2017

INJURY DATA AND PREVENTION STRATEGIES FOR SPOKANE COUNTY

SPOKANE REGIONAL HEALTH DISTRICT

Injury Data and Prevention Strategies for Spokane County

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SUMMARY

Injuries are widespread in society. They are categorized as unintentional (occur without the intent of harm, e.g. motor vehicle crash, fall, drowning) or intentional (occur with intent of harm, e.g., suicide, homicide). Injuries may result in death or hospitalization or less severe harm. Yet there are ways to decrease the risk of an injury occurring or the level of injury sustained. These prevention strategies can impact the individual, the force or mechanism of injury, or the environment in which the injury occurs. Injury Data and Prevention Strategies for Spokane County presents data, trends, and a framework for identifying injury prevention opportunities.

Each year approximately 400 Spokane County residents die and 4,000 are hospitalized from an injury. Spokane County's death rate from injuries and rate of non-fatal hospitalizations from injuries increased and is higher than Washington State's rates. By far, seniors 65 years of age or older had the highest rate of both death and hospitalization from an injury.

Injuries in Spokane County are a leading cause of death among the young as these individuals are not old enough to be impacted by chronic conditions such as heart disease or conditions that impact older adults more such as cancer. Unintentional injuries are the leading cause of death among individuals 1 to 44 years of age. Suicide is the second leading cause of death among individuals 15 to 34 years of age. While injuries decrease in rank as a leading cause of death as age increases, older adults still have similar, or sometimes much higher, rates of injury compared to younger individuals.

Over the last 25 years in Spokane County, the distribution changed for types of injury deaths. The proportion of injury deaths from suicide and motor vehicle traffic deaths decreased as deaths from poisoning and falls increased. During the last five years, falls were the leading cause of injury-related deaths and non-fatal hospitalizations, followed by suicide, then poisoning, then motor vehicle traffic injuries.

133 Spokane County residents die each year on average from a fall.

The county's death rate from falls increased over time and was significantly higher than the state's rate. Death and non-fatal hospitalization rates from a fall were highest among seniors 65 years of age or older. Even among seniors, the rate continued to increase with age. Half of fatal falls occurred at home and 40% occurred at a nursing home.

78 Spokane County residents die each year on average from suicide.

The Spokane County suicide death rate increased over time. Males have a higher suicide death rate, but females have a higher rate of non-fatal suicide attempts resulting in hospitalization. A firearm was the most prevalent means of suicide and poisoning was the highest cause for a non-fatal suicide attempt.

64 Spokane County residents die each year on average from poisoning.

Deaths from poisoning increased starting in 1998, peaking in 2008, then decreasing since. Since 2000, non-fatal poisonings resulting in a hospitalization increased. Approximately 25-30% of poisonings were from an opioid.

37 Spokane County residents die each year on average from a motor vehicle traffic collision.

Death and non-fatal hospitalization rates from motor vehicle traffic injuries decreased over time. Children younger than 15 years of age had the lowest injury rates. Males, blacks, and American Indians/Alaska Natives had higher death rates from injuries sustained in a motor vehicle traffic collision.

16 Spokane County residents die each year on average from homicide.

The homicide rate decreased over time. More than half of homicides were from the use of a firearm. Only 4% of non-fatal hospitalizations from an assault were from the use of a firearm.

14 Spokane County residents die each year on average from suffocation.

The death rate from suffocation increased over time. Seniors 65 years of age or older had a significantly higher suffocation death rate. The main type of obstruction among seniors was an object blocking the airway.

7 Spokane County residents die each year on average from drowning.

Young adults 15 to 24 years of age had the highest drowning death rate. The largest source of drowning deaths was natural water accounting for 43% of drownings.

Specific to injury, public health agencies like Spokane Regional Health District (SRHD) work to improve community health by providing surveillance of these issues and working in partnership with the community to decrease associated negative effects. Injuries are preventable and prevention can occur before the incident, and can reduce harm from an injury during the incident and after the injury occurs. Prevention efforts can take place through changes in the individual, the mechanism of injury, and/or the physical/social/economic environment.

INTRODUCTION

Injury is damage or harm to the body that results in impairment or destruction of health.[1] Historically, injury was not viewed as a public health problem because injuries were thought of as "accidents," "acts of fate," or as "part of life." Yet, most events resulting in injury, disability, or death are predictable and preventable. To this end, SRHD considers injuries, whether intentional or unintentional, to be a public health problem. This is especially true when considering how injury and violence limit the ability of Spokane County residents to live to their full potential.

Spokane Regional Health District receives frequent requests from staff and the community for information about various types of injuries. The SRHD Data Center compiled available information on injuries into this report, Injury Data and Prevention Strategies for Spokane County. The work of this report is an element of the public health accreditation standard domain 1 to conduct and disseminate assessments focused on population health status and public health issues facing the community.

To determine the magnitude of fatal and non-fatal injuries here, this report examines data gathered and analyzed from injuries in Spokane County. It provides trend analysis on rates from 1990-2014 and descriptive data and rates for 2010-2014 injury morbidity and mortality, including variation by age, sex, race, and ethnicity where available. Not all injuries result in hospitalization or death. Reports of injuries from emergency departments, emergency response agencies, or provider offices were not available for inclusion in the report.

The report also describes injury concepts and definitions to provide a framework for understanding public health injury prevention. Stakeholders can use Injury Data and Prevention Strategies for Spokane County to monitor injury trends and identify priority areas. The data and the framework for prevention can guide program development and policy initiatives.

A rich body of research documents the effectiveness of these approaches to prevent injury-related morbidity and mortality. Injuries are the leading cause of death of children and adults 1 to 44 years of age in Spokane and around the nation. More years of life are lost due to injuries than from the preventable causes of death of heart disease and cancer. Injuries are tragic in terms of lives lost and disability suffered, but also costly for the health care system and business community. The estimated costs of injury-related deaths in Washington State in 2013 was about $4.1 billion.[2]

And there are faces behind these numbers—injuries and violence damage mothers, fathers, children, families, neighborhoods and communities. Spokane can take steps to minimize the risk of injury by implementing evidence-based public health practices. To this end, this report also includes examples of prevention strategies.

In summary, it is the hope of Spokane Regional Health District that Injury Data and Prevention Strategies for Spokane County is used widely in the community to help prevent future unintentional injuries and violence, and reduce the associated consequences.

REPORT STRUCTURE

This report provides data on injuries mainly for residents of Spokane County, Washington. There is some comparison to Washington State as a benchmark to identify areas where Spokane County is faring better or worse than the rest of the state. Unless otherwise noted, the main data sources are death certificates and inpatient hospitalization records. A description of these data sources can be found in the methodology section. Additional information is provided as available and appropriate to the discussion.

Section 1 provides an overview of fatal injuries. Data in this section includes both unintentional and intentional injuries, as well as those where the manner of death was unknown or undetermined. This encompassing category of fatal injuries is described several ways: over time, by demographics, and by the types of injuries included in this category.

Section 2 provides an overview of non-fatal injuries where inpatient hospitalization was required for treatment. Data in this section includes both unintentional and intentional injuries, as well as those where the intent of injury was unknown or undetermined. This encompassing category of non-fatal hospitalizations from an injury is described over time, by demographics, and describes the types of injuries included in this category.

Section 3 describes how injury and injury prevention can be conceptualized. The description ends by detailing the Haddon Matrix, which can be used to identify and plan injury prevention opportunities for a given injury type.

Section 4 describes injuries that were unintentional in manner. This excludes intentional injuries and injuries where the manner was unknown or undetermined. Data is described over time and by demographics, first for fatal unintentional injuries and then for non-fatal unintentional injuries requiring inpatient hospitalization.

Subsections of Section 4 provide data in the same format, but for specific types of unintentional injuries. Data is described over time and by demographics for both fatal and non-fatal hospitalization injuries. A description of prevention measures for each specific type of injury concludes each subsection.

Section 5 describes injuries that were intentional in manner. This excludes unintentional injuries and injuries where the manner was unknown or undetermined. Data is described over time and by demographics, first for fatal intentional injuries and then for non-fatal intentional injuries requiring inpatient hospitalization.

Subsections of Section 5 provide data in the same format, but for specific types of intentional injuries. Data is described over time and by demographics for both fatal and non-fatal hospitalization injuries. A description of prevention measures for each specific type of intentional injury concludes each subsection.

Terminology

Unintentional injuries are due to unplanned events such as a fall, motor vehicle crash, falling from a bicycle, drowning, poisoning (including an overdose of medication), or a house fire.

Intentional injuries include violence against oneself (suicide) or against another person (homicide or assault).

Motor vehicle traffic (MVT) injuries occur from collisions between a vehicle and another vehicle, pedestrian, animal, bicyclist, road debris, or other stationary obstruction.

Other transport injuries occur when the transport is not a traffic motor vehicle. Examples include transport by animal-drawn vehicle, watercraft, or aircraft. Bicyclists who are injured, but not from colliding with another transport vehicle, are also categorized as other transport injuries.

AIAN: American Indian/Alaska Native

API: Asian/Pacific Islander

SECTION [1]

OVERVIEW OF FATAL INJURIES

Section 1 provides an overview of fatal injuries. Data in this section includes both unintentional and intentional injuries, as well as those where the manner of death was unknown or undetermined. This encompassing category of fatal injuries is described several ways: over time, by demographics, and by the types of injuries included in this category. Additional information is provided as available and appropriate to the discussion.

INJURIES AS A LEADING CAUSE OF DEATH

The two leading causes of death, heart disease and cancer, accounted for almost half of all Spokane County deaths in 2014. Deaths from injury were the third leading cause of death. Injury deaths include unintentional injury; intentional injury, either self-inflicted (suicide) or assault by another person (homicide); an injury where the intent could not be determined; or an injury due to legal intervention. These deaths accounted for nearly one in 10 deaths. The majority of injury deaths were unintentional, followed by suicide.

Comparison of the Top 10 Leading Causes of Death, 2014

	Spokane County	% Total	Washington State	% Total
1	Heart disease	25.6	Heart disease	27.8
2	Cancer	22.6	Cancer	23.4
3	**Injuries** **Unintentional, 6.5** **Intentional, 2.7**	**9.2**	**Injuries** **Unintentional, 5.7** **Intentional, 2.5**	**8.3**
4	COPD*	6.4	COPD*	5.6
5	Alzheimer's disease	6.4	Alzheimer's disease	6.4
6	Diabetes	3.0	Diabetes	3.2
7	Chronic liver disease	1.7	Chronic liver disease	1.7
8	Influenza/pneumonia	1.6	Influenza/pneumonia	1.4
9	Aspiration pneumonia	1.4	Aspiration pneumonia	1.1
10	Parkinson's disease	1.2	Parkinson's disease	1.1

Source: Washington State Department of Health, Center for Health Statistics, Death Certificate Data.

*Chronic lower respiratory disease, chronic obstructive pulmonary disease

Causes of death vary by age group. Unintentional injury was the leading cause of death among children and young adults. Later into adulthood, chronic health conditions overtake injury as the leading cause of death. Still, deaths from injuries are among the leading causes of death for all age groups.

FATAL

Spokane County, Leading Causes of Death, 2010--2014								
	Age Groups and Number							
Rank	<1	1-14	15-24	25-34	35-44	45-54	55-64	65+
1	Perinatal conditions 69	Unintentional Injury 16	Unintentional Injury 85	Unintentional Injury 99	Unintentional Injury 96	Cancer 343	Cancer 897	Cancer 3,150
2	Congenital anomalies 44	Congenital anomalies 10	Suicide 37	Suicide 79	Cancer 94	Heart disease 210	Heart disease 421	Heart disease 3,145
3	SIDS 27	Cancer 8	Cancer 13	Homicide 25	Suicide 52	Unintentional Injury 180	Chronic low respiratory disease 179	Alzheimer's disease 1,181
4	Unintentional Injury 6	Symptoms of illness 7	Homicide 11	Cancer 20	Heart disease 44	Liver disease 103	Unintentional Injury 167	Chronic low respiratory disease 1,154
5	*	Homicide 5	Heart disease 8	Heart disease 19	Liver disease 32	Suicide 83	Diabetes 136	Cerebro-vascular 970
6	*	*	*	Diabetes 7	Diabetes 13	Chronic low respiratory disease 53	Liver disease 120	Unintentional Injury 766
7	*	*	*	Chronic low respiratory disease 6	Homicide 13	Diabetes 45	Suicide 74	Diabetes 471
8	*	*	*	Liver disease 6	Chronic low respiratory disease 11	Cerebro-vascular 34	Cerebro-vascular 68	Influenza pneumonia 259
9	*	*	*	Pregnancy and childbirth 5	Cerebro-vascular 9	Infections parasitic 17	Infections parasitic 47	Parkinson's disease 237
10	*	*	*	*	Symptoms of illness 7	Influenza pneumonia 17	Influenza pneumonia 28	Infections parasitic 229

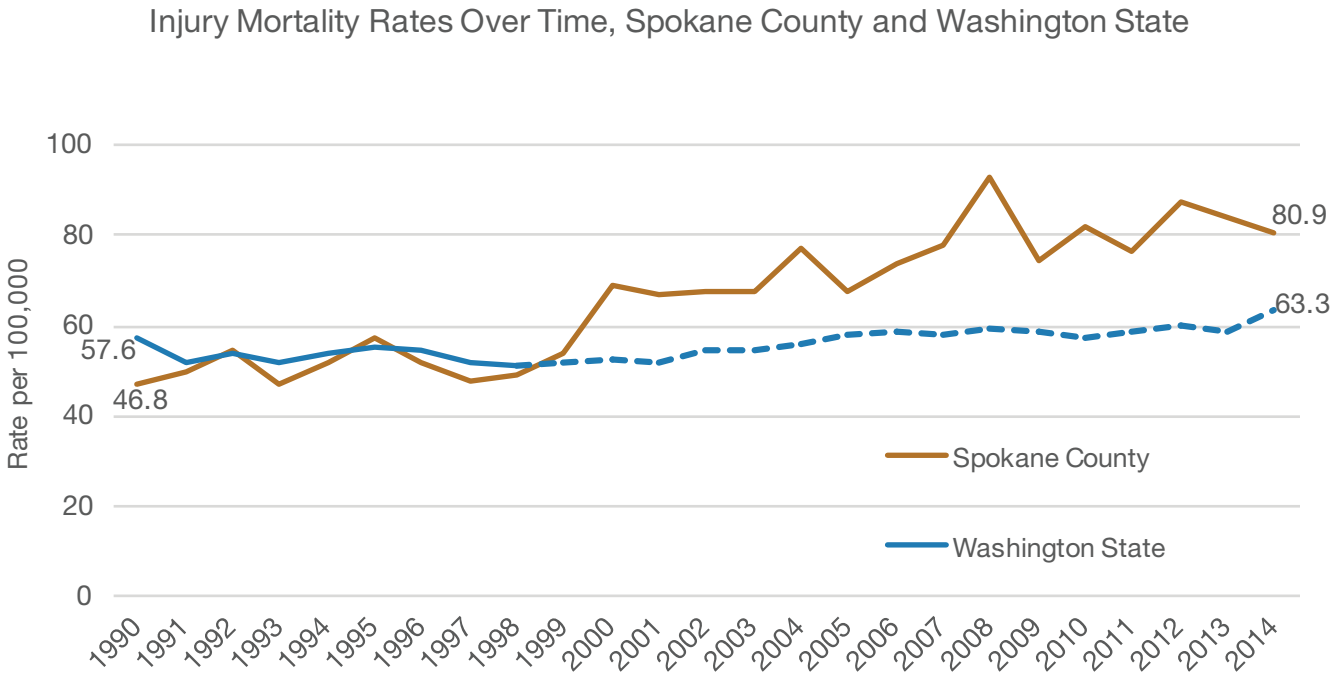
Source: Washington State Department of Health, Center for Health Statistics, Death Certificate Data.

* Suppressed n<5

UNINTENTIONAL INJURY | SUICIDE | HOMICIDE

INJURY MORTALITY OVER TIME

The rate of mortality from injury changed over the last 25 years. In Spokane County, there was a significant increase in the injury mortality rate from 1990-2014 with an annual percent increase of 2.7. Statewide, the injury mortality rate was steady from 1990-1998, significantly increasing from 1998-2014 with an annual percent increase of 1.1. Since 2000, Spokane County had a higher injury mortality rate than Washington State. Previously during the 1990s, the Spokane County injury mortality rate was similar to that of Washington State.



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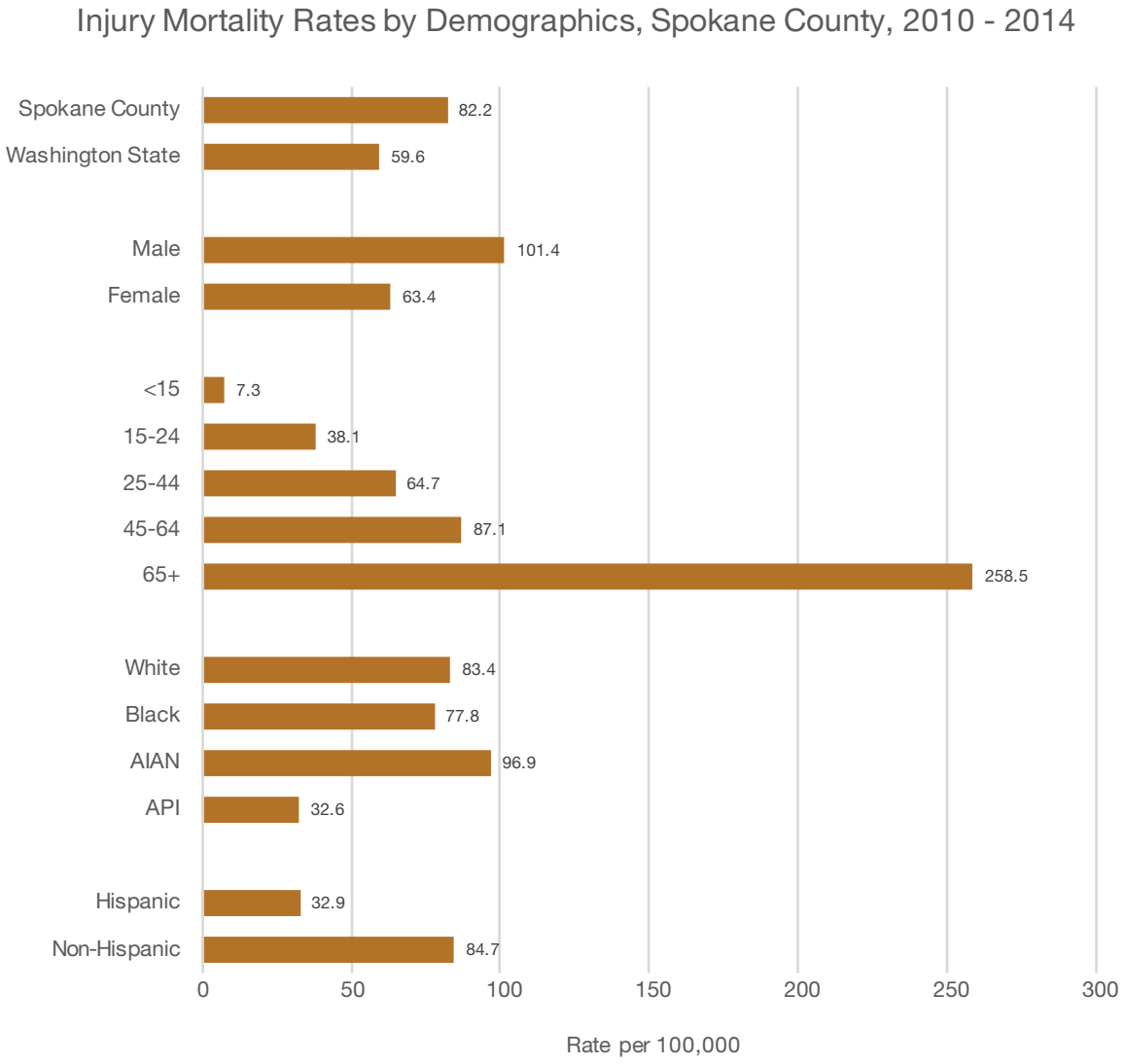
Approximately 400 Spokane County residents died each year from an injury from 2010-2014. The five-year injury mortality rate was significantly higher for Spokane County than Washington State. The injury mortality rate increased as age increased. Males had a significantly higher injury mortality rate than females. Compared to whites, Asians/Pacific Islanders (APIs) had a significantly lower injury mortality rate. Rates for blacks and American Indians/Alaska Natives (AIANs) were similar to the white rate. Hispanics had a significantly lower injury rate compared to non-Hispanics.

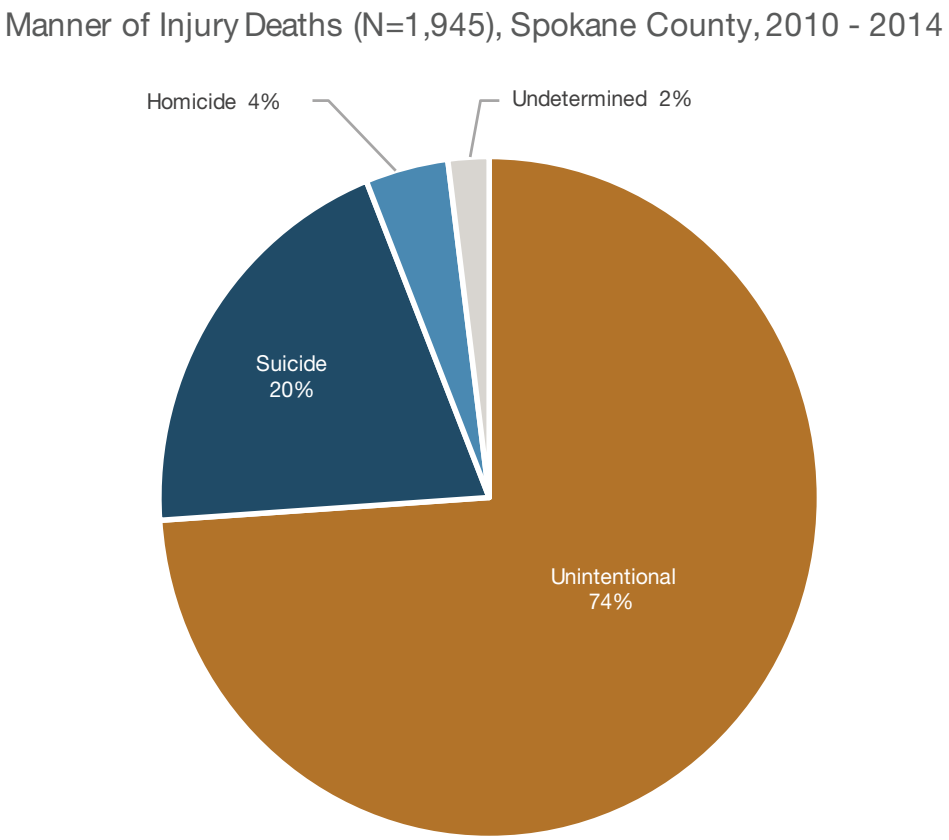


It is challenging to identify why Spokane County had a higher injury mortality rate than Washington State. There are just more deaths from injuries among most demographics. The rate in Spokane County during 2010-2014 was higher than the Washington State rate for all demographic groups except children younger than 15 years of age and American Indians/Alaska Natives. The distribution of type of injury was similar for Spokane County and Washington State except for the two leading causes – suicide and falls. Suicide accounted for 25% of injury deaths statewide, but 20% in Spokane County. Falls accounted for 21% of injury deaths statewide, but 34% in Spokane County.

