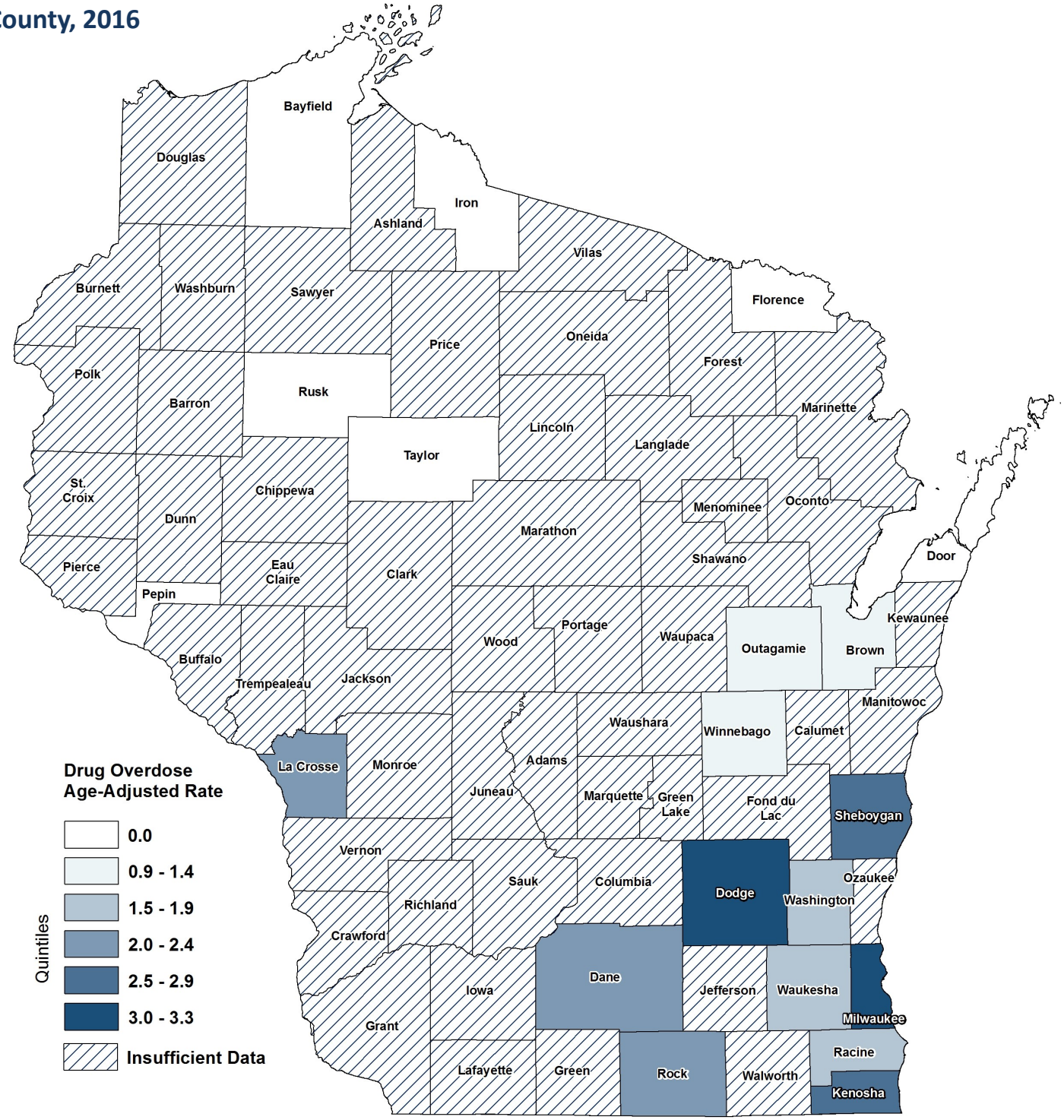
The total number of unintentional drug overdose deaths nearly doubled for males from 308 deaths in 2007 to 597 deaths in 2016, and it increased 103 percent among females, from 154 deaths in 2007 to 313 deaths in 2016. Among males, self-inflicted drug overdose deaths (suicide) decreased 43 percent, from 56 deaths in 2007 to 32 deaths in 2016; among females there was a 14 percent increase, from 49 deaths in 2007 to 56 deaths in 2016. Although there was a percent increase in self-inflicted overdose deaths among females from 2007 to 2016 overall, there was a 24 percent decrease within the last year, from 2015 to 2016.

Figure 19. Number of drug overdose deaths, by intent and sex



In 2016, the highest drug overdose mortality rates were in Milwaukee, Dodge, Kenosha, and Sheboygan counties. Bayfield, Door, Florence, Iron, Pepin, Rusk, and Taylor counties had no drug overdose deaths in 2016 (Map 5).

Map 5. Age-adjusted mortality rate (per 10,000) for drug overdose cause of death by County, 2016



Autopsies were more likely performed on younger people (37 percent of children ages 0 to 5, 49 percent of those ages 5 to 17, and 72 percent of those ages 18 to 25) compared to people ages 65 and older (2 percent). The proportion of autopsies performed was higher among males (11 percent) than among females (5 percent), and higher among NH African Americans (22 percent), Hispanics (22 percent), and NH Native Americans (18.8 percent) than among NH Asians (11 percent) and NH Whites (7 percent; Table 13).

Table 13. Number and percent of autopsies performed by demographics, 2016

Demographics	No Autopsy	Autopsy	Total	Percent
Age				
Less than 5	307	183	490	37.3
5 to 17	98	95	193	49.2
18 to 25	156	408	564	72.3
26 to 64	8,139	2,779	10,918	25.5
65 and older	38,870	753	39,623	1.9
Sex				
Female	24,386	1,381	25,767	5.4
Male	23,184	2,837	26,021	10.9
Race/ethnicity				
Non-Hispanic White	44,142	3,309	47,451	7.0
Non-Hispanic African American	2,121	604	2,725	22.2
Non-Hispanic Native American	323	75	398	18.8
Non-Hispanic Asian	352	43	395	10.9
Hispanic	611	174	785	22.2
Total	**47,570**	**4,218**	**51,788**	**8.1**

As seen in Table 14 on the next page, autopsies were more likely to be performed in the case of injuries, with 42 percent being performed in unintentional injury deaths, 97 percent in homicide/assault cases, and 54 percent performed with self-inflicted injury deaths. Autopsies were also more likely when deaths were due to poisoning (84 percent), fire (78 percent), drowning (71 percent), firearms (66 percent), or MVCs (55 percent; Table 14). Compared to 2015, the total number of injury deaths increased by 14 percent in 2016. However, the proportion of autopsies performed for injury deaths only increased by 6 percent.

Table 14. Number and percent of autopsies performed by leading causes of death, intent, and causes of injury, 2016

Cause of Death	No Autopsy	Autopsy	Total	Percent
By leading causes				
Heart disease	10,697	790	11,487	6.9
Cancer	11,371	124	11,495	1.1
Unintentional injury	1,983	1,519	3,502	43.4
By injury intent				
Assault (homicide)	5	245	250	98.0
Undetermined	17	50	67	74.6
Self-inflicted (suicide)	328	534	862	61.9
Legal/war	1	8	9	88.9
By selected causes of injury				
Poisoning	144	995	1,139	87.4
Fire/flame	19	29	48	60.4
Drowning	13	53	66	80.3
Firearm	198	464	662	70.1
Motor vehicle crash (MVC)	254	346	600	57.7
Suffocation	124	192	316	60.8
Fall	1,393	106	1,499	7.1
All others	189	171	360	47.5
Total injury causes	2,299	2,074	4,373	47.4
Total	**47,570**	**4,218**	**51,788**	**8.1**

Cremation continues to be the predominant method of disposition compared to burials.