Manner of death refers to the reason a death occurred. There are five categories for manner of death:

- **Natural**
- **Accidental** – (those from an unintentional injury)
- **Suicide** – (intentional, self-inflicted injury)
- **Homicide** – (intentional injury inflicted by another person)
- **Undetermined**

Natural deaths are those from a medical cause, such as cancer or pneumonia. Undetermined manner of death occurs when, after an investigation of the death, there is no clear determination of one manner over all the others. These deaths are not included in the further discussion of injury deaths in this report. The remaining manners of death – accidental, suicide, and homicide - are examined further in this report and are categorized as unintentional and intentional injuries.



In Spokane County during 2010-2014, there were nearly 2,000 deaths from injuries. Three in four injury deaths were from unintentional injuries. Deaths from intentional injuries accounted for one in four injury deaths. The majority of intentional injury deaths were suicide, accounting for 20% of all injury deaths. Four percent of injury deaths were homicides. In a small proportion of injury deaths, the manner of death was undetermined.

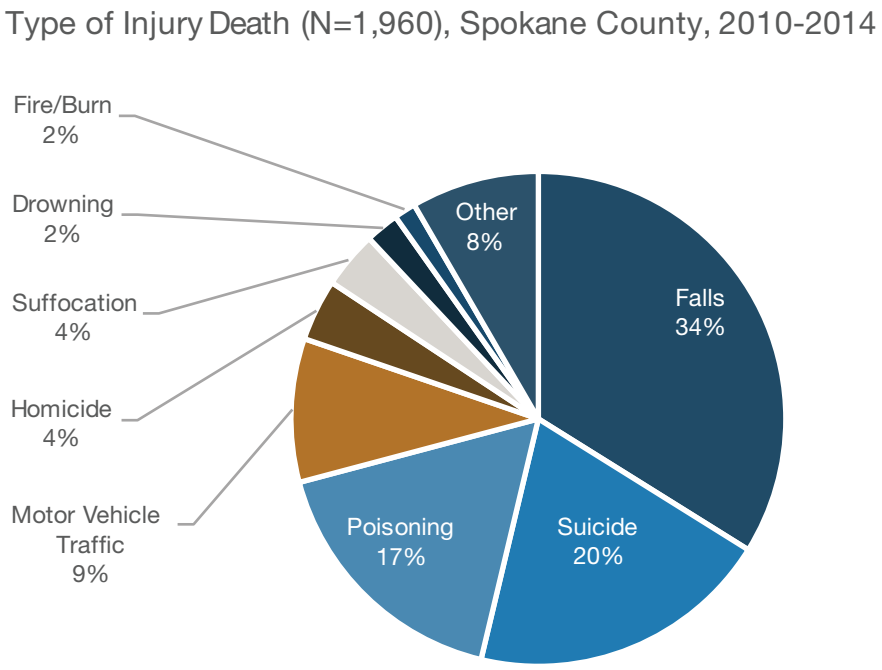
TYPES OF INJURY AND MANNER

Some types of injuries are almost always unintentional, such as motor vehicle crashes. Other types are almost always intentional, such as firearm-related deaths. In Spokane County during 2010-2014, four in five deaths from a firearm injury were suicide. Another 18% of deaths from a firearm injury were homicide. Deaths from poisoning were mostly unintentional, but 18% of poisoning deaths were suicide. The manner of some types of injury deaths may be harder to determine, for instance, in more than one in 10 deaths from drowning, the manner of death was undetermined. Most drowning deaths were unintentional, but 12% were suicide.

Type of Death by Manner, Spokane County, 2010-2014

Manner	Suicide		Homicide		Unintentional		Undetermined		Total
	Deaths	% Total	Deaths	% Total	Deaths	% Total	Deaths	% Total	
Motor Vehicle Traffic	0	0%	0	0.0 %	184	100.0 %	0	0.0 %	184
Firearm	201	80.7 %	43	17.3 %	3	1.2 %	2	0.8 %	249
Poisoning	73	17.8 %	2	0.5 %	322	78.3 %	14	3.4 %	411
Falls	13	1.9 %	0	0.0 %	663	97.9 %	1	0.1 %	677
Suffocation	78	48.8 %	9	5.6 %	72	45.0 %	1	0.6 %	160
Drowning	6	12.2 %	0	0.0 %	36	73.5 %	7	14.3 %	49
Fire/Burn	2	6.7 %	0	0.0 %	26	86.7 %	2	6.7 %	30

Injuries from a fall were the most common type of injury-related death during 2010-2014, accounting for one-third of all deaths from an injury in Spokane County. The second most common type of injury resulting in death was suicide, followed closely by unintentional poisoning.



Over time, the distribution of types of injury deaths changed. In the 1990s, suicide was the leading cause of injury-related death. Then, the prevalence of suicide decreased and other types of injuries increased so that suicide was the second leading cause of injury-related death.

Over the past 25 years, deaths from a fall-related injury increased. In 2008, falls became the leading cause of unintentional injury deaths.

During the early to mid-1990s, motor vehicle traffic injuries were the leading type of unintentional injury-related deaths. From the late 1990s to mid-2000s, these deaths declined and stabilized at around 9% of all injury deaths.

Meanwhile, deaths from unintentional poisoning were low during the 1990s, but increased during the 2000s. Unintentional poisoning deaths were more prevalent than motor vehicle traffic injury deaths in 2003. Unintentional poisoning deaths peaked in 2006 and then decreased.

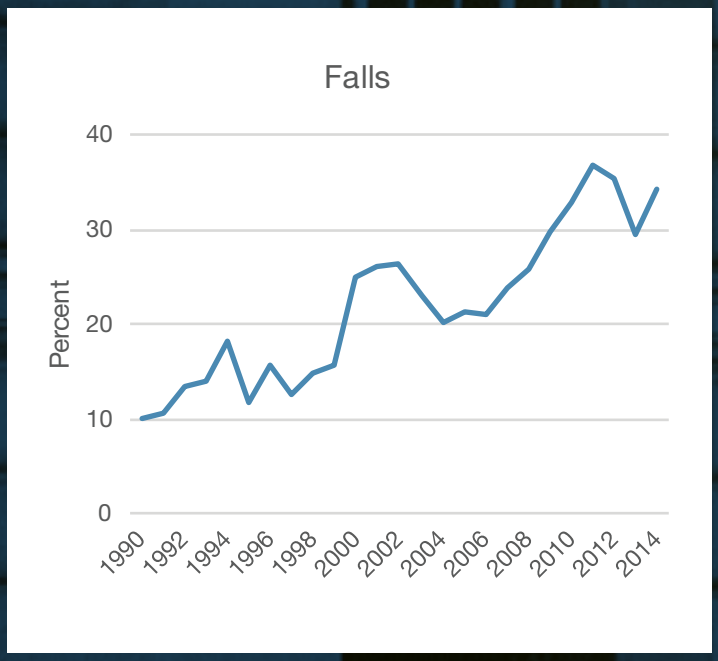
Leading Type of Injury Deaths Over Time, Spokane County

Percent of all injury deaths

40
35
30
25
20
15
10
5
0

1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

Falls
Suicide
Poisoning
MVT


Falls
Percent
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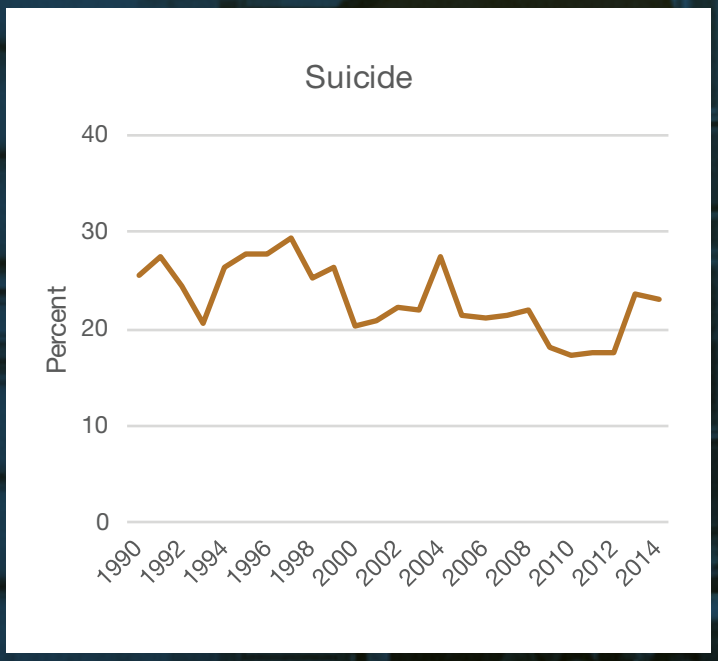
Suicide
Percent
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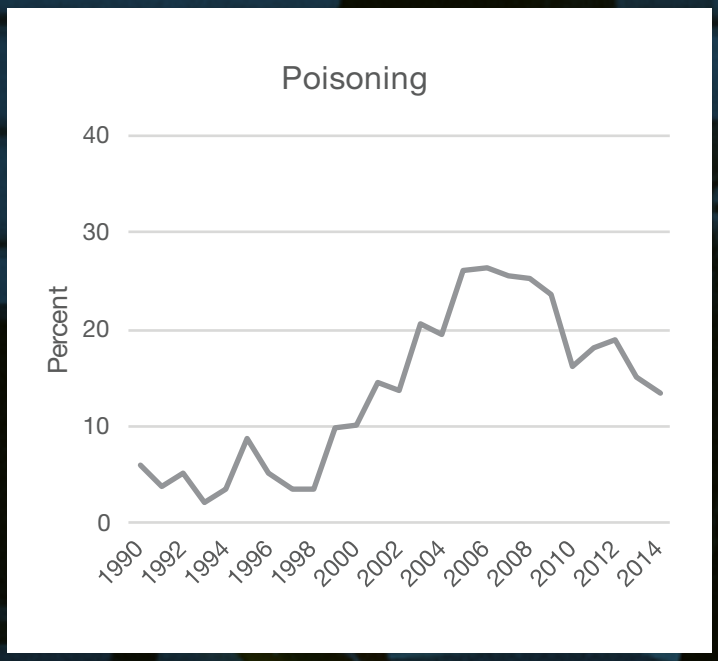
Poisoning
Percent
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2008
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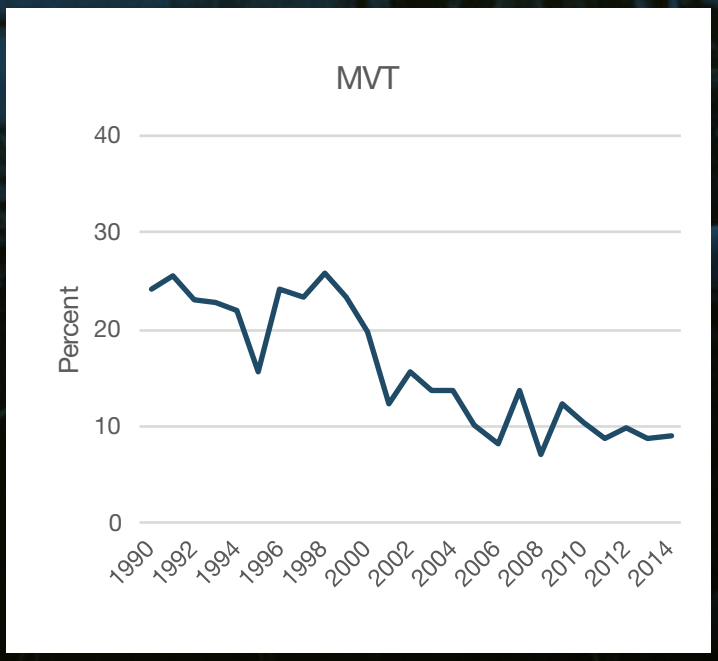
2012
2014


MVT
Percent
40
30
20
10
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1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014

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TYPES OF INJURY BY AGE GROUP

Age of an individual can affect the types of injuries they may experience and also impact the likelihood of dying from an injury. Injuries account for a higher proportion of total deaths among younger individuals. The five leading types of injury-related deaths among individuals 15 to 24 years of age accounted for 63% of all deaths in that age group. This was due to fewer deaths from other causes compared to other age groups. Injuries accounted for a small proportion of all deaths among older individuals as chronic health conditions began to cause death. Yet, older individuals had a higher rate of injury mortality than younger age groups.

As an example, suicide accounted for 19% of all deaths among individuals 15 to 24 years of age, but for less than 1% of deaths among those 65 years of age or older, even though there were 47% more suicides among the older age group (60 suicides) than the younger age group (37 suicides). The suicide rate was 10.1 per 100,000 for those 15 to 24 years of age and 18.4 per 100,000 for those 65 years of age or older. Similarly, falls are the leading cause of injury mortality overall, but falls are not a leading cause of fatal injury except among those 65 years of age or older. Falls accounted for 4% of all deaths among those 65 years of age or older, but the mortality rate from falls among this age group is much higher; (183 per 100,000) compared to the rate for any other type of fatal injury in any age group.

Leading Fatal Injuries by Age Group, Spokane County, 2010-2014									
Age <15 (N=223)		**Age 15-24 (N=196)**		**Age 25-44 (N=798)**		**Age 45-64 (N=4,026)**		**Age 65+ (N=15,225)**	
Type of Injury	**% of all deaths**	**Type of Injury**	**% of all deaths**	**Type of Injury**	**% of all deaths**	**Type of Injury**	**% of all deaths**	**Type of Injury**	**% of all deaths**
Suffocation	4.0%	MVT*	22.4%	Suicide	16.4%	Poisoning	4.3%	Falls	3.9%
Drowning	2.2%	Suicide	18.9%	Poisoning	14.0%	Suicide	3.9%	Suicide	0.4%
Homicide	2.2%	Poisoning	10.7%	Homicide	4.8%	MVT*	1.6%	Suffocation	0.3%
Suicide	1.8%	Drowning	5.6%	MVT*	4.6%	Falls	1.3%	MVT*	0.2%
MVT*	0.9%	Homicide	5.6%	Falls	1.4%	Homicide	0.5%	Poisoning	0.1%

Age <15		**Age 15-24**		**Age 25-44**		**Age 45-64**		**Age 65+**	
Type of Injury	**Rate per 100,000**	**Type of Injury**	**Rate per 100,000**	**Type of Injury**	**Rate per 100,000**	**Type of Injury**	**Rate per 100,000**	**Type of Injury**	**Rate per 100,000**
Suffocation	2.0	MVT	12.1	Suicide	21.7	Poisoning	27.0	Falls	183.3
Drowning	1.1	Suicide	10.1	Poisoning	18.6	Suicide	24.6	Suicide	18.4
Homicide	1.1	Poisoning	5.8	Homicide	6.3	MVT*	10.3	Suffocation	12.3
Suicide	0.9	Drowning	3.0	MVT*	6.1	Falls	8.1	MVT*	10.7
MVT*	0.4	Homicide	3.0	Falls	1.8	Homicide	3.1	Poisoning	4.9

* MVT – Motor Vehicle Traffic

TYPES OF INJURY BY SEX

Type of fatal injuries varied by sex in Spokane County. Suicide was a much more common type of injury death among males than females. To a lesser extent, males also experienced more deaths from motor vehicle traffic injuries and homicide compared to females. An injury death from a fall was much more common among females. This may be influenced by the fact that women live longer than men and reach an age where a fall-related injury could result in death.

Leading Fatal Injuries by Sex, Spokane County, 2010-2014			
Male (N=1,196)	**% of injury deaths**	**Female (N=764)**	**% of injury deaths**
Suicide	26.6%	Falls	49.7%
Falls	23.7%	Poisoning	17.0%
Poisoning	16.1%	Suicide	9.3%
Motor Vehicle Traffic	10.9%	Motor Vehicle Traffic	7.1%
Homicide	4.9%	Suffocation	3.9%
Suffocation	3.5%	Homicide	2.6%

SECTION [2]

OVERVIEW OF NON-FATAL INJURIES

Section 2 provides an overview of non-fatal injuries where inpatient hospitalization was required for treatment. Data in this section includes both unintentional and intentional injuries, as well as those where the intent of injury was unknown or undetermined. This encompassing category of non-fatal hospitalizations from an injury is described over time, by demographics, and describes the types of injuries included. Additional information is provided as available and appropriate to the discussion.

INJURIES AS A LEADING CAUSE OF HOSPITALIZATION

The following are the leading causes of non-fatal, non-childbirth related hospitalizations. The leading cause of non-childbirth related hospitalization was injuries. The majority of those injuries were unintentional. A small proportion of these hospitalizations (1%) was for intentional injuries.

Leading Causes of Non-Childbirth Hospitalizations, Spokane County, 2014

Reason for hospitalization	Number of hospitalizations	% of non-childbirth hospitalizations	Average length of stay (days)	Average total charges	Average charges per day
Injuries	3,828	10.7%	5.7	$ 45,601	$ 11,256
Unintentional injury	3,391	9.4%	7.5	$47,929	$11,256
Suicide	314	0.9%	5.3	$24,512	$ 7,211
Assault	123	0.3%	10.5	$ 3,026	$12,248
Digestive system disease	3,791	10.6%	4.3	$ 34,951	$ 9,779
Heart disease	3,623	10.1%	4.3	$ 59,540	$ 16,894
Respiratory disease	2,955	8.2%	4.6	$ 33,289	$ 7,660
Severe bacterial disease	2,596	7.2%	6.3	$ 47,816	$ 7,761
Psychoses - not dementia	1,632	4.5%	8.0	$ 25,095	$ 3,311
Genitourinary disease	1,504	4.2%	3.9	$ 29,040	$ 9,622
Cancer	1,265	3.5%	5.9	$ 68,735	$ 16,021
Cerebrovascular	1,131	3.2%	4.1	$ 48,562	$ 15,580
Dorsopathies (back disorder)	873	2.4%	2.5	$ 80,912	$ 40,975

Source: Washington State Department of Health, Center for Health Statistics, Comprehensive Hospital Abstract Reporting System.

Hospitalizations from an injury were significantly longer than hospitalizations for other non-childbirth reasons, averaging 5.7 days compared to 4.9 days. Individuals hospitalized from an injury were more likely to need assisted care upon discharge from the hospital. Twenty-five percent of individuals hospitalized with an injury were discharged to a skilled nursing facility and 13% were discharged home under the care of a health service organization. Comparatively, among non-injury hospitalizations, 8% were discharged to a skilled nursing facility and 11% discharged home under the care of a health service organization.

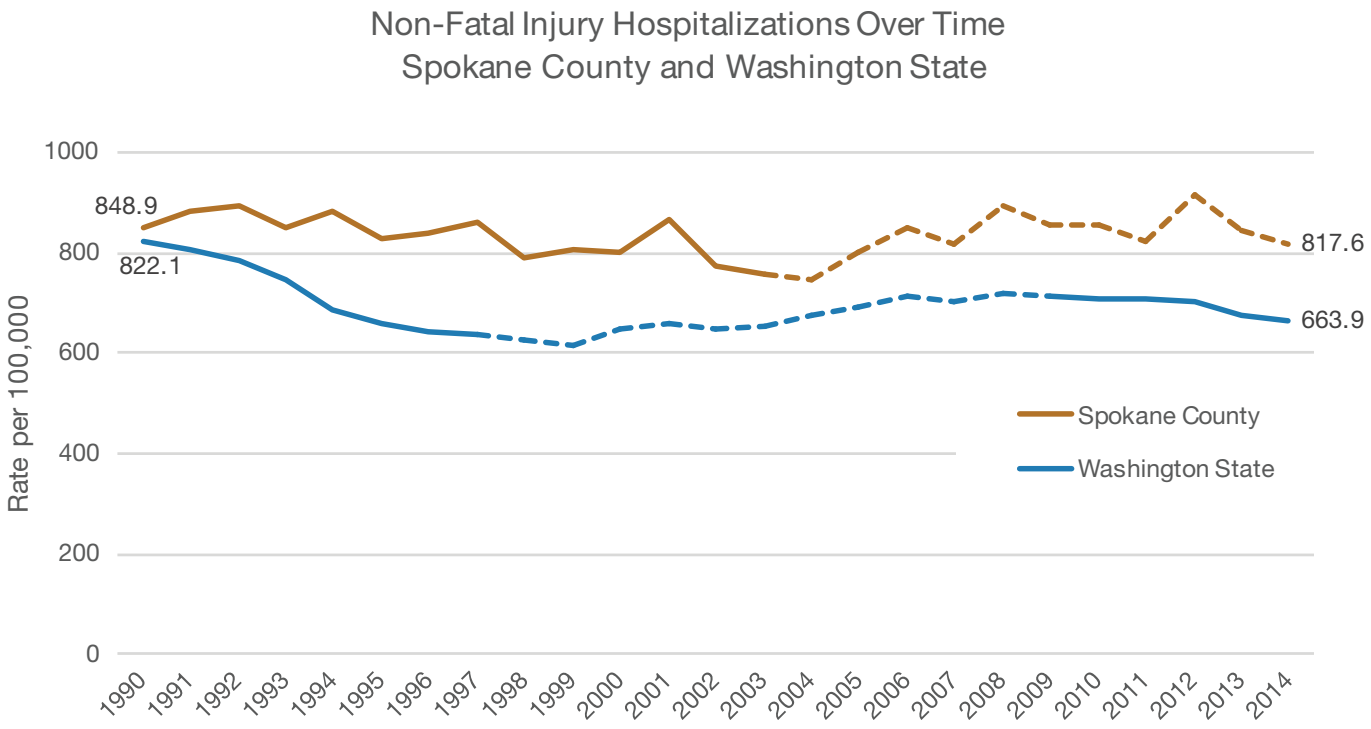
Causes of inpatient hospitalization for reasons other than childbirth vary by age. Unintentional injury is among the top five reasons for hospitalization among individuals of all age groups.