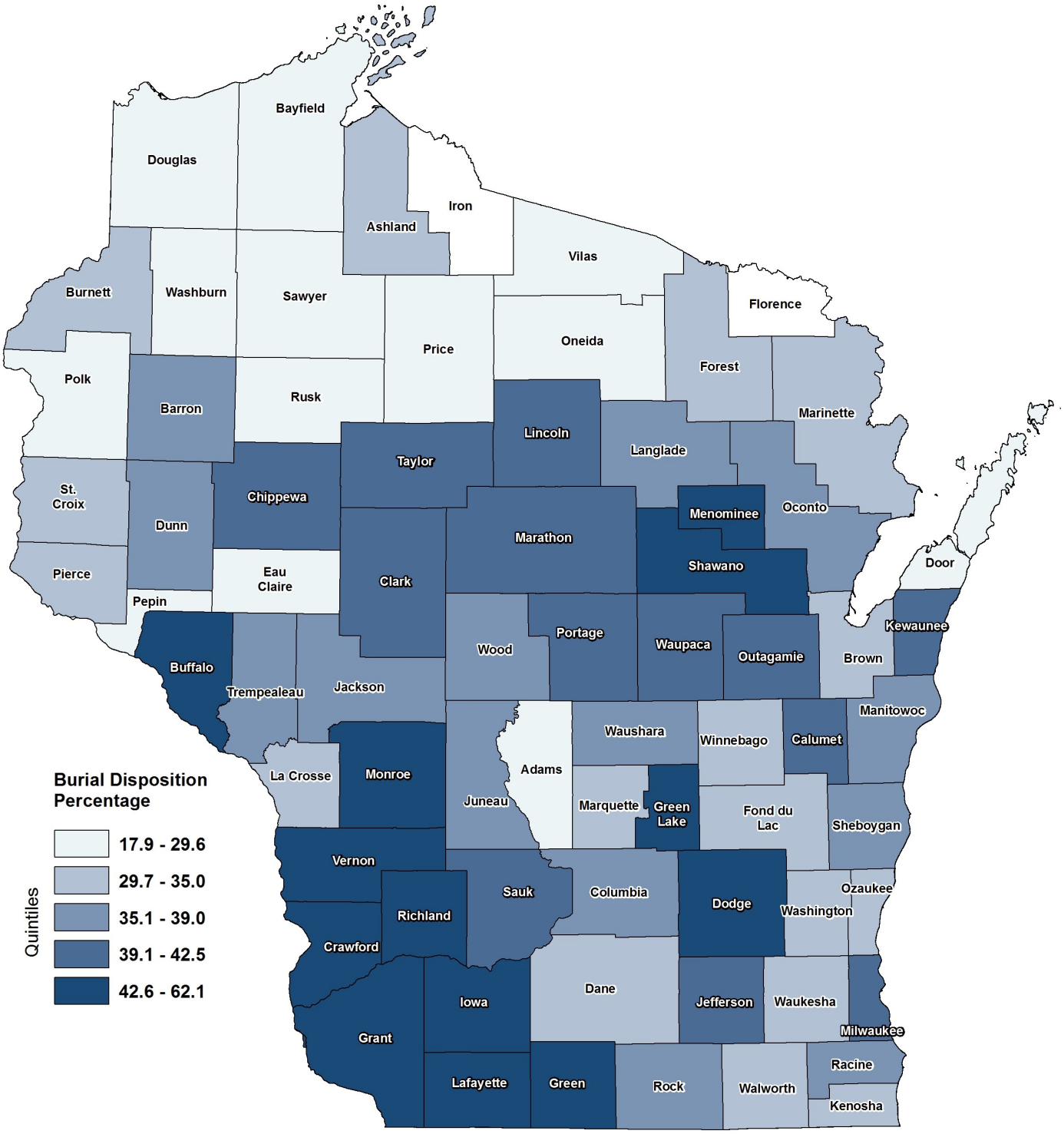
Of the 51,788 deaths in 2016, the percent cremated increased from 54 to 57 percent, while the proportion of burials decreased from 39 to 37 percent in 2015. Table 15 shows the number and percent of body disposition by demographics, education, marital status, and region of residence. The proportion of decedents who were cremated was higher among those ages 18 to 64. Among males, about 61 percent of decedents were cremated compared to 53 percent among females. NH Whites and Hispanics had the highest proportion of decedents cremated compared to other race/ethnicity categories. NH African Americans had the lowest proportion of decedents cremated followed by NH Asians. Decedents with an education level higher than high school were more likely to be cremated compared to those with less than a high school education.