Leading Causes of Non-Childbirth Hospitalizations by Age Group, Spokane County, 2010-2014

<15 (N=10,514)	15-24 (N=9,396)	25-44 (N=27,310)	45-64 (N=55,354)	65+ (N=75,168)
Respiratory disease 2,317	Psychoses - not dementia 1,664	Digestive system disease 3,475	Digestive system disease 6,682	Heart disease 10,906
Digestive system disease 997	Digestive system disease 1,011	Psychoses - not dementia 2,753	Heart disease 5,328	Unintentional injury 8,419
Perinatal condition 925	Unintentional injury 1,008	Unintentional injury 2,440	Unintentional injury 4,415	Respiratory disease 7,602
Unintentional injury 892	Pregnancy complication 626	Genitourinary disease 1,604	Respiratory disease 4,270	Digestive system disease 7,106
Psychoses - not dementia 554	Respiratory disease 439	Respiratory disease 1,370	Severe bacterial disease 3,049	Severe bacterial disease 4,967

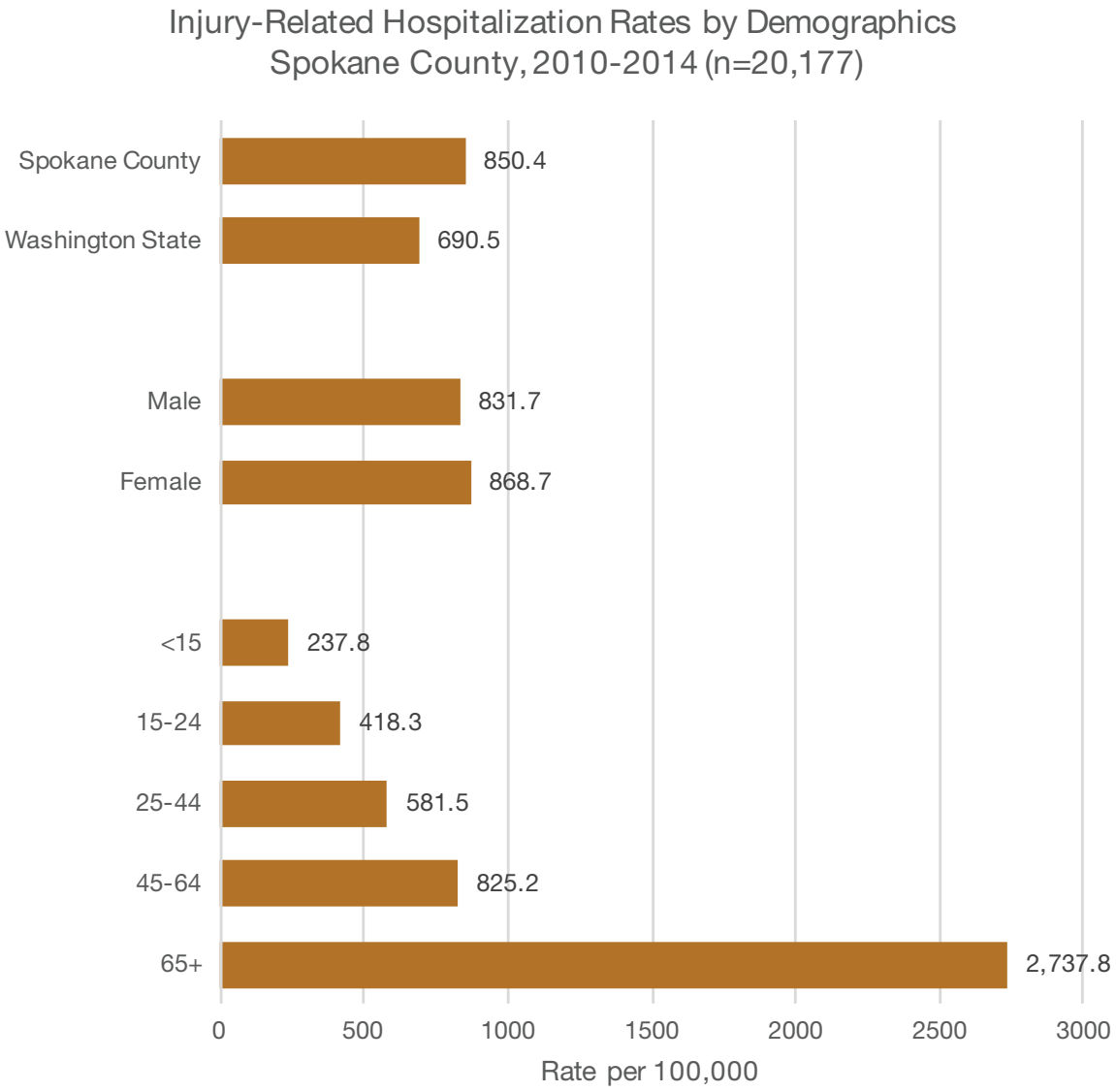
INJURY HOSPITALIZATIONS OVER TIME

Hospitalization rates for non-fatal injuries changed over the last 25 years. In Spokane County, the rate significantly decreased from 1990-2003, then increased from 2003-2014. In Washington State, there was a significant decrease from 1990-1997, a subsequent increase from 1997-2009, and another decrease from 2009-2014. The non-fatal injury hospitalization rate was higher in Spokane County than in Washington State.



NON-FATAL

During 2010-2014, approximately 4,000 Spokane County residents were hospitalized annually from an injury. The five-year injury-related hospitalization rate was significantly higher for Spokane County than Washington State. The county's injury hospitalization rate increased as age increased. Seniors were nearly 12 times more likely than youth to be hospitalized for an injury. Males had a significantly higher injury hospitalization rate than females.



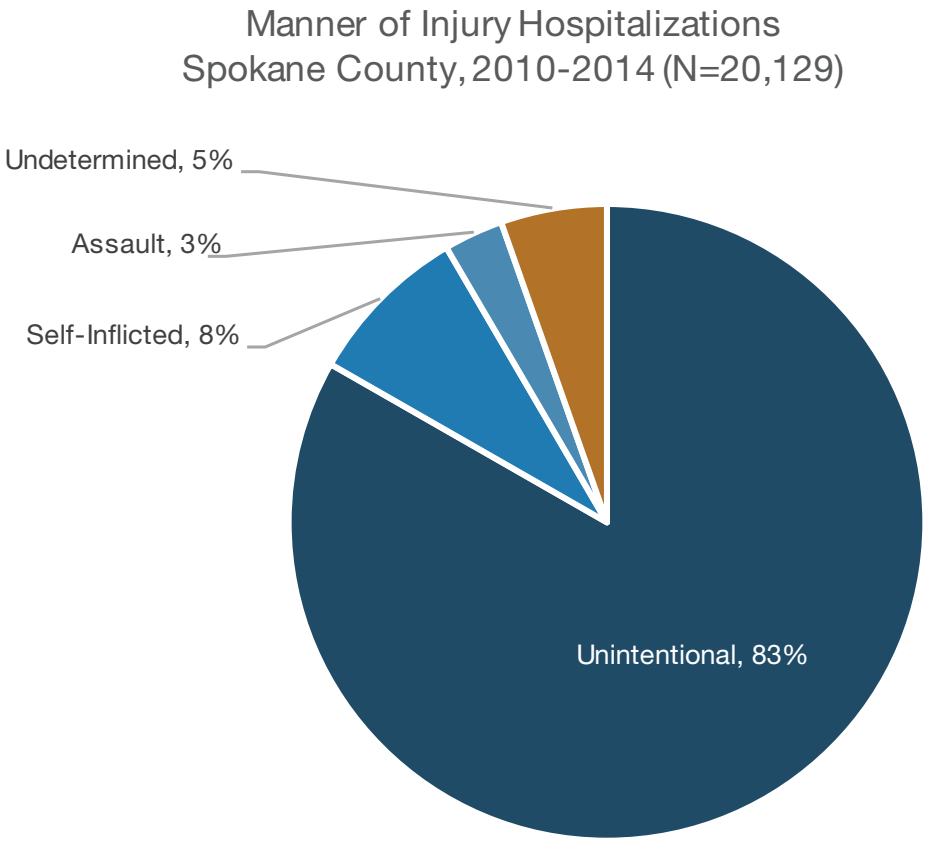
In comparing this data by certain demographics to Washington State, the non-fatal injury hospitalization rate in Spokane County during 2010-2014 was higher than the state's rate for males and females, and for all age groups. The distribution of type of injury was similar for Spokane County and Washington State.

MANNER OF INJURY

The manner of an injury refers to the reason for how the injury occurred. There are four categories for manner of a non-fatal injury:

- **Accidental** – (those from an unintentional injury)
- **Self-inflicted** – (when a person is trying to harm oneself)
  This category is considered as attempted suicide, but may capture some individuals who intentionally harm themselves without the intent to die.
- **Assault** – (injuries inflicted upon them by another person)
- **Undetermined** – (no clear determination of one manner over all the others)

The vast majority of injury hospitalizations were for unintentional injuries. Suicide attempts accounted for 8% of all injury hospitalizations.



NON-FATAL

TYPES OF INJURY AND MANNER

Some types of non-fatal injuries are almost always unintentional, such as motor vehicle crashes. Other types have a higher proportion where the manner was intentional, such as firearm related injuries. In Spokane County during 2010-2014, all non-fatal drownings were unintentional. Among hospitalizations from a poisoning-related injury, approximately half were unintentional and half were suicide attempts. Among non-fatal firearm-related injury hospitalizations, half were unintentional, approximately one-third were from an assault, and a smaller proportion were suicide attempts.

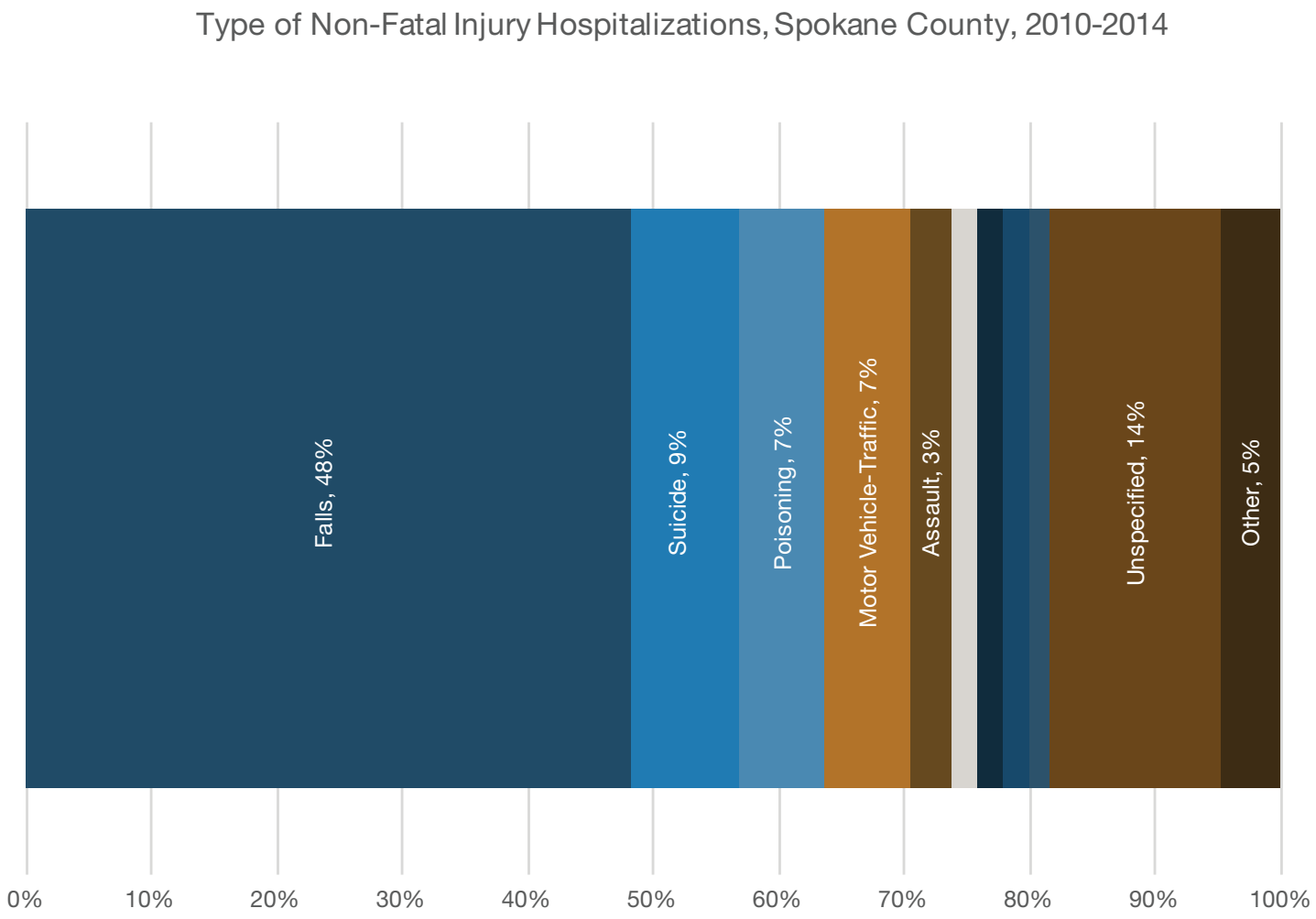
Type of Non-fatal Injury Hospitalization by Manner, Spokane County, 2010-2014

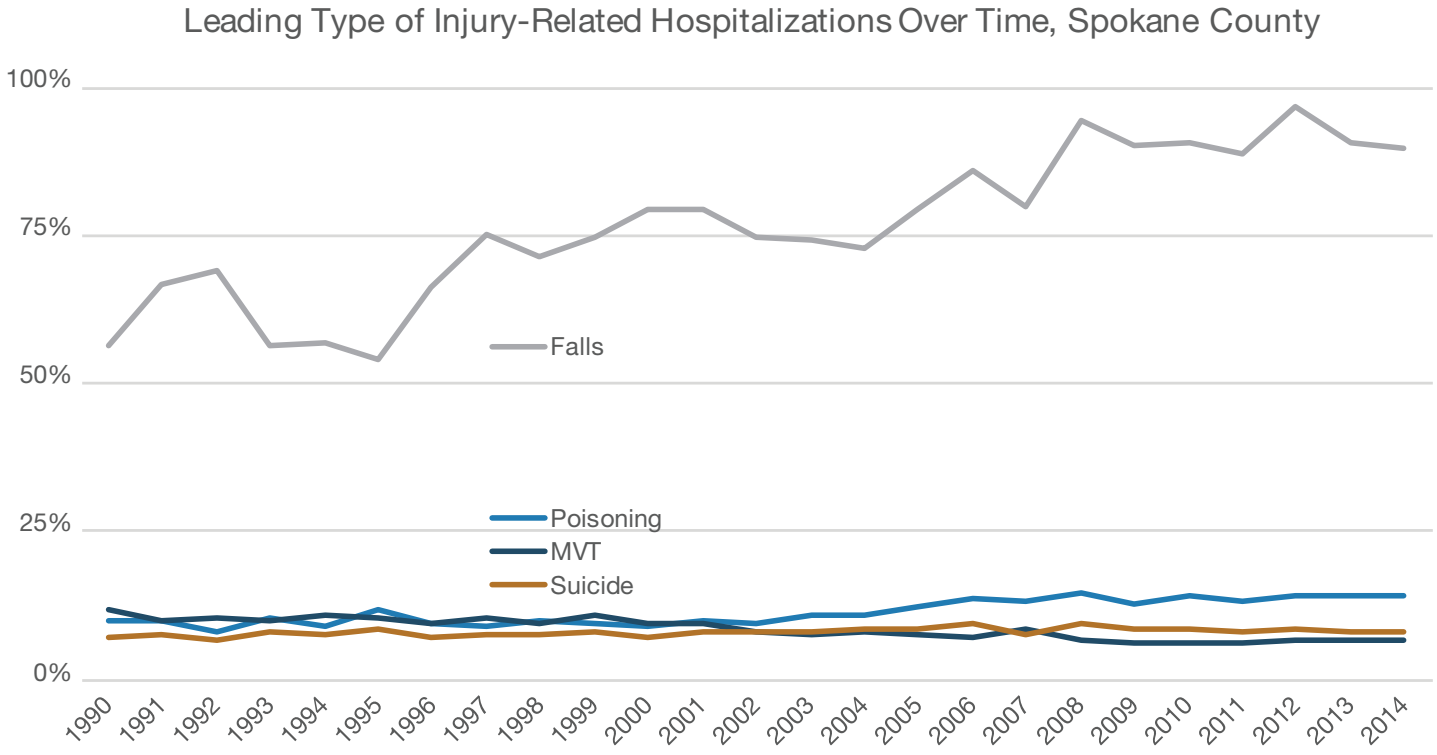
Manner	Unintentional		Self-Inflicted		Assault		Undetermined		Total
	Count	% Total	Count	% Total	Count	% Total	Count	% Total	
Falls	9176	99.8%	12	0.1%	5	0.1%	3	0.0%	9196
Poisoning	1295	46.1%	1315	46.8%	3	0.1%	197	7.0%	2810
Motor Vehicle Traffic	1292	99.4%	5	0.4%	3	0.2%	0	0.0%	1300
Firearm	42	50.6%	11	13.3%	26	31.3%	4	4.8%	83
Suffocation	168	85.7%	27	13.8%	1	0.5%	0	0.0%	196
Drowning	17	100.0%	0	0.0%	0	0.0%	0	0.0%	17

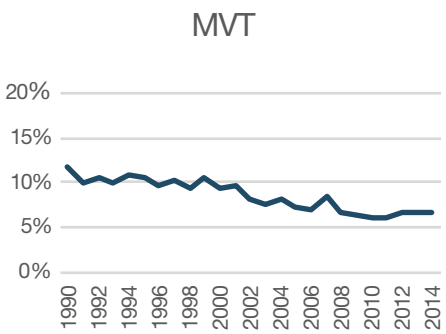
TYPES OF INJURY

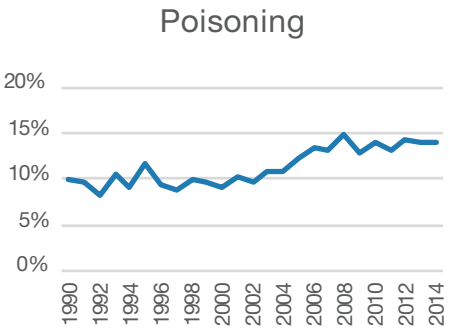
Falls were the predominant type of injury resulting in a non-fatal hospitalization. Nearly half of injury-related hospitalizations, excluding those with an unknown manner of injury, were from a fall. Almost one in 10 injury-related hospitalizations were for injuries sustained during a suicide attempt. Unintentional poisoning and motor vehicle traffic injuries each accounted for 7% of injury-related hospitalizations. Three percent were for injuries from an assault. Injuries from the natural environment - struck by or against something, overexertion, and other transport (i.e. boat, airplane, train) - each accounted for 2% of injury-related hospitalizations. Nearly one in five injury-related hospitalizations did not have a type of injury listed.

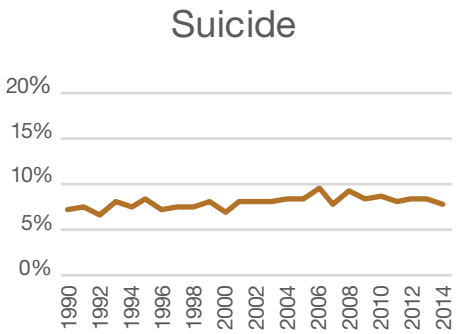
NON-FATAL




Leading Type of Injury-Related Hospitalizations Over Time, Spokane County
100%
75%
50%
25%
0%
Falls
Poisoning
MVT
Suicide
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014


MVT
20%
15%
10%
5%
0%
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014


Poisoning
20%
15%
10%
5%
0%
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014


Suicide
20%
15%
10%
5%
0%
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014

TYPE OF INJURY BY AGE GROUP

The types of injuries Spokane County individuals experienced varied by age. Falls were the leading cause of non-fatal injury hospitalizations among children younger than 15 years of age and adults 45 years of age or older. Among seniors, one out of 50 individuals was hospitalized for injuries from a fall. Injury from a suicide attempt was the leading cause of non-fatal injury hospitalizations among individuals 15 to 44 years of age.

Non-Fatal Injury Hospitalizations by Age Group, Spokane County, 2010-2014

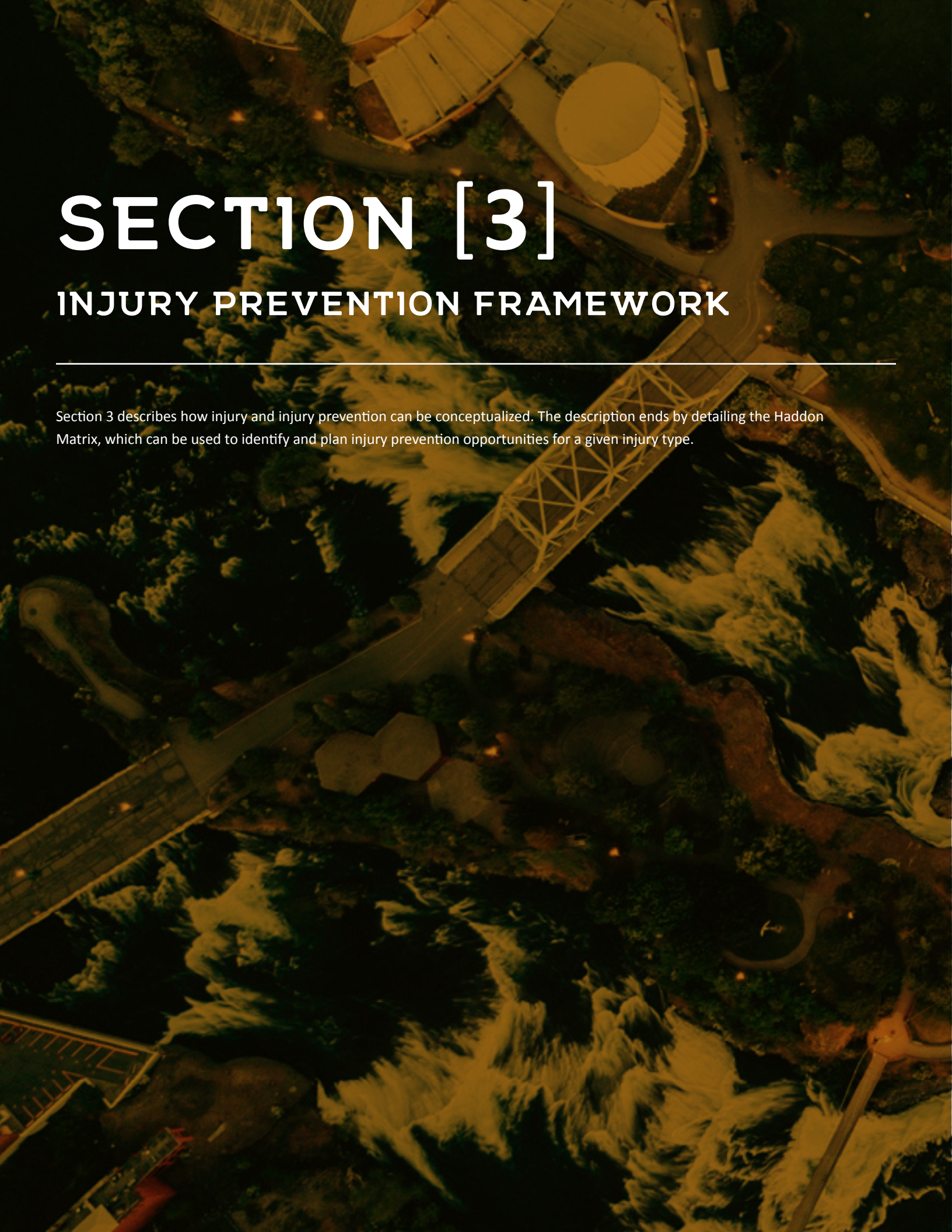
<15 (N=1,075)		15-24 (N=1,539)		25-44 (N=3,464)		45-64 (N=5,143)		65+ (N=8,558)	
Type of Injury	**% of NF injuries**	**Type of Injury**	**% of NF injuries**	**Type of Injury**	**% of NF injuries**	**Type of Injury**	**% of NF injuries**	**Type of Injury**	**% of NF injuries**
Fall	28%	Suicide	24 %	Suicide	19 %	Fall	36 %	Fall	74 %
Suffocation	16 %	MVT	17 %	Fall	16 %	Suffocation	10 %	Suffocation	5 %
Suicide	10 %	Fall	13 %	MVT	11 %	Poison	10 %	Poison	4 %
Assault	6 %	Suffocation	11 %	Poison	10 %	Suicide	9 %	MVT	3 %
Poison	6 %	Assault	8 %	Suffocation	9 %	MVT	8 %	Suicide	1 %
MVT	5 %	Poison	7 %	Assault	7 %	Assault	3 %	Assault	0 %

Age <15		Age 15-24		Age 25-44		Age 45-64		Age 65+	
Type of Injury	**Rate per 100,000**	**Type of Injury**	**Rate per 100,000**	**Type of Injury**	**Rate per 100,000**	**Type of Injury**	**Rate per 100,000**	**Type of Injury**	**Rate per 100,000**
Fall	66	Suicide	102	Suicide	110	Fall	294	Fall	1957
Suffocation	39	MVT	70	Fall	95	Suffocation	79	Suffocation	136
Suicide	23	Fall	54	MVT	63	Poison	77	Poison	94
Assault	15	Suffocation	44	Poison	55	Suicide	75	MVT	68
Poison	14	Assault	32	Suffocation	54	MVT	64	Suicide	23
MVT	12	Poison	29	Assault	42	Assault	24	Assault	8

TYPES OF INJURY BY SEX

The distribution of non-fatal injury-related hospitalizations was different between males and females. Females had a higher proportion of injury hospitalizations from a fall. Males had a higher proportion of injury hospitalizations from motor vehicle traffic injuries and from assault.

Non-Fatal Injury Hospitalizations by Sex, Spokane County, 2010-2014			
Male (N=9,576)		**Female (N=10,203)**	
Type of Injury	% of all	Type of Injury	% of all
Fall	39.2%	Fall	54.0%
Suffocation	9.6%	Suicide	9.6%
MVT	8.3%	Poison	7.0%
Suicide	7.4%	Suffocation	6.7%
Poison	6.0%	MVT	5.1%
Assault	4.9	Assault	1.5%



SECTION [3]

INJURY PREVENTION FRAMEWORK

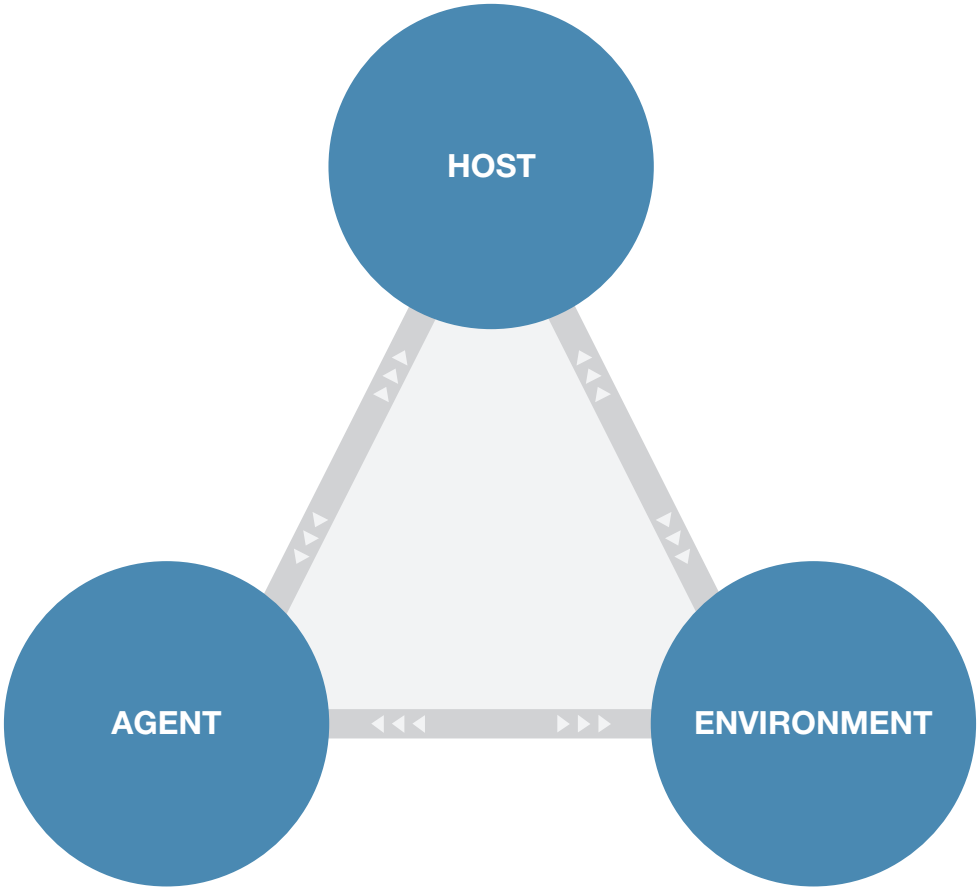
Section 3 describes how injury and injury prevention can be conceptualized. The description ends by detailing the Haddon Matrix, which can be used to identify and plan injury prevention opportunities for a given injury type.

EPIDEMIOLOGIC TRIANGLE

Injuries may sometimes be thought of as accidents, and as such, not preventable. However, years of injury prevention study have shown this to be untrue. A framework to characterize injuries and injury prevention is described here. [3, 4]

Epidemiologic Triangle

Professionals and stakeholders of varied disciplines can benefit from studying health problems using the epidemiologic triangle.[5] There are three components to this model; host, agent, and environment. The host is the organism with a disease. The agent is what is causing the disease. The environment is the external factors that cause or allow the disease to be transmitted. Reframing this model for use with injuries, the host is the person who is injured. The agent is one of the various types of energy (or forces) that result in an injury; thermal, radiant, chemical, electrical, and mechanical. The environment is the physical, social, and economic circumstances that support an injury occurring.



To better illustrate this concept, motor vehicle crash prevention—a highly-studied and well-understood subject—will be applied to the triangle. The host is the person injured by the crash. The agent is the force of the motor vehicle against the person when the crash occurs. The environment could be physical factors of the vehicle or roadway, the social environment such as traffic speed or attentiveness while driving, or the legal environment affecting ability to receive a driver's license or penalties for poor driving.

Prevention measures aimed at decreasing injury will try and disrupt harmful connections and support positive connections between the three factors of the triangle. Imagine a grandparent driving their grandchild when they are struck by another vehicle that ran a red light. The hosts are the grandparent and child, and their ages can affect the level of injury sustained. As an older adult, the grandparent may be physically more fragile and sustain more severe injuries. Children are disadvantaged in vehicles designed with safety features meant for the height and weight of adults. The agent of injury is the force exerted by the vehicles. The structural ability of a vehicle to withstand a collision, use of a seatbelt, and airbags all affect how much energy is transferred from the agent to the host. Laws requiring safety features on vehicles demonstrate a connection between environment and agent. Creating a social norm, through beliefs or laws, where children do not ride in the front seat due to the risk of injury from an air bag is an environmental factor. A grandparent having their grandchild ride in the rear seat is an example of the environment impacting the host. Use of car safety seats for children is another environmental factor. These are just a few factors related to motor vehicle crashes to demonstrate how the epidemiologic triangle can be used to think about injuries and injury prevention.

PHASES OF PREVENTION

There are three phases in which prevention measures can affect injury. Primary prevention seeks to prevent the injury from occurring. Secondary prevention tries to limit the health impact from the injury. Tertiary prevention works to maximize positive health outcomes once the injury has occurred. For injuries, these phases can be labeled pre-event, event, and post-event.

The Haddon Matrix is a model that uses a grid with columns representing the three injury factors (adapted from the epidemiologic triangle) and rows showing phases of prevention. Often a fourth column is added to account for the relevant factors in the social environment that have a bearing on injury. This model can be used to conceptualize factors related to injury and to identify potential prevention strategies. It can be used to facilitate brainstorming and evoke innovative ideas around cause and prevention of injuries. Users can then determine a prevention measure on which to focus. Decision criteria could include effectiveness, cost, freedom, equity, or feasibility.

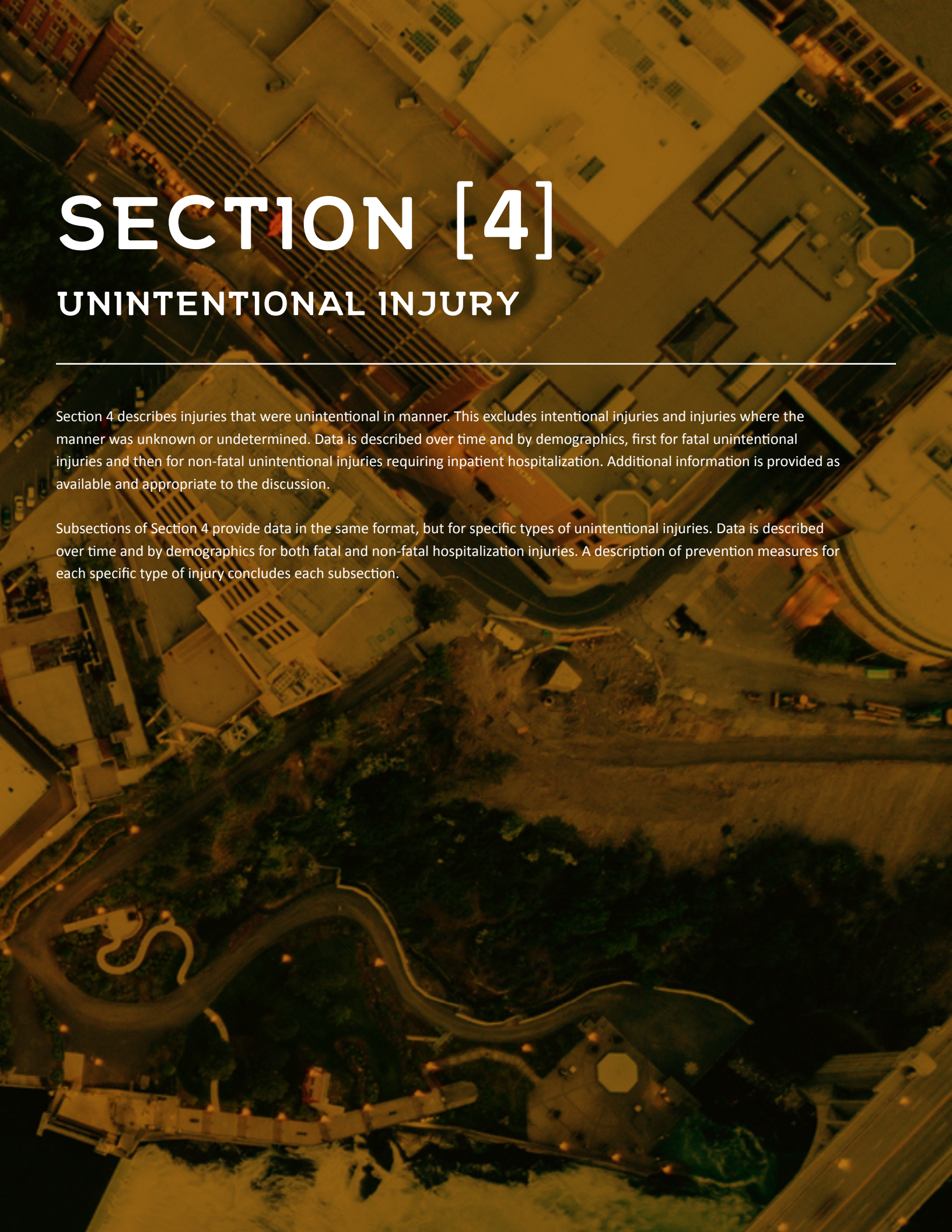
Haddon Matrices from a variety of injury prevention professionals are offered in the report for specific types of injuries. An example is below.

Table 1 exemplifies the Haddon Matrix using injuries to children from residential fires caused by cigarettes igniting upholstered furniture.[6]

Table 1.

Event sequence	Host (children in home)	Agent/vehicle (cigarette, matches, and upholstered furniture)	Physical environment (home)	Social environment (community norms, policies, rules)
Pre-event (before fire starts)	Teach children not to play with matches.	Redesign cigarettes so they self-extinguish before ignition of upholstery.	Lower flammability of structures.	Improve efforts to curb smoking initiation. Improve smoking cessation efforts.
Event (during fire)	Teach children to stop, drop, and roll. Plan and practice a fire escape route with children. Teach children not to hide during a fire.	Design furniture with materials that are less toxic when burned. Design upholstery that is flame resistant.	Install smoke detectors. Install sprinklers. Increase number of usable exits.	Pass ordinances requiring smoke detectors and/or sprinkler systems. Fund the fire department adequately to provide enough personnel and equipment for rapid response.
Post-event (after child is injured by fire)	Provide first aid and CPR* to all family members.	Design heaters with quick and easy shutoff device.	Build homes with less toxic building materials.	Increase availability of burn treatment facilities.

*CPR = cardiopulmonary resuscitation.



SECTION [4]

UNINTENTIONAL INJURY

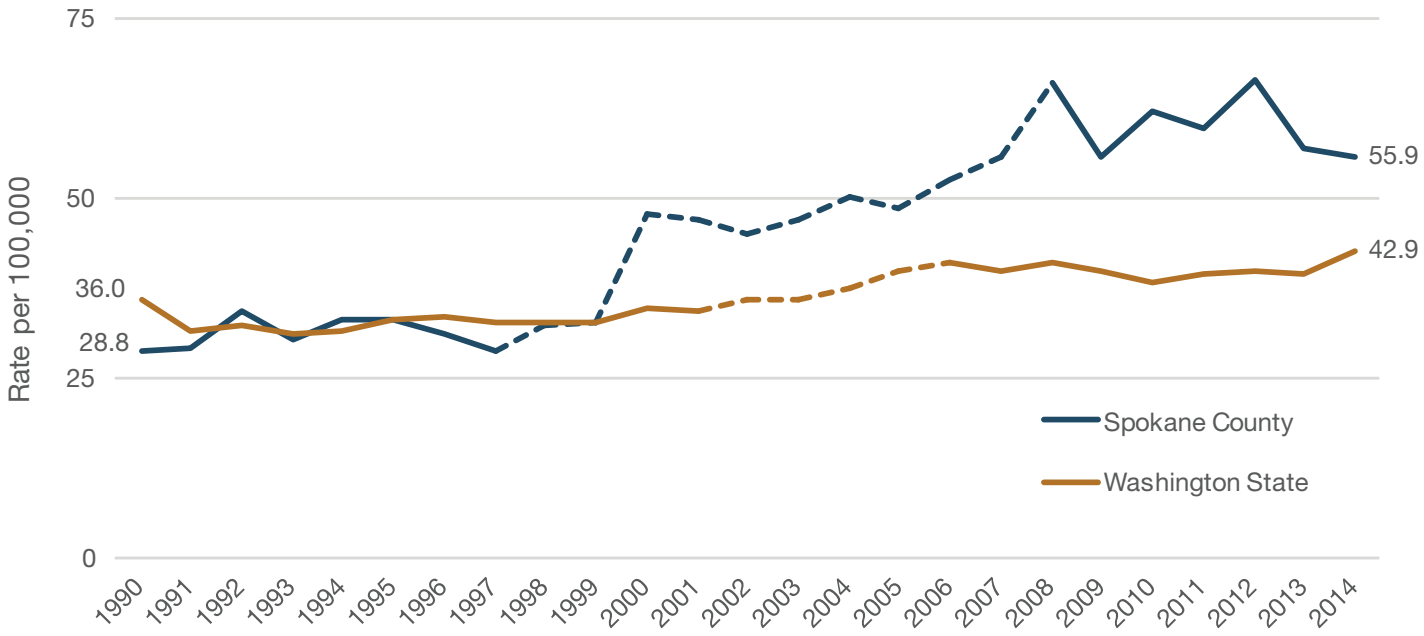
Section 4 describes injuries that were unintentional in manner. This excludes intentional injuries and injuries where the manner was unknown or undetermined. Data is described over time and by demographics, first for fatal unintentional injuries and then for non-fatal unintentional injuries requiring inpatient hospitalization. Additional information is provided as available and appropriate to the discussion.

Subsections of Section 4 provide data in the same format, but for specific types of unintentional injuries. Data is described over time and by demographics for both fatal and non-fatal hospitalization injuries. A description of prevention measures for each specific type of injury concludes each subsection.

Unintentional injury was the third leading cause of death in Spokane County in 2014. It was the leading cause of death among individuals 1 to 44 years of age. During 2014, there were 2.5 deaths from unintentional injury for every death from an intentional injury (suicide and homicide).

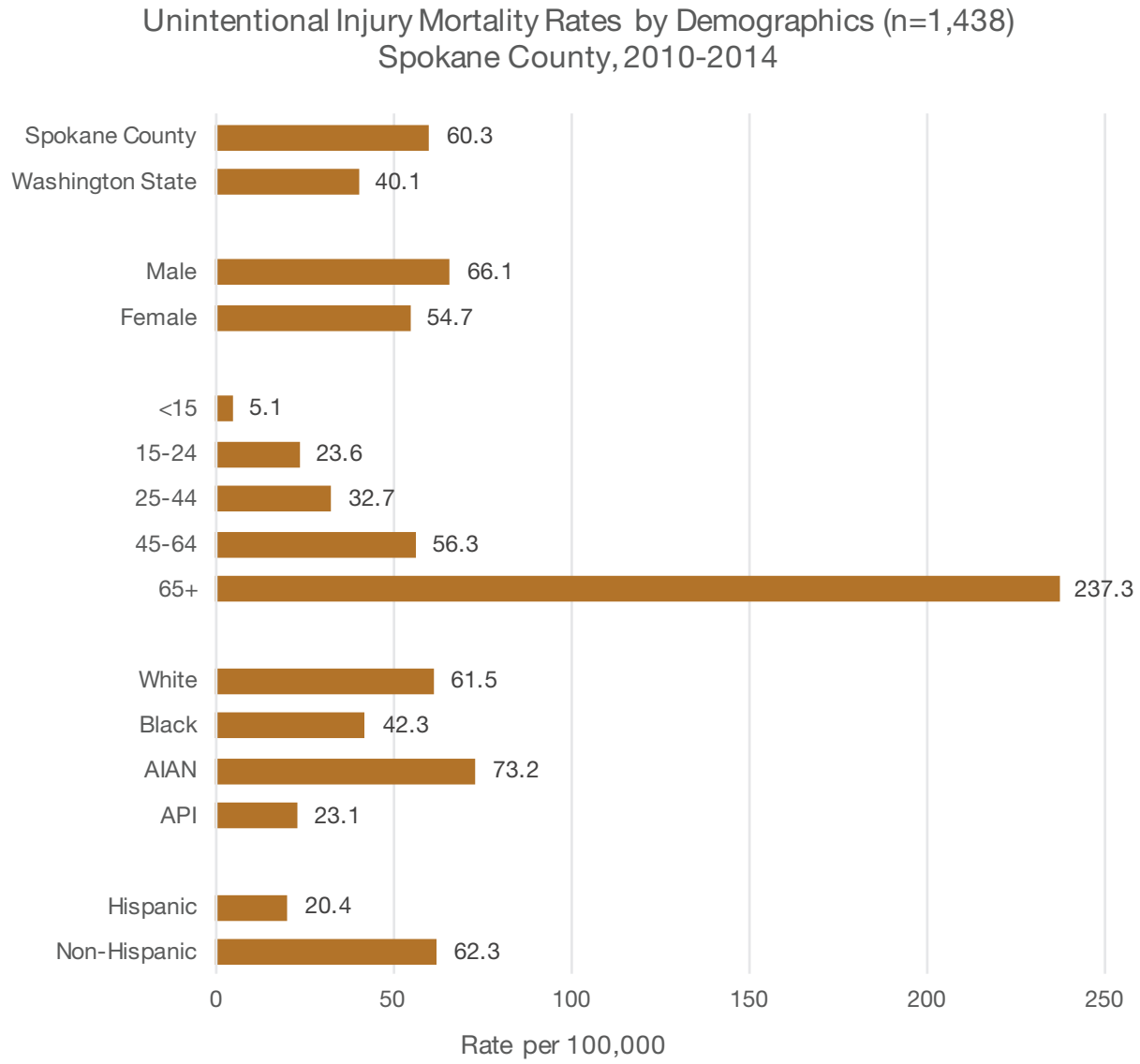
Spokane County's unintentional injury mortality rate was similar to the statewide rate during the 1990s. Significant increases over time occurred from 2001 to 2006 in Washington State and from 1997 to 2008 in Spokane County. The county's unintentional injury mortality rate increased 130% during that time period. Since 2000, the unintentional injury mortality rate was higher in Spokane County than Washington State.

Unintentional Injury Mortality Rates Over Time, Spokane County and Washington State



FATAL

During 2010-2014, approximately 300 Spokane County residents died each year from an unintentional injury. The unintentional injury mortality rate during that time was significantly higher for Spokane County than Washington State. Males had a higher rate than females. The unintentional injury mortality rate increased as age increased. Compared to whites, Asians/Pacific Islanders had a lower unintentional injury mortality rate. The rates for blacks and American Indians/Alaska Natives were similar to the rate for whites.



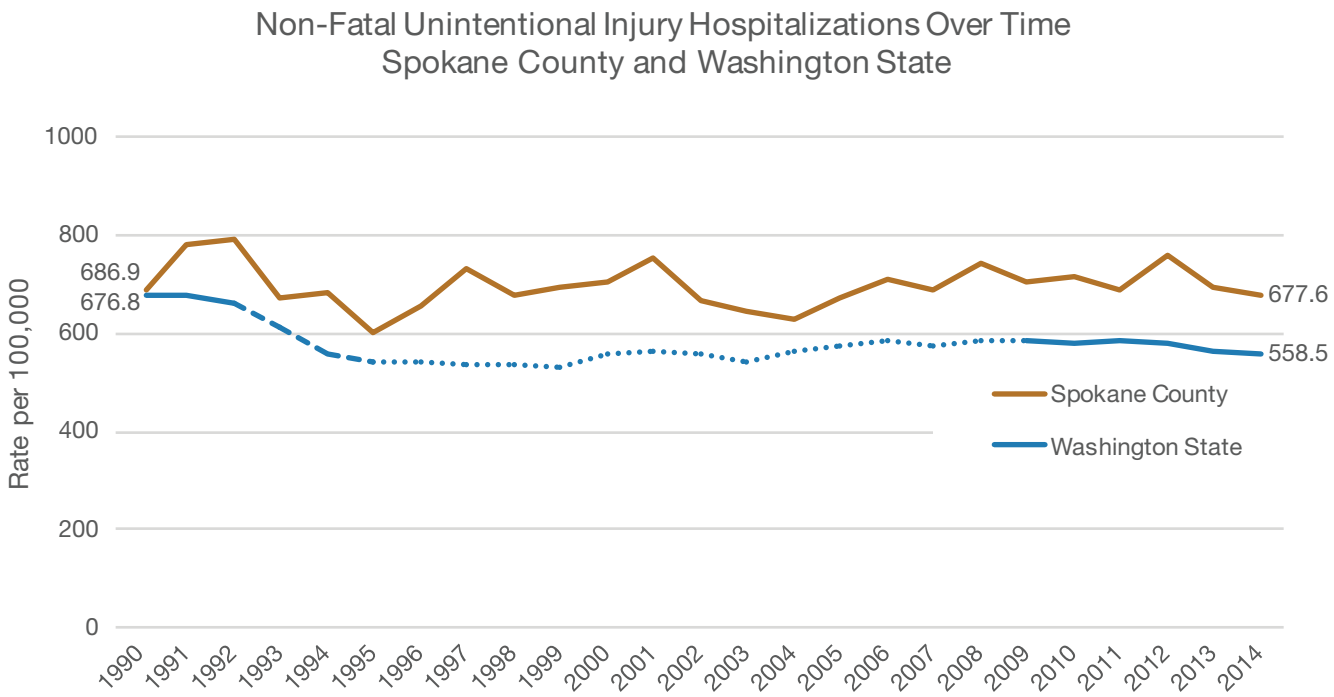
FATAL

The five leading causes of death from an unintentional injury in Spokane County during 2010-2014 accounted for 88.8% of all unintentional injury deaths. Nearly half of all deaths from unintentional injuries were from a fall. Poisoning was the second leading cause of death from an unintentional injury. This was followed by deaths from an injury sustained during a motor vehicle traffic collision.