Table 15. Disposition of bodies by demographics, 2016

Characteristic	Burial		Cremation		Donation		Entombment		Other		Total
	N	%	N	%	N	%	N	%	N	%	N
Age											
Less than 5	220	44.9	264	53.9	0	0.0	<5	-	<5	-	490
5 to 17	92	47.7	99	51.3	0	0.0	<5	-	<5	-	193
18 to 25	217	38.5	339	60.1	0	0.0	6	1.1	<5	-	564
25 to 64	2,646	24.2	8,081	74.0	49	0.4	116	1.1	26	0.2	10,918
65 and older	15,903	40.1	20,954	52.9	248	0.6	2,462	6.2	56	0.1	39,623
Sex											
Female	10,389	40.3	13,694	53.1	154	0.6	1,496	5.8	34	0.1	25,767
Male	8,689	33.4	16,043	61.7	143	0.5	1,091	4.2	55	0.2	26,021
Race/Ethnicity											
Non-Hispanic White	16,647	35.1	27,981	59.0	288	0.6	2,463	5.2	72	0.2	47,451
Non-Hispanic African	1,626	59.7	991	36.4	6	0.2	94	3.4	8	0.3	2,725
Non-Hispanic Native	207	52.0	187	47.0	0	0.0	<5	-	<5	-	398
Non-Hispanic Asian	232	58.7	156	39.5	<5	-	5	1.3	<5	-	395
Hispanic	354	45.1	401	51.1	<5	-	23	2.9	5	0.6	785
Other	12	35.3	21	61.8	0	0.0	0	0.0	<5	-	34
Education											
High school or less	13,771	39.7	18,797	54.2	152	0.4	1,926	5.6	48	0.1	34,694
College/undergraduate	4,321	30.8	9,045	64.4	103	0.7	554	3.9	29	0.2	14,052
Graduate school	717	29.3	1,591	64.9	35	1.4	96	3.9	11	0.4	2,450
Unknown	269	45.4	304	51.4	7	1.2	11	1.9	<5	-	592
Marital status											
Single	2,537	36.3	4,256	60.9	16	0.2	159	2.3	16	0.2	6,984
Married	6,194	32.9	11,583	61.5	120	0.6	895	4.8	47	0.2	18,839
Divorced	1,621	22.0	5,568	75.6	52	0.7	119	1.6	7	0.1	7,367
Widowed	8,657	46.9	8,255	44.7	109	0.6	1,414	7.7	17	0.1	18,452
Unknown	69	47.6	75	51.7	0	0.0	0	0.0	<5	-	145
DHS Region											
Northeastern	4,236	36.2	6,534	55.9	58	0.5	852	7.3	13	0.1	11,693
Northern	1,757	34.0	3,262	63.2	18	0.3	121	2.3	5	0.1	5,163
Southeastern	6,931	37.4	10,081	54.3	133	0.7	1,377	7.4	34	0.2	18,556
Southern	3,744	40.1	5,362	57.4	54	0.6	158	1.7	22	0.2	9,340
Western	2,410	34.3	4,494	63.9	34	0.5	79	1.1	11	0.2	7,028
Unknown	0	0.0	<5	-	0	0.0	0	0.0	<5	-	8
Total	**19,078**	**36.8**	**29,737**	**57.4**	**297**	**0.6**	**2,587**	**5.0**	**89**	**0.2**	**51,788**