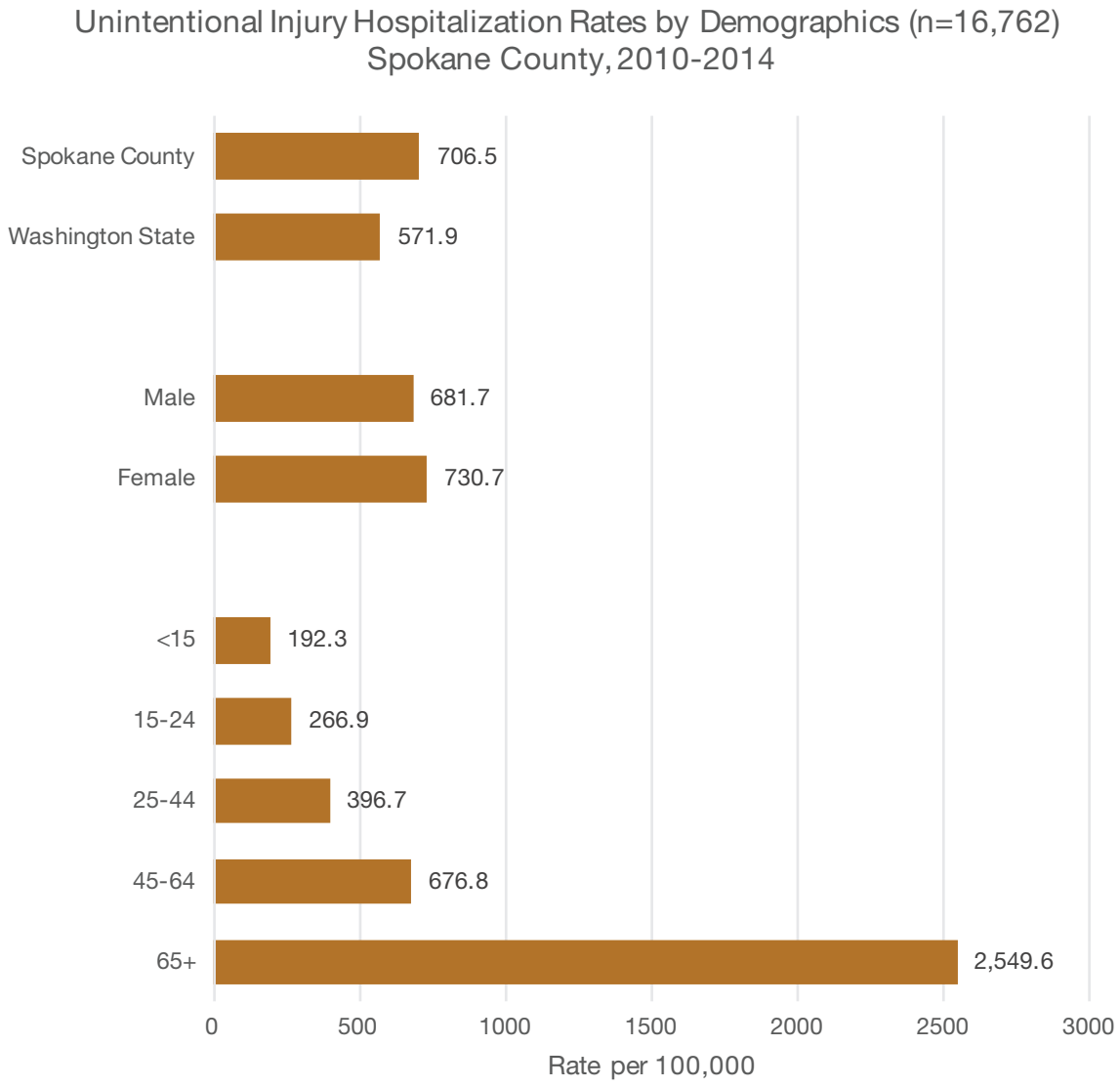
Leading Causes of Unintentional Injury Mortality, Spokane County, 2010-2014, (N=1,438)		
Manner	**Count**	**% of Total**
Falls	663	46.1%
Poisoning	322	22.4%
Motor Vehicle Traffic	184	12.8%
Suffocation	72	5.0%
Drowning	36	2.5%

NON-FATAL HOSPITALIZATIONS

Over the last 25 years in Spokane County, there was variability from year to year in the rate of non-fatal hospitalizations due to an unintentional injury. There was no significant trend during that time, up or down. Statewide, the rate decreased significantly from 1992 to 1995, then increased from 1995-2009. The rate stabilized thereafter.



During 2010-2014, approximately 3,500 Spokane County residents were hospitalized annually from an unintentional injury. The non-fatal unintentional injury rate was significantly higher in Spokane County compared to Washington State. Females had a higher rate of hospitalization from an unintentional injury compared to males. Unintentional injury hospitalizations increased as age increased. Individuals 65 years of age or older were almost 14 times more likely to be hospitalized from an unintentional injury than were children younger than 15 years of age.



The three leading causes of non-fatal unintentional injury hospitalizations accounted for 70% of all unintentional injury hospitalizations. Falls were the leading cause and accounted for more than half of all unintentional injury hospitalizations. Poisoning and motor vehicle traffic injuries each accounted for 7.7% of unintentional injury hospitalizations. Fifteen percent of unintentional injury hospitalizations did not have a specified injury mechanism. The remaining causes were each less than 3% of unintentional injury hospitalizations.

Among the leading causes of hospitalization from an unintentional injury, on average, motor vehicle traffic injuries required the longest hospitalization. These injuries also had the highest average charges per day. This suggests that these injuries were more severe or more complicated to manage than injuries from falls or poisoning.

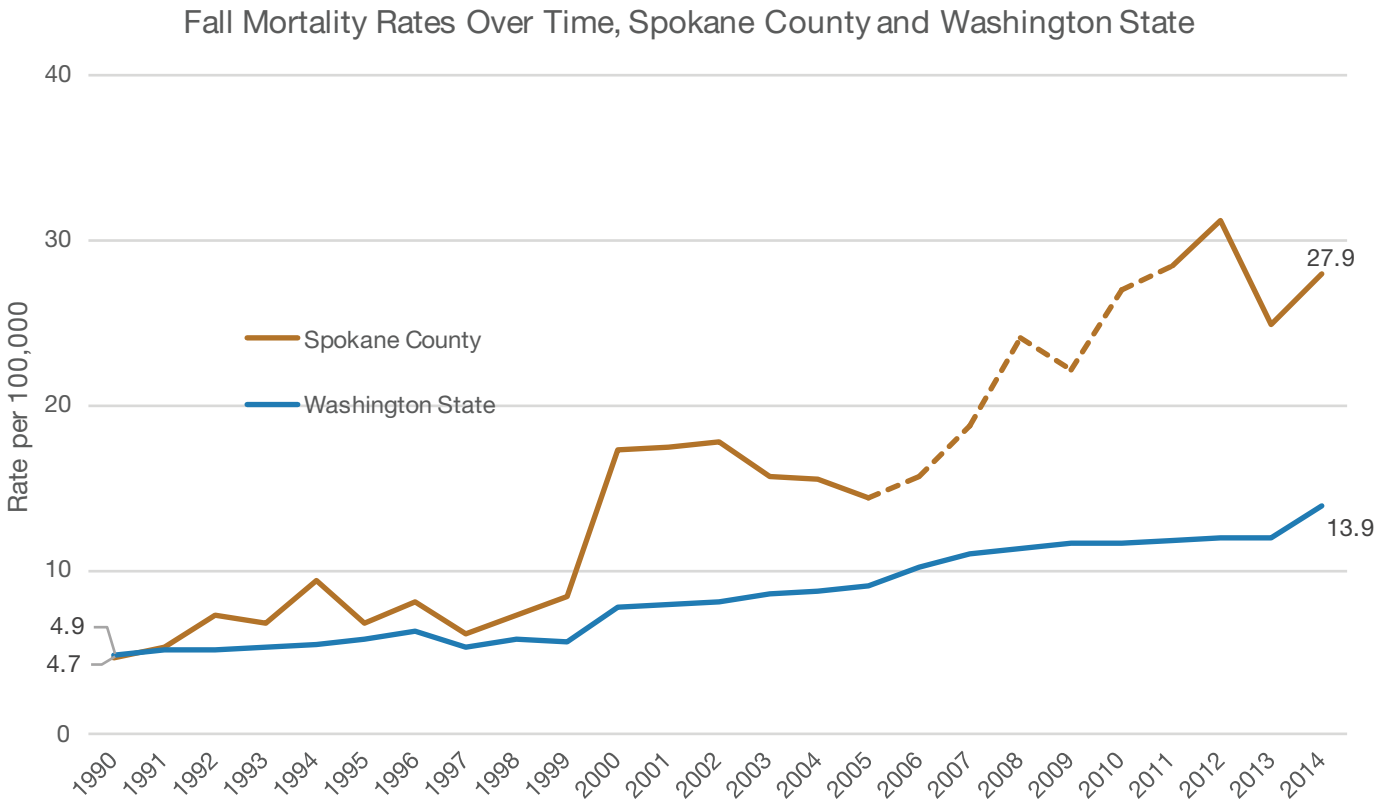
Leading Causes of Non-Fatal Unintentional Hospitalizations, Spokane County, 2010-2014

Reason for hospitalization	Number of hospitalizations	% of unintentional injury hospitalizations	Average length of stay (days)	Average total charges	Average charges per day
Falls	9,176	54.7%	5.7	$39,468	$9,334
Poisoning	1,295	7.7%	3.7	$24,865	$7,880
Motor Vehicle Traffic	1,292	7.7%	6.5	$59,247	$12,703
Total	**16,762**	**100%**	**5.6**	**$40,712**	**$9,724**

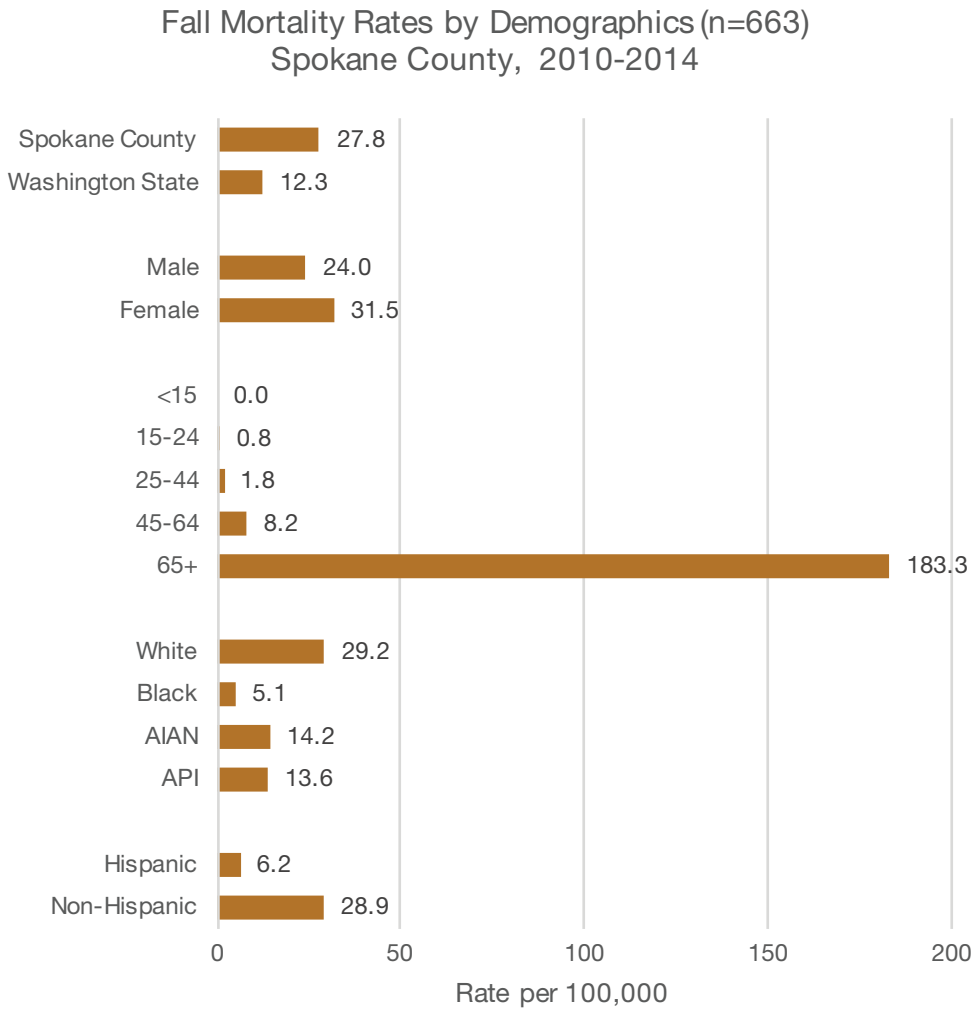
Injuries from a fall occur in many ways. A person may fall on the same level they are standing, such as slipping or tripping on something; they may slip on snow or ice; they may fall while skating or skateboarding. A person may fall off of a structure they are on, such as a bed or chair, playground equipment, stairs, a ladder or scaffolding, a building, or a tree. The falls category also includes falling from a cliff and diving or jumping into water causing injury other than drowning or submersion. Not included are falls during an assault or from intentional self-harm, from an animal, into fire, while operating machinery, or from a vehicle.

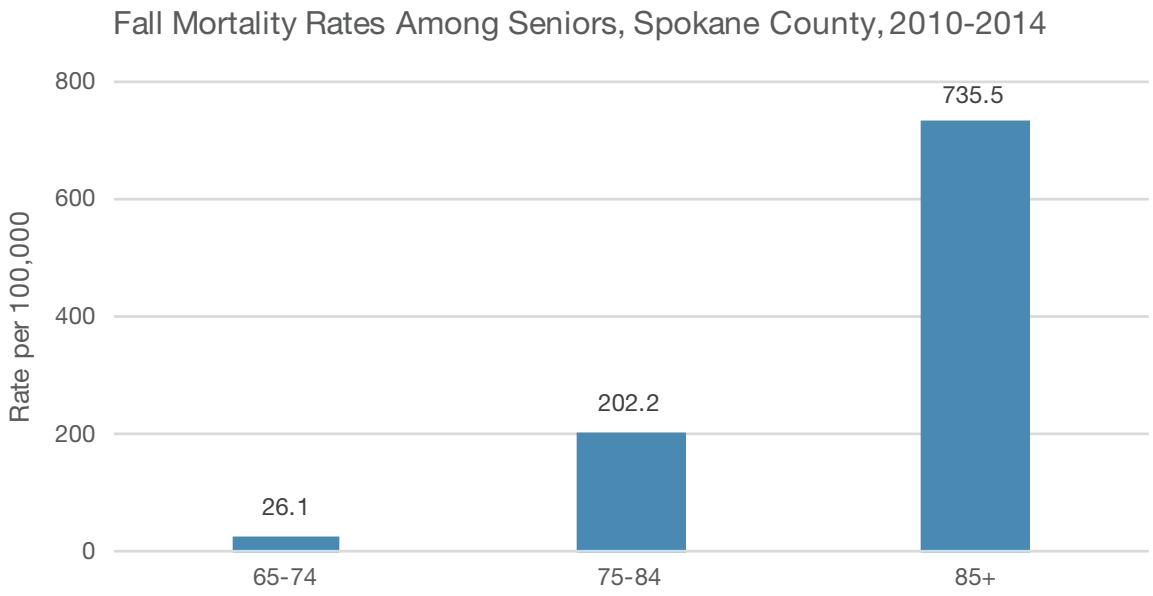
Mortality

Deaths from fall-related injuries increased over time. The fall mortality rate significantly increased from 2005-2011 in Spokane County. Statewide, an increase occurred steadily from 1990-2014.

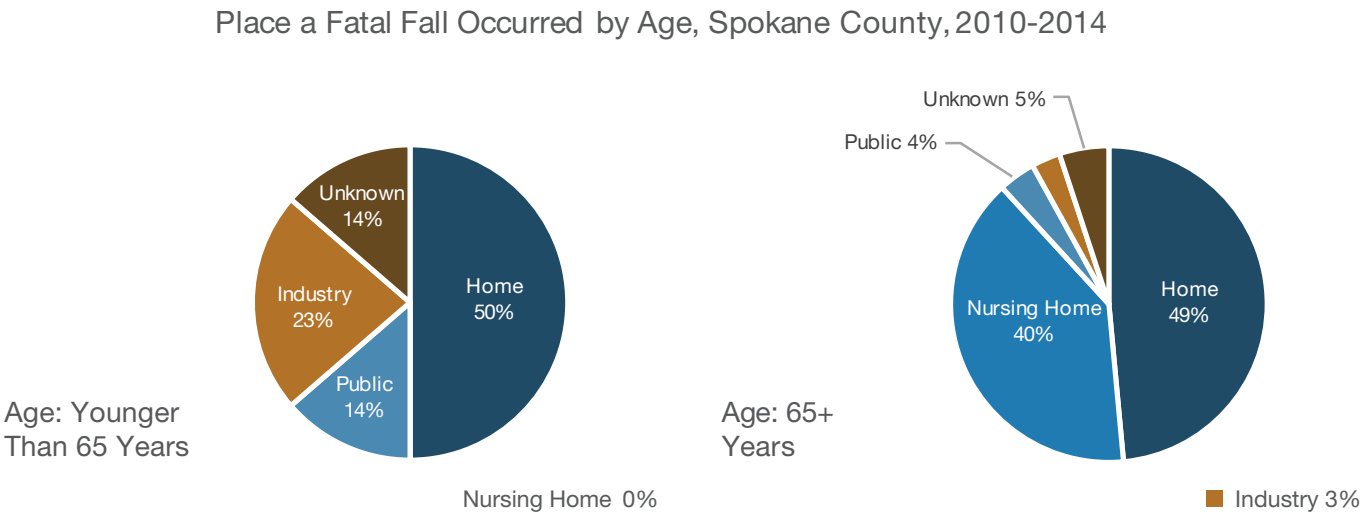


An average of 133 people died each year from injuries incurred from a fall during 2010-2014 in Spokane County. The fall mortality rate was significantly higher in Spokane County than statewide. Females had a higher fall mortality rate than males. The fall mortality rate was highest among seniors. Even among seniors, the fall mortality rate increased as age increased. Individuals 85 years or age or older had the highest rate., Blacks and Asians/Pacific Islanders had significantly lower fall mortality rates compared to whites. The rate for American Indians/Alaska Natives was not statistically different from the rate for whites. Hispanics had a significantly lower fall mortality rate than non-Hispanics.





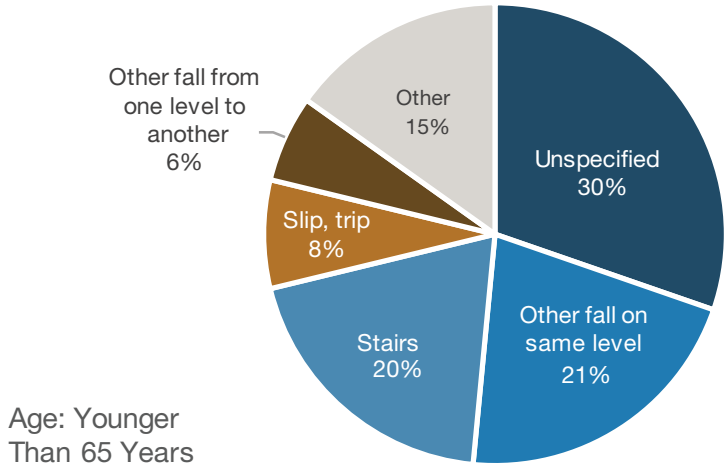
Half of deaths from a fall occurred in the home for both seniors and those younger than 65 years of age†. There were differences in other locations where a fatal fall occurred by age group. Forty percent of fatal falls among seniors occurred in a nursing home. There were no fatal falls in a nursing home among individuals younger than 65 years of age. The younger age group had a higher proportion of fatal falls occur in a public place or at a workplace (industry).



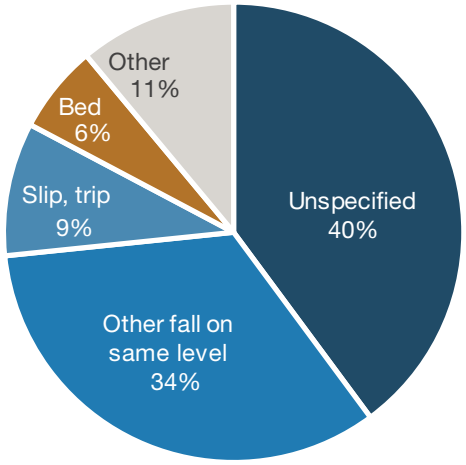
† Excludes deaths where the place of injury was not documented.

In the majority of fatal falls, the type of fall was not specified. The next leading type of fall was other fall on same level. This included a fall from bumping against an object, falling from or off a toilet, or a fall on the same level that was otherwise not specified. Individuals younger than 65 years of age had a higher proportion of fatal falls due to falling on stairs. The "Other" category included several specified types of falls, but each accounted for 3% or less of the total. Those types included cliff, wheelchair, ice/snow, chair, furniture, ladder, from building, or while being carried.

Type of Fatal Fall by Age, Spokane County, 2010-2014



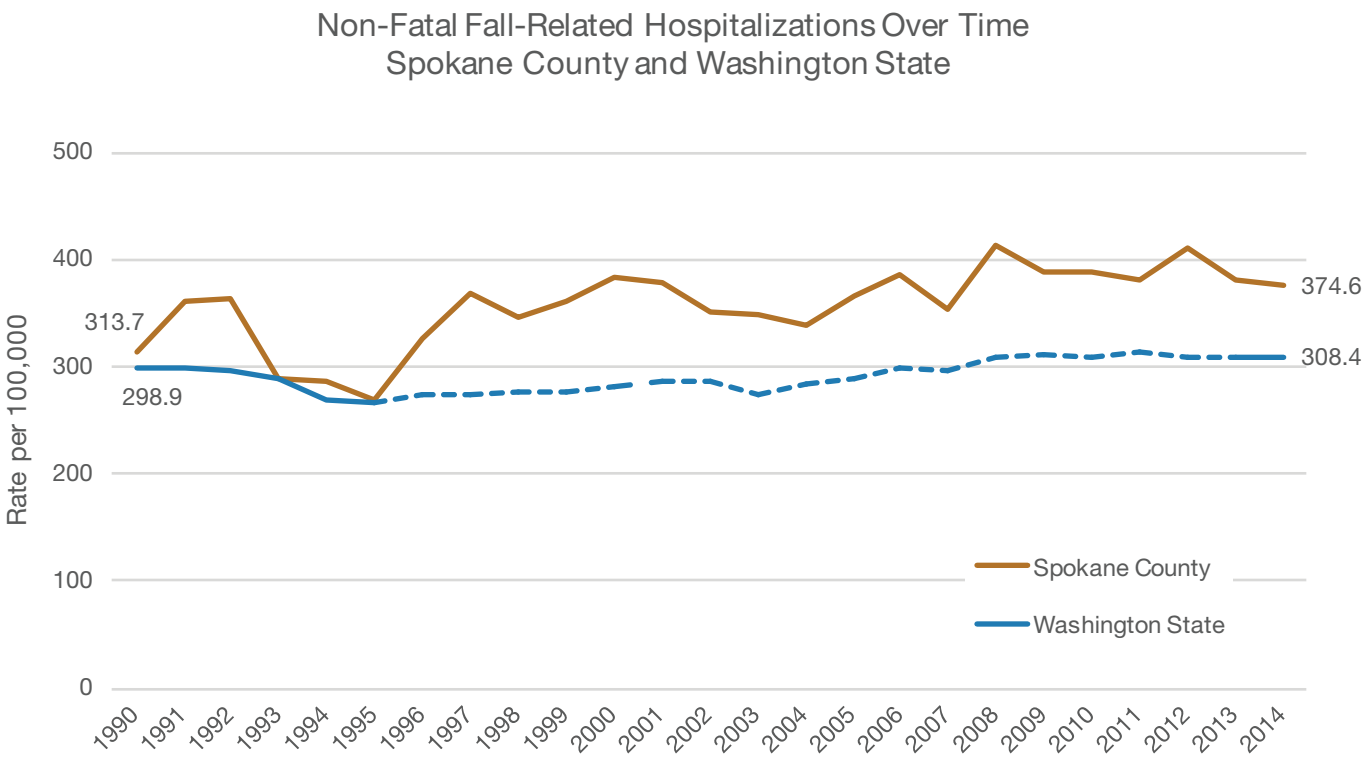
Age: Younger Than 65 Years



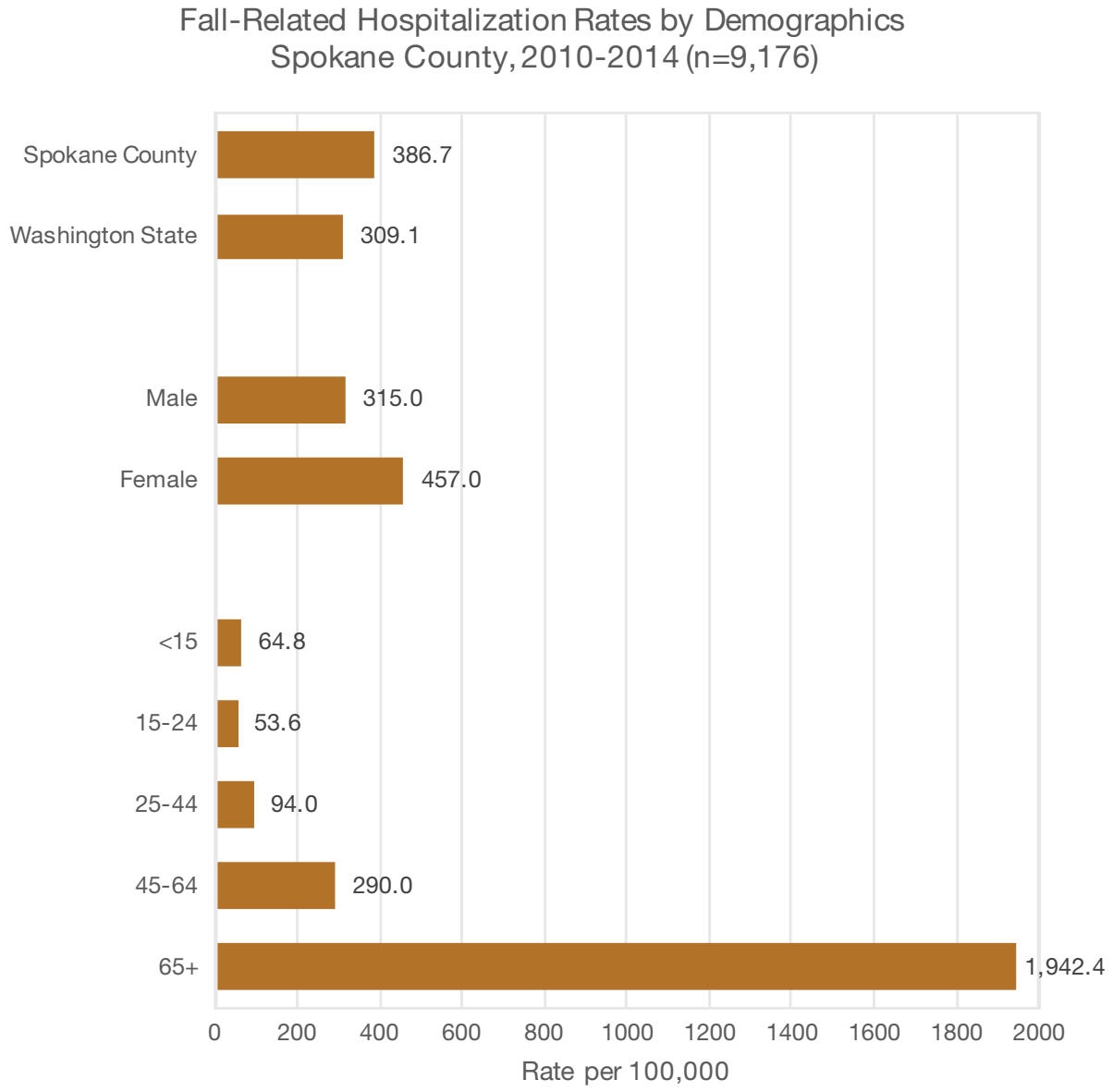
Age: 65+ Years

Non-Fatal Hospitalizations

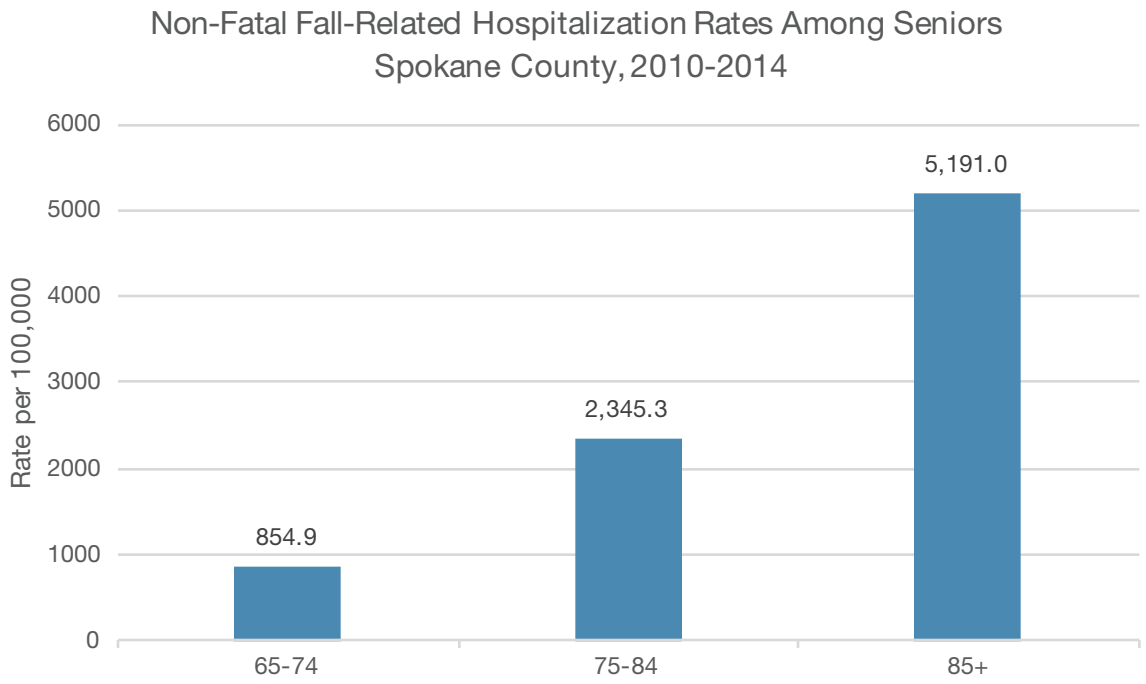
Over the last 25 years, the hospitalization rate for injuries from non-fatal falls significantly increased in Spokane County. Statewide, there was a significant decrease from 1990-1995, but then an increase from 1995-2014.



On average, 1,800 Spokane County residents were hospitalized each year with injuries from a fall. During 2010-2014, the fall-related hospitalization rate was significantly higher for Spokane County than for Washington State. Females were more likely to be hospitalized due to a fall than were males. Young adults had the lowest fall-related hospitalization rate and seniors had the highest. Among seniors, the rate increased as age increased.



During 2010-2014, approximately 3,500 Spokane County residents were hospitalized annually from an unintentional injury. The non-fatal unintentional injury rate was significantly higher in Spokane County compared to Washington State. Females had a higher rate of hospitalization from an unintentional injury compared to males. Unintentional injury hospitalizations increased as age increased. Individuals 65 years of age or older were almost 14 times more likely to be hospitalized from an unintentional injury than were children younger than 15 years of age.

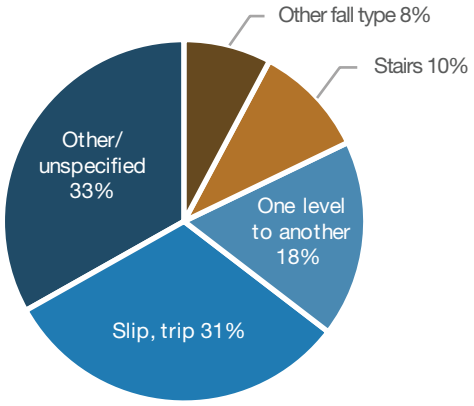


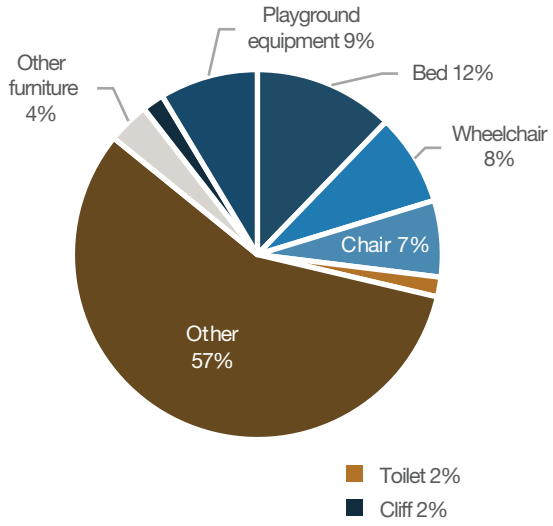
The majority of non-fatal hospitalizations from a fall-related injury did not have a specified type of fall. Approximately one-third of fall-related hospitalizations were from a slip or trip fall with a slightly higher proportion among seniors than among individuals younger than 65 years of age.

One in ten fall-related hospitalizations among seniors was from a fall from one level to another. Nearly one in five fall-related hospitalizations among individuals younger than 65 years of age were from a fall from one level to another. Nearly all falls from one level to another among seniors was from falling from furniture: bed, wheelchair, chair, or toilet. Falls from the specified furniture among individuals younger than 65 years of age accounted for 29% of fall-related injury hospitalizations.

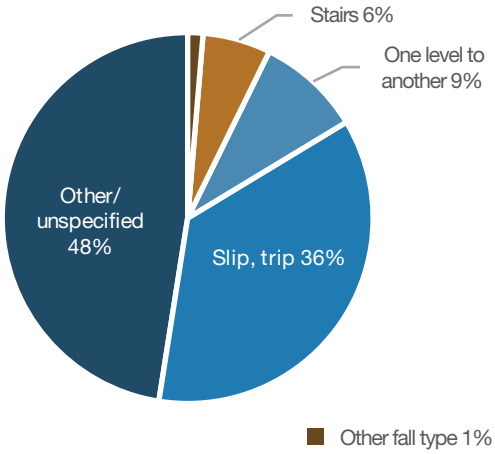
Type of Non-Fatal Fall Hospitalizations by Age Spokane County, 2010-2014

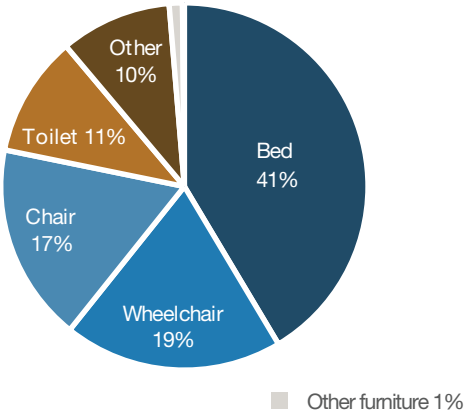
Age: Younger Than 65 Years





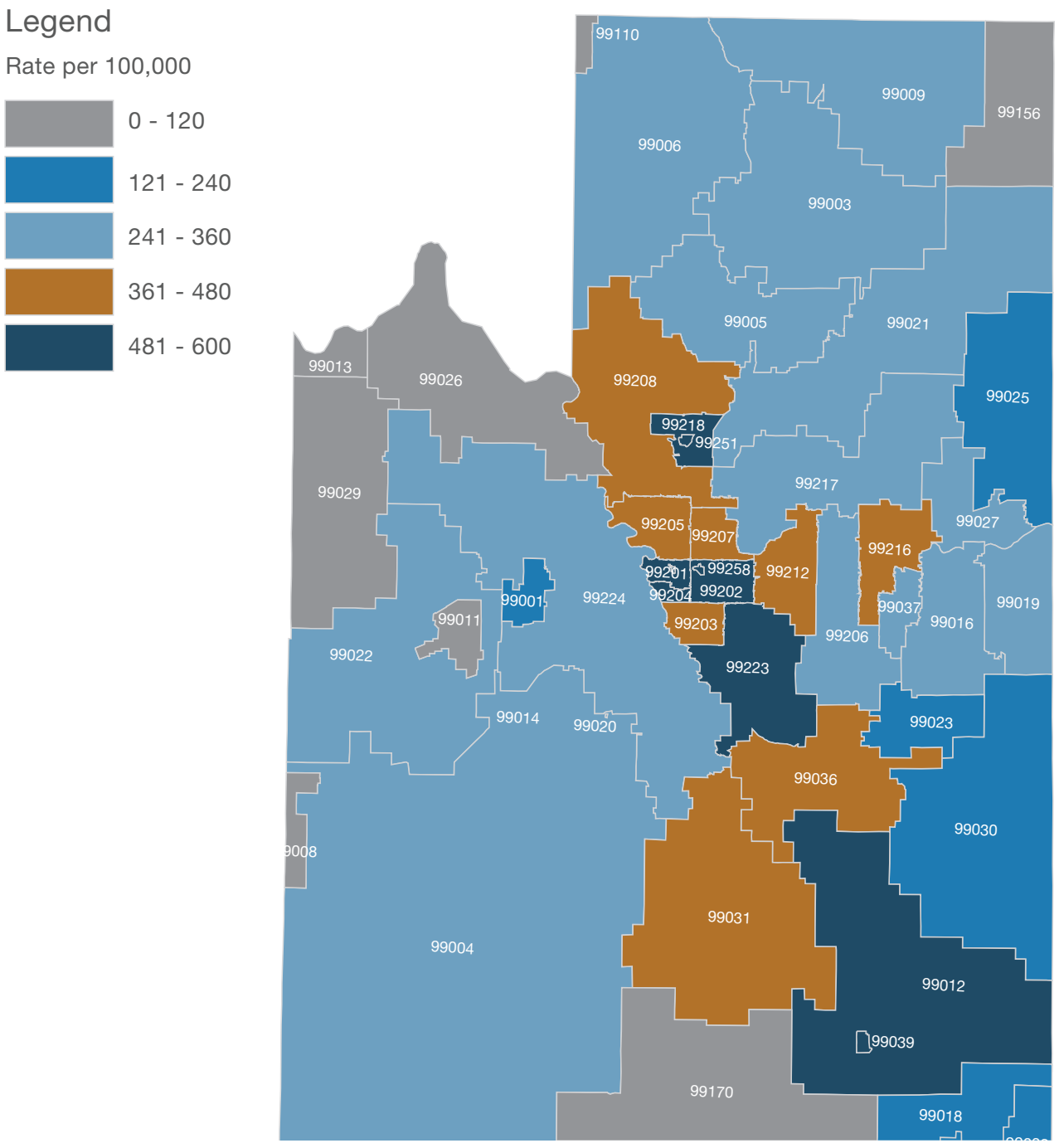
Age: 65+ Years





NON-FATAL

For residents of all age, several zip codes in the urban core of the City of Spokane had high rates for hospitalizations from a fall-related injury. Those zip codes include the neighborhoods of Browne's Addition, Cliff/Cannon, East Central, Riverside, and West Central. Another zip code with a high rate was just north of the City of Spokane. The southwest portion of Spokane County also had areas with high rates of fall-related hospitalizations.



Prevention

There are many effective interventions for preventing injuries from a fall among older adults living in the community.[7] Some interventions have a singular focus and others are multi-faceted. Single-focus interventions fall into one of three categories: exercise, home modifications, and clinical.

Exercise

Seniors who exercise or participate in a fitness class decrease their risk of falling and sustaining an injury. The type of exercise varies, but could include group sessions and exercises performed at home. The exercise content includes balance and coordination exercises, strengthening exercises, and aerobic exercises. The U.S. Centers for Disease Control and Prevention (CDC) recommends that older adults include leg strengthening and balance exercises. A best practice program, Stay Active and Independent for Life (SAIL) is available in Spokane County and includes this content with a goal to prevent falls among older adults.

Home Modifications

Home modifications include looking for fall hazards in the home and assessing behaviors that increase the risk of a fall. Effective interventions generally use an occupational therapist to conduct the home assessment. Standardized assessment forms are used to identify hazards and needed safety aids. Unsafe behaviors are also identified, such as wearing loose shoes or having clutter in walk areas. A plan to address the hazards is developed and the occupational therapist evaluates success in implementing the plan at a follow-up visit to the home.

Clinical

Clinical interventions are when health care providers alter the current medical care of an individual to decrease their risk for falling. The type of clinical change may include vitamin D supplements, cataract surgery, a health care provider review of all medication, withdrawal from psychotropic medication, and a footwear evaluation by a podiatrist.

Multi-faceted interventions incorporate a combination of exercise, home modifications, and clinical treatment.

Infants and Children

Infants and children have different effective prevention strategies than those for older adults.[8,9] To prevent young children from falling, stairs in the home should be fitted with safety gates at the top and bottom, and windows should have guards. Playground equipment should have safe and soft material underneath. This decreases the severity of injury should a child fall. When youth participate in sports, organizers and families should ensure protective gear is worn to limit injury if the child falls.

Haddon Matrix Example

Falls among Older Individuals				
	Host (Victim)	Agent	Physical Environment	Social/Economic
Pre-event	Age, sex, multiple medications, history of falls, agility, malnutrition, dehydration, conditioning, chronic illness, vision/hearing loss, misfit clothes, unsafe gait/imbalance, incontinence, weakness, depression, amputation, foot disease	Floor or surface fallen on	Dressings, splints, unfamiliar environment, poor lighting, throw rugs, clutter, obstacles in walkway, absence of railings or grab bars, unsafe stairways, furniture height or placement, footwear, slippery floor surfaces	Belief that after first fall one should not be physically active
Event	Osteoporosis, isolation, heart conditions, methods/ability for rising after fall	sharp objects/hard surfaces fallen onto, alarm or surveillance system to alert if elder has fallen	Ability of elder to call for help, cleanliness of environment	Response time of EMS, first aid knowledge of present family members
Post-event	Decreased recovery ability, increased risk for complications, multiple injuries, diseases		Stairs in home or other impediments for returning to home	Financial status, insurance coverage, support systems, familial proximity, accessibility to rehab centers, quality of emergency treatment

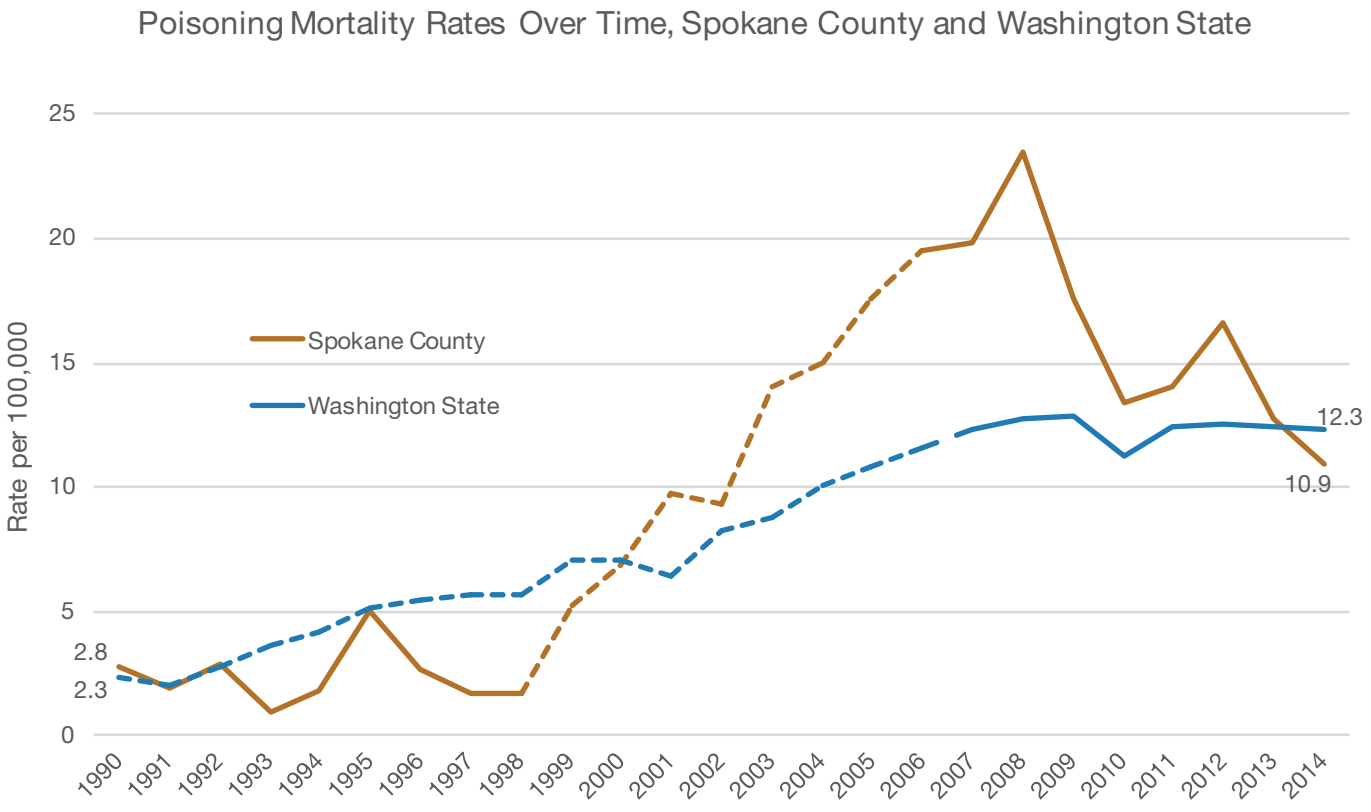
University of Minnesota. Injury Prevention. A Public Health Approach: Falls in the Elderly, Risk Factors and Prevention Strategies. http://enhs.umn.edu/current/injuryprevent/falls/risk.html. Accessed 06/13/2016.