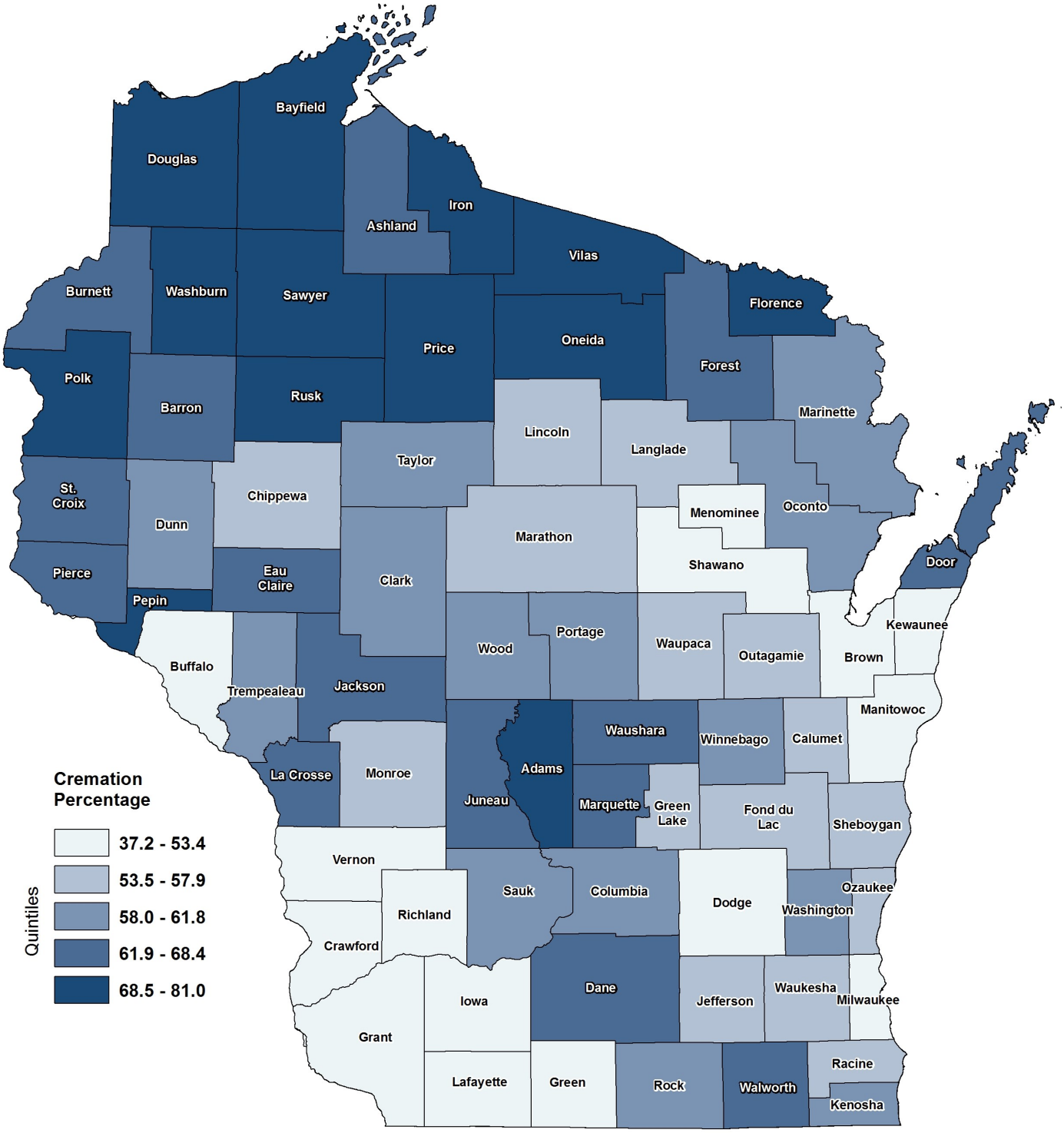
When looking at the percent of burials by county in 2016, the three highest counties are Lafayette (62 percent), Grant (60 percent), and Menominee (58 percent).

Map 6. Percent distribution of burials by County, 2016



When looking at the percent of cremation by county in 2016, the three highest counties were Iron (81 percent), Bayfield (80 percent), and Oneida (77 percent).

Map 7. Percent distribution of cremation by County, 2016



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