Poisoning includes the unintentional overdose of a drug, a wrong drug given or taken in error, and taking a drug inadvertently. The worst outcome of a poisoning is death, but there are many non-lethal poisoning events that occur as well. Substances included in poisonings are prescription and non-prescription medicine, illicit drugs, alcohol, solvents, gases, and pesticides. Not included in poisonings are contact with a poisonous animal or plant and poisoning with the intent to harm one's self or another person.

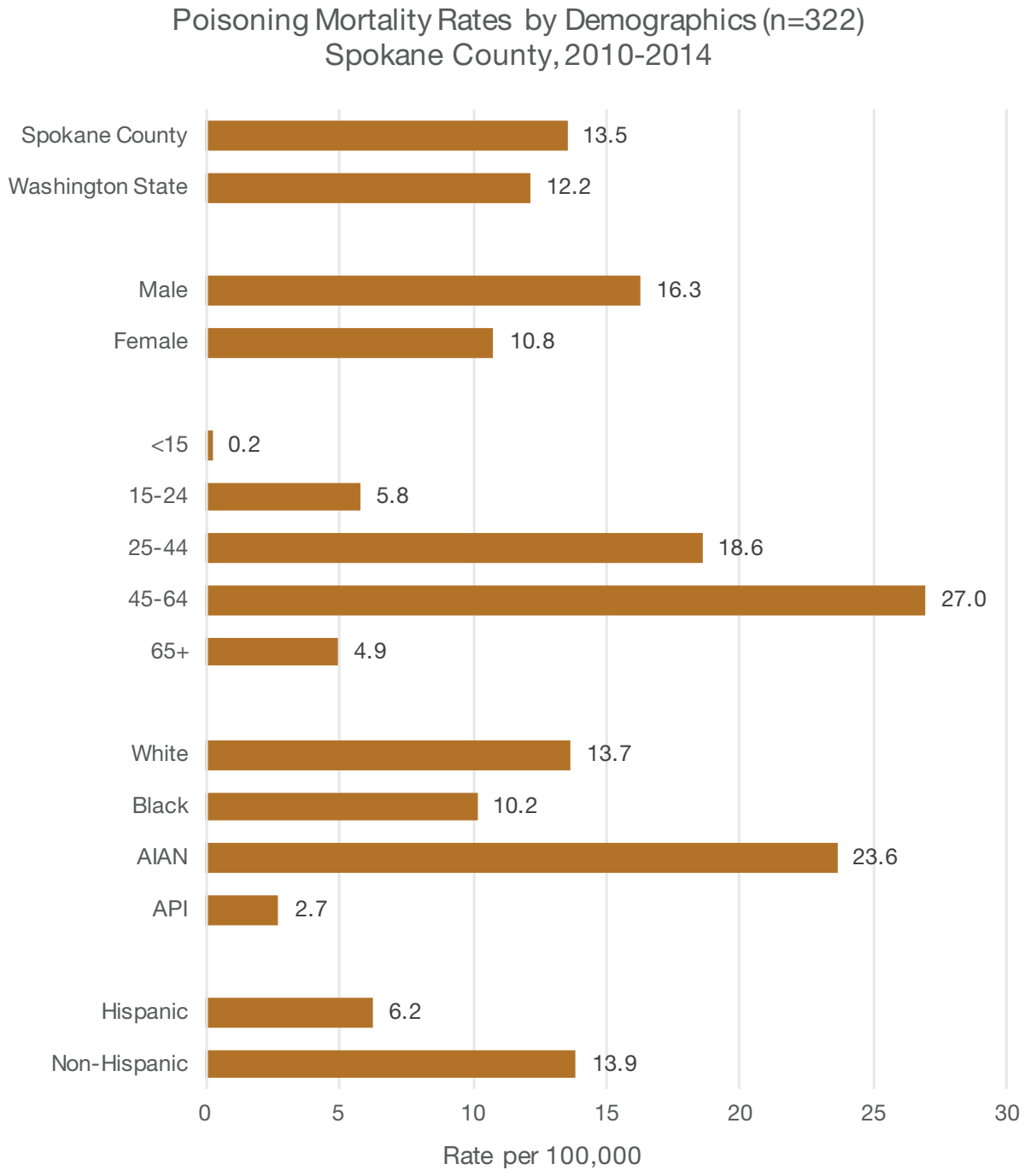
Of particular interest as a contributor to unintentional poisonings are opioid pain relievers. Medications that fall within this class include hydrocodone (e.g., Vicodin), oxycodone (e.g., OxyContin, Percocet), morphine (e.g., Kadian, Avinza), codeine, and related drugs. Over time there were changes that impacted accessibility to opioids through changing the amount and dosage of prescriptions. At the end of the 1990s, opioids were being recognized as important for treating chronic, non-cancer pain. New policies for opioid prescribing were instituted to address beliefs that patients were under-treated for pain and that there was low risk of addiction while taking opioids long-term. "Prescription opioid sales and prescribing increased dramatically after this policy change".[10] Additionally, the dosage increased. In 1997, opioid prescribing was 5.5 mg morphine equivalents per person. Dosages increased to 28.5 mg morphine equivalents per person in 2006. In 2011, Washington State initiated a prescription monitoring program, which allows providers to better monitor prescriptions of patients. [11, 12]

Mortality

Death trends from poisoning changed over the last 25 years. During the 1990s, the poisoning mortality rate for Spokane County was stable. The rate began to significantly increase in 1998, peaking in 2008, then significantly decreased. In Washington State, poisoning mortality trended up from 1990-2007 and stabilized thereafter.



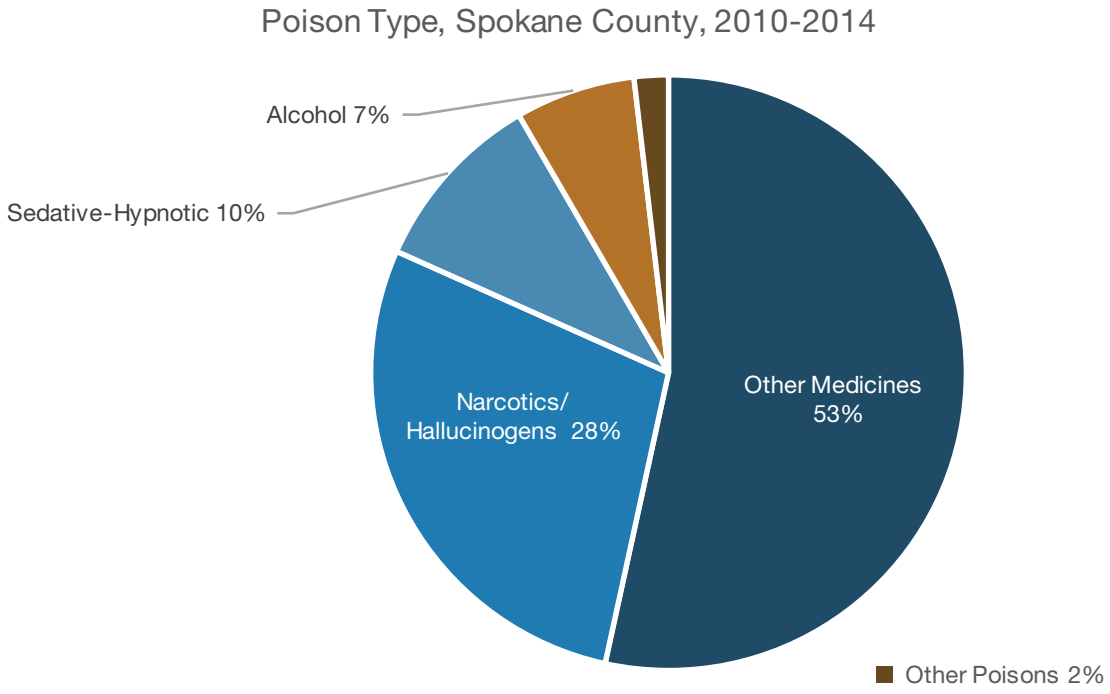
During 2010-2014, an average of 64 people died annually from unintentional poisoning in Spokane County. The poisoning mortality rate was similar for Spokane County and Washington State. Males had a significantly higher poisoning mortality rate than females. Adults 45-64 years of age had the highest rate of unintentional poisoning. There was no difference by race in the poisoning rate. Hispanics had a significantly lower poisoning mortality rate than non-Hispanics.



FATAL

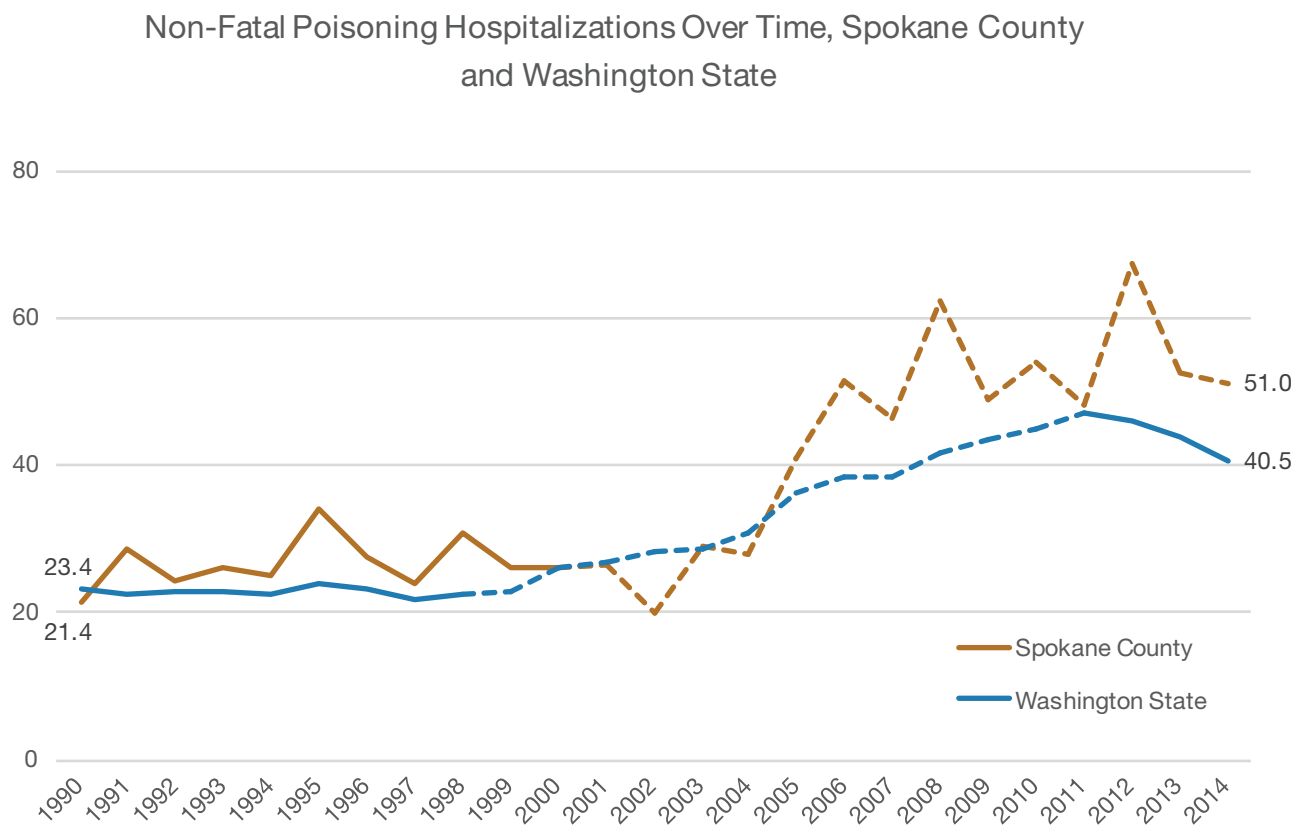
While much attention has been given to opioids in relation to unintentional poisoning, the largest category of poison type among fatal poisonings was other drugs, medicines, and biologic substances. This category includes medicines such as those that work on muscles, the respiratory system, cardiovascular system, or gastrointestinal system: hormones; blood agents; and antibiotics. More than half of unintentional poisoning deaths were from medicines in this category.

The second largest category of fatal poison type was narcotics and hallucinogens. This category includes cannabis, cocaine, codeine, heroin, LSD, mescaline, methadone, morphine, and opium.

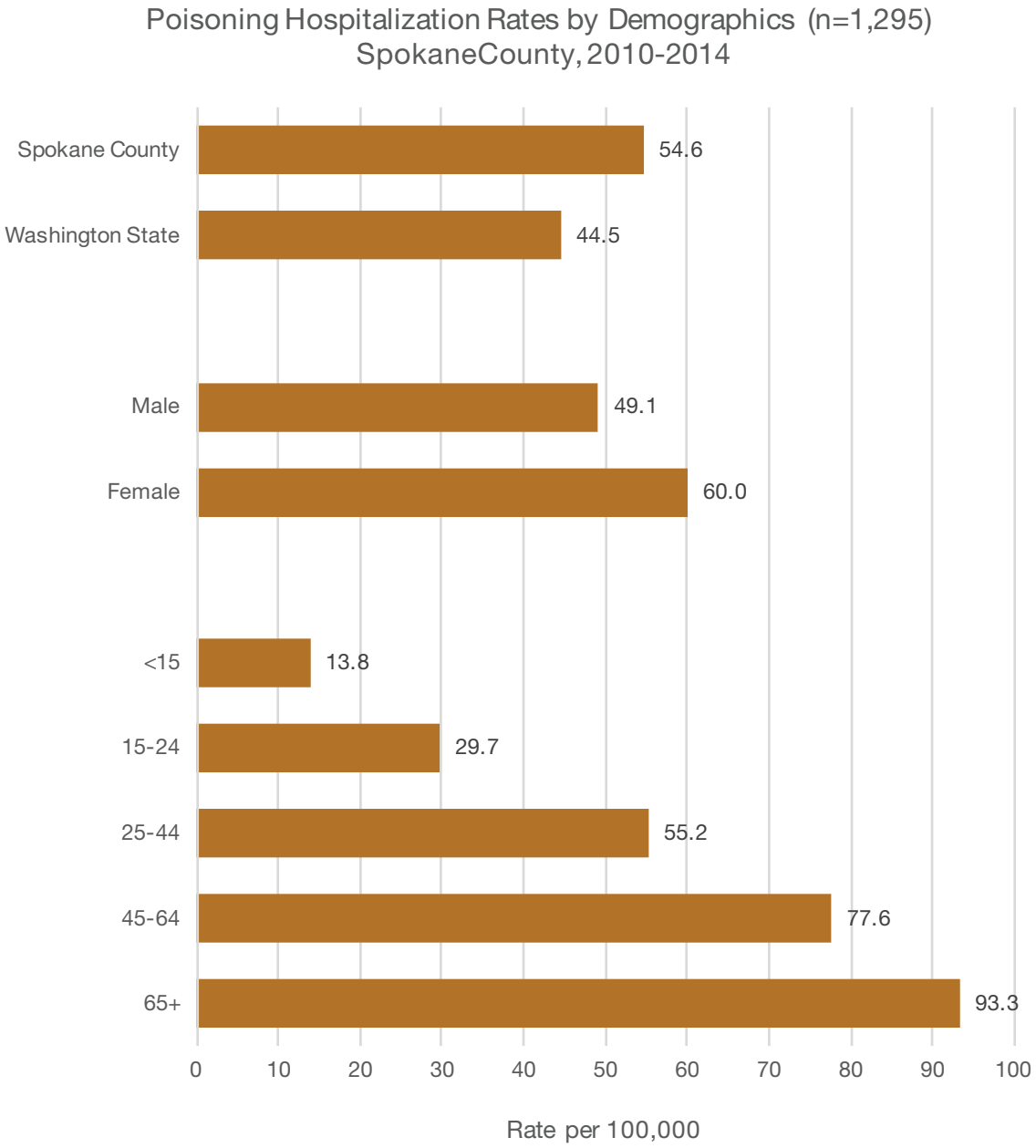


Non-Fatal Hospitalizations

The rate of unintentional poisoning hospitalizations was stable through the 1990s. Spokane County's rate significantly increased from 2000-2014. Statewide, the rate increased significantly from 1998-2011, but then decreased since.

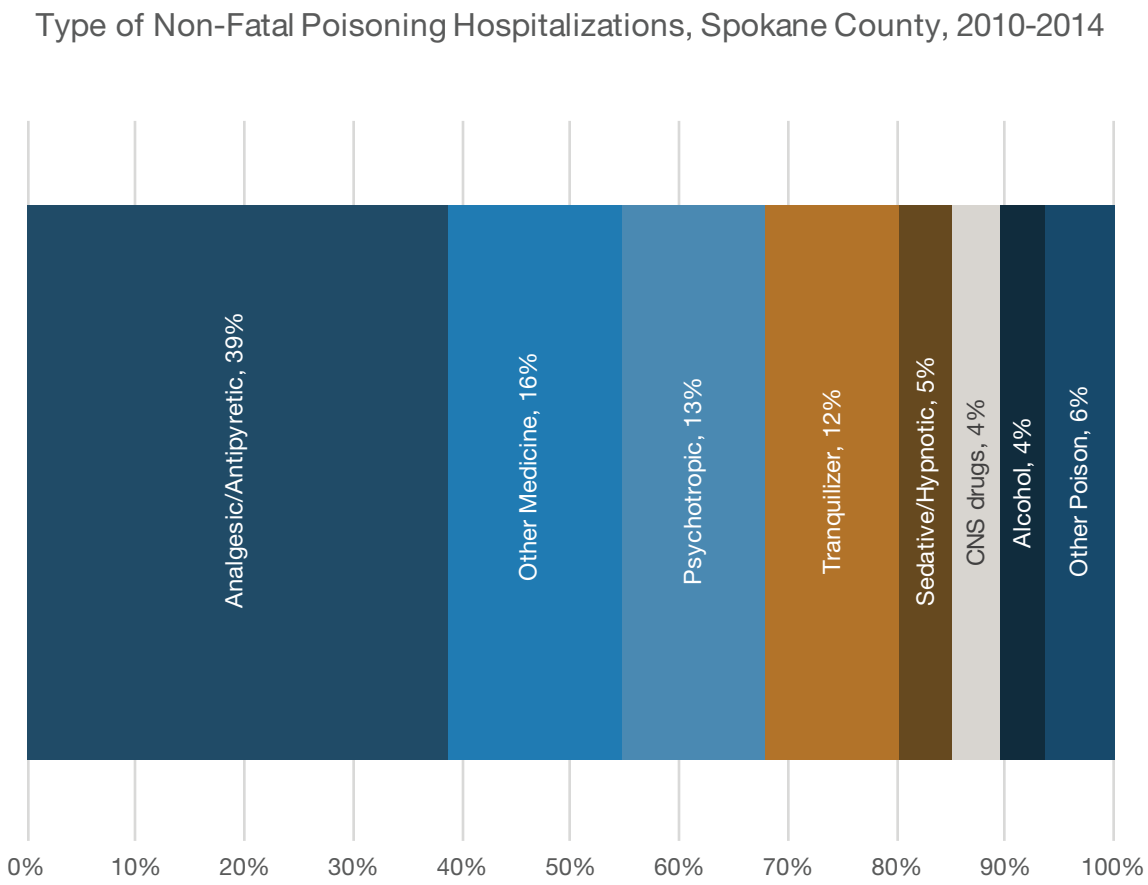


Approximately 260 individuals were hospitalized each year for a non-fatal poisoning during 2010-2014 in Spokane County. The county had a higher poisoning hospitalization rate than Washington State. Females had significantly higher poisoning hospitalization rates than males. Being hospitalized for a poisoning increased as age increased.



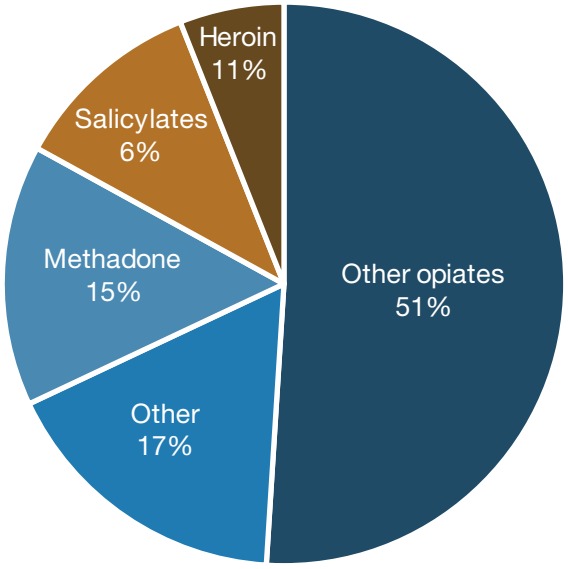
The largest category for which people were hospitalized with a non-fatal poisoning was analgesics/antipyretic drugs. This category includes opioid pain relievers, aspirin based pain relievers, anti-rheumatic drugs, and drugs to reduce fever (antipyretics). More than one third of poisoning hospitalizations were for this category of drugs. Among these hospitalizations, 11% were for heroin. Methadone accounted for 15% of poisoning hospitalizations in this category. Half of the poisoning hospitalizations for the analgesic/antipyretic group was from other opiates and related narcotics.

Psychotropic agents accounted for 13% of poisoning hospitalizations. This category includes antidepressants, hallucinogens (such as marijuana and LSD), and stimulants.



CNS = Central Nervous System

Type of Analgesic/Antipyretic in Poisoning Hospitalizations
Spokane County, 2010-2014



Prevention

As previously mentioned, prevention can occur in three phases, primary, secondary, and tertiary. Washington Poison Center (WAPC) is a non-profit organization that approaches poisoning prevention at all three phases.

In terms of primary prevention, the center provides community education about poisoning in an attempt to prevent the injury from occurring.[13]

The center's professional staff offers statewide advice and assistance over the phone (1-800-222-1222) in the case of a toxic substance exposure. This meets the criteria for secondary prevention as staff limit the health impact of an injury. They work to treat the poisoning at the place from where the call is made in case the person does not need to seek further medical treatment.

If a poisoning does require emergency care, WAPC works to maximize positive health outcomes by calling ahead to emergency providers and ensuring they are prepared to effectively treat the poisoning. This is the tertiary phase of prevention as it seeks to limit further harm and death.

Spokane County generated 5,411 calls to WAPC in 2015.

There are other primary prevention measures to decrease poisonings. Medicines and toxic substances should be stored where children cannot see or reach them. Safety caps make it more difficult to open containers and unintentionally access medication. Safely dispose of unused or unneeded medicine and toxic substances. Medicines can be disposed of at drug take-back sites.[14] The medicine needs to be in its original container. Spokane County has an ongoing drug take-back site at the Spokane Valley Police Department, 12710 E Sprague Avenue.[15] This site accepts prescription pills, narcotics, over-the-counter medications, vitamins, and medications for pets.

Haddon Matrix Example

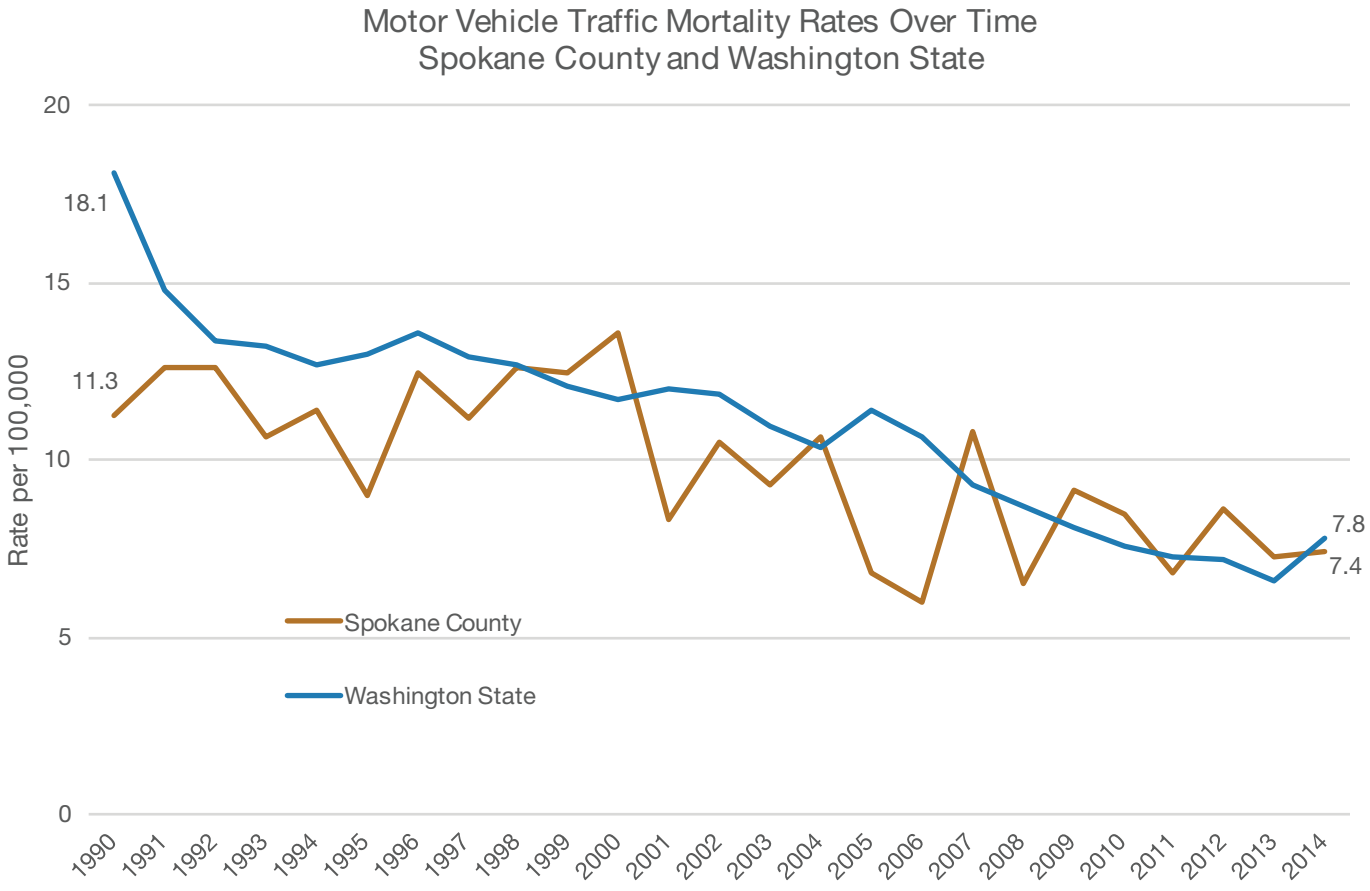
Poisoning				
	Host (Victim)	Agent	Physical Environment	Social/Economic
Pre-event	Children: explore Teens: experiment Elderly: mistakes, drug interactions Addicts: overdose	Toxicity of chemical Availability of agent Unanticipated exposure Eliminate production	Agents available: pills, consumer products, illegal substances Product labeling Poor storage Too many pills Safety packaging, blister packaging	Poor storage practices Poor supervision of young and old Drug-taking society Substance abuse Poor children at greater risk Substitute safer products Lack of drug take back program
Event	Knowledge of what to do Knowledge of poison control center toll-free number Emergency actions: antidotes, emetics, correct treatment Access to expert advice	Dose of exposure Route of exposure Body's reaction to agent Immediate use of antidote/ treatment	Antidote information available Availability of emergency medical services and emergency departments Health system functioning Available antidotes	Availability of telephone and transport Availability of poison control center information
Post-event	Rehabilitation: lungs, esophagus, neurological Educate public based on cases, experience Post-exposure follow-up and monitoring of victims Knowledge about correct care of poisoned host	Track exposure to agents Modify hazardous agents based on information Repackaging agents	Regulate products Invent new products that are less toxic to replace those more toxic Repackage agents	Political and public support to regulate chemicals and change manufacturing Replace hazards Public knowledge and perception of poison control system

Institute of Medicine, Committee on Poison Prevention and Control and Board on Health Promotion and Disease Prevention. 2004. Forging a Poison Prevention and Control System. National Academy of Science.

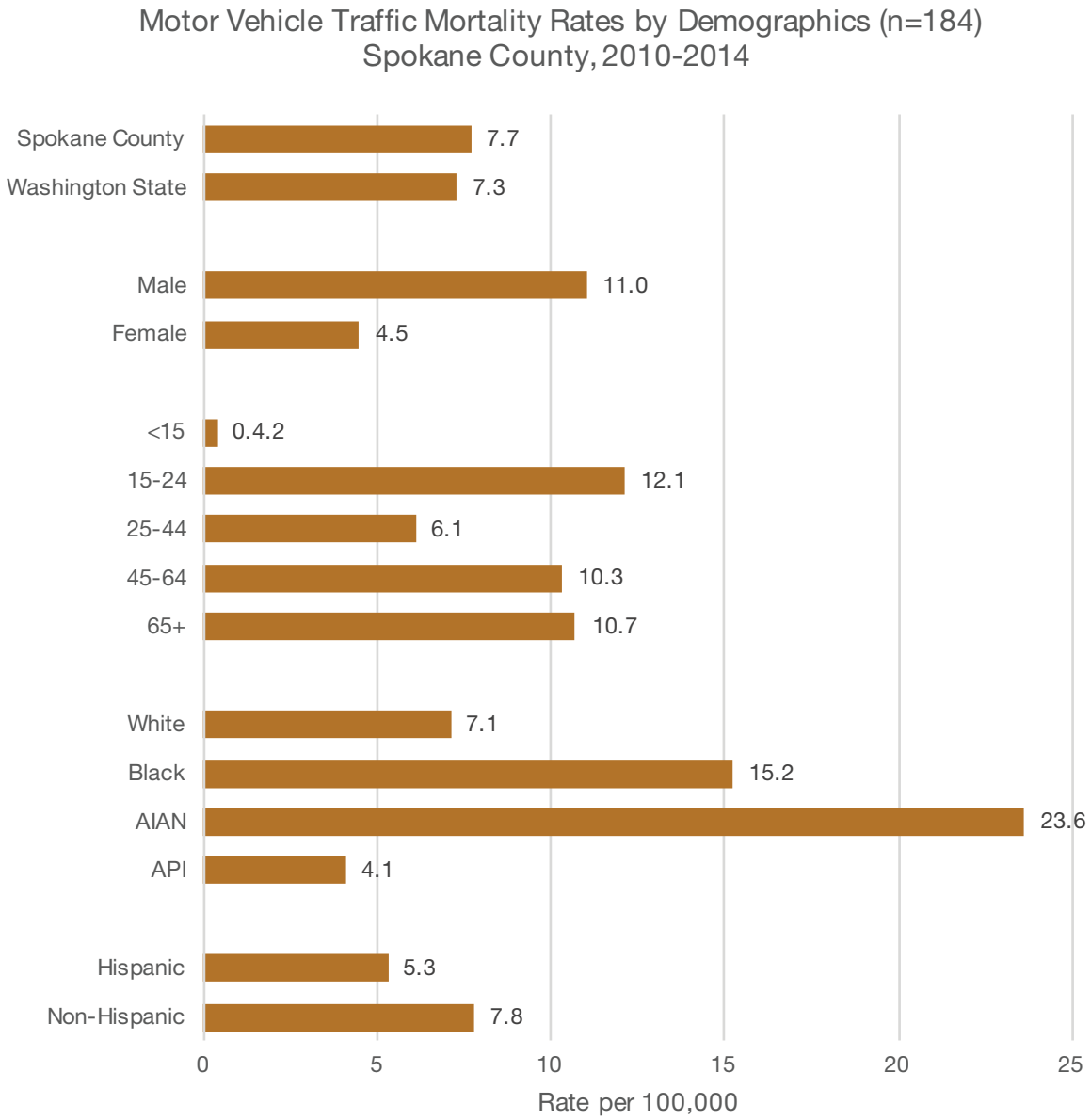
Injuries from motor vehicle traffic result from collisions with a car, truck, van, bus, motorcycle, train, or all-terrain vehicle. This category includes pedestrians and bicyclists who are involved in a collision with a motor vehicle. Not included in this category are pedestrian and bicyclist injuries not involving a motor vehicle, and motor vehicle traffic injuries with an intent to self-harm or to intentionally harm another.

Mortality

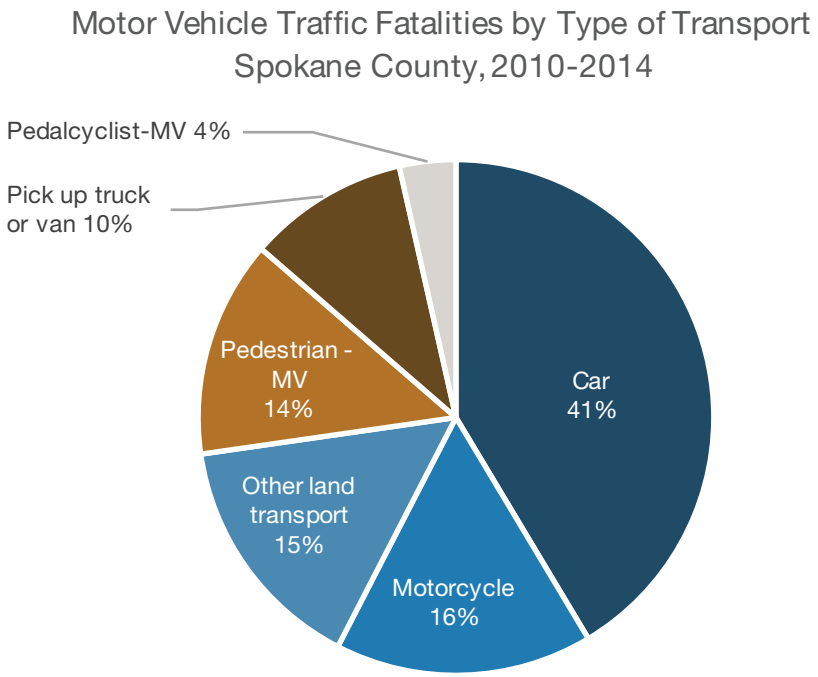
The rate of unintentional motor vehicle traffic deaths significantly decreased over the last 25 years in both Spokane County and Washington State.



During 2010-2014, an average of 37 Spokane County residents died each year from injuries due to a motor vehicle traffic collision. The motor vehicle traffic mortality rate was similar for Spokane County and Washington State. Males had a significantly higher rate of motor vehicle traffic mortality. Adults 25 to 44 years of age had a significantly lower rate compared to other age groups. Children younger than 15 years of age were not included in the comparison as there were too few deaths. Compared to whites, blacks and American Indians/Alaska Natives had significantly higher rates of motor vehicle traffic deaths. There was no difference in the rate between Hispanics and non-Hispanics.



The largest proportion of motor vehicle traffic deaths were to people in a car. There were similar proportions of deaths to pedestrians and motorcyclists who were struck by a motor vehicle.

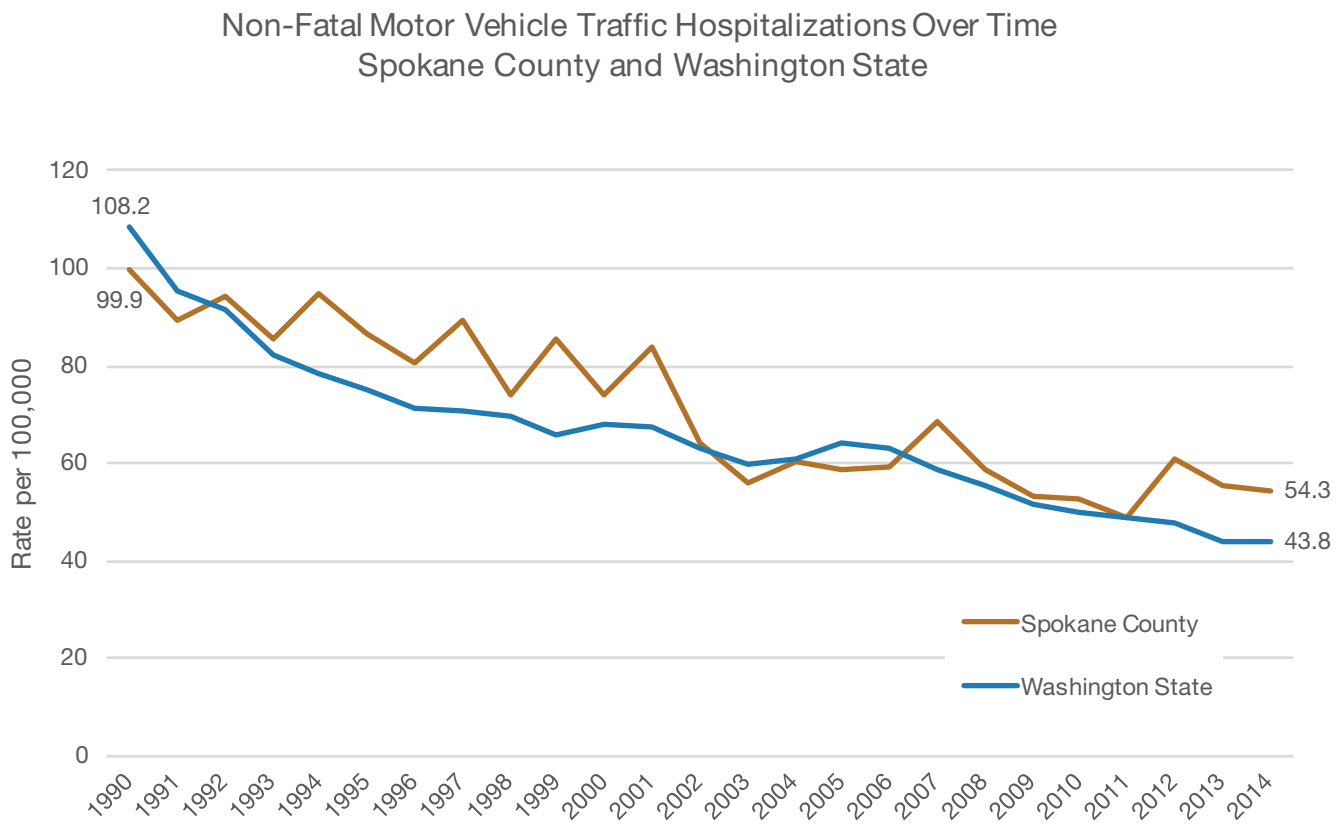


There were 43 fatal motor vehicle crashes in Spokane County during 2014.[16] In 15 of the crashes (35%), there was no distraction reported for the driver. There were many scenarios specific to driver inattention. The driver may have been drinking alcohol before driving, eating or drinking, using a cell phone, distracted by others in the vehicle, or daydreaming. Some specific examples of inattention were:

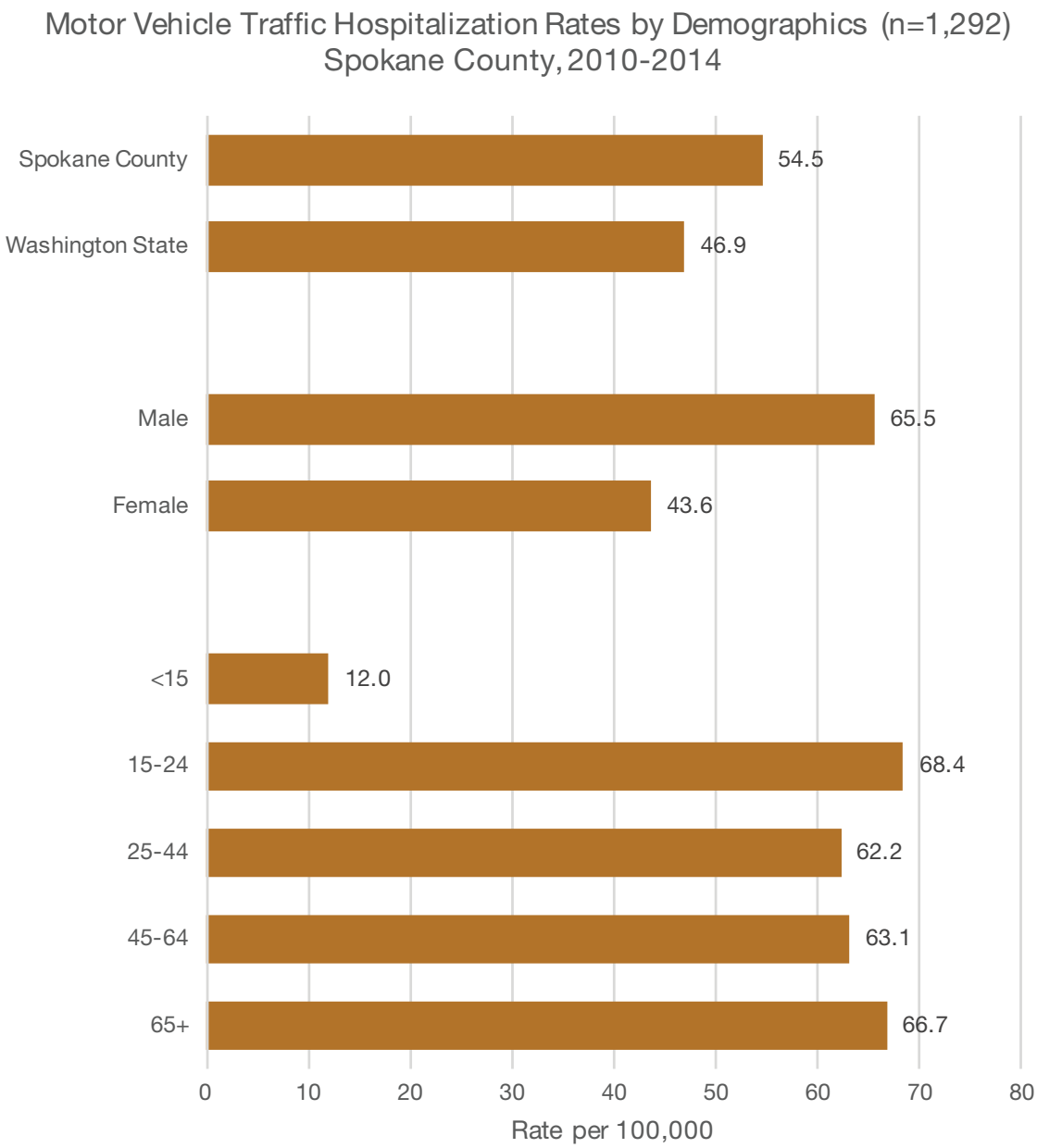
- 11 had driver alcohol involvement (26%)
- 1 had the driver talking on a cell phone (2%)
- 2 had driver inattentive (5%)

Non-Fatal Hospitalizations

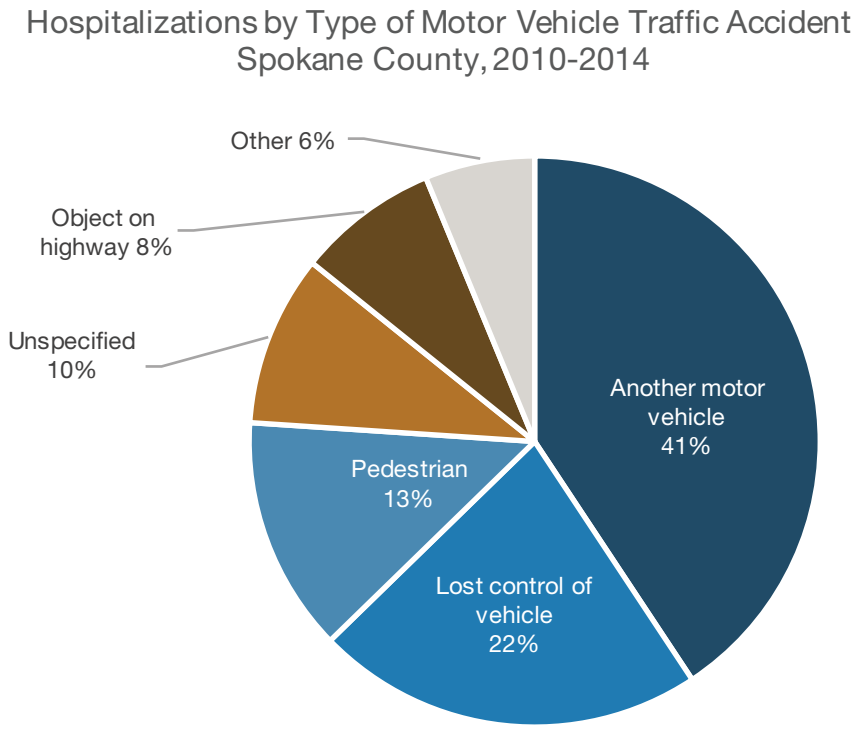
The rate of unintentional motor vehicle traffic deaths significantly decreased over the last 25 years in both Spokane County and Washington State.



During 2010-2014, an average of 260 individuals were hospitalized with injuries from a non-fatal motor vehicle traffic collision each year. Spokane County had a higher motor vehicle traffic hospitalization rate than Washington State. Spokane County males had a significantly higher motor vehicle traffic hospitalization rate than females. Children younger than 15 years of age had a significantly lower rate of hospitalization with injuries from a motor vehicle traffic collision compared to older age groups.



The majority of non-fatal hospitalizations due to a motor vehicle traffic injury were from collisions between two vehicles. Nearly one-quarter were from a vehicle losing control, but without a collision on the highway. These injuries include a motor vehicle failing to make a curve, having a tire blowout, a mechanical problem, or driver inattention. Injuries from losing control occur when the motor vehicle collides with an object off the highway, overturns, or stops abruptly off the highway.



Prevention

The U.S. Department of Health and Human Services' Community Preventive Services Task Force publishes "The Community Guide", a website that houses reviews of interventions intended to improve the public's health. Through a systematic review process, it identifies whether certain interventions have sufficient evidence of effectiveness in changing health outcomes. The Community Guide recommends the following interventions for reducing injury from motor vehicle collisions.[17]

Child Safety Seats

The use of a child safety seat is intended to decrease the risk of injury to children younger than five years of age when riding in a motor vehicle involved in a collision. Laws mandating the use of child car seats are recommended. Having a law decreases injuries by increasing the use of safety seats. Washington State's child passenger Restraint law requires children younger than eight years of age to use a child safety seat, unless the child is 4'9" or taller. Child passenger safety teams advocate for the use of a booster until a child is 4'9" regardless of their age. This height assures proper fitting of the seat belt in the vehicle. For safe riding, the seat belt should lay across the hip and collar bones. Community-wide information and enforcement campaigns are recommended including mass media information, public displays, and special strategies such as checkpoints. These increase the use of safety seats and impact the population at all socioeconomic levels.

Distribution of car seats with an educational component increases proper use of car seats and increases the proportion of families with a car seat. These programs target low-income parents or those who do not understand the importance of using a car seat.

Education programs with an incentive for the parent or child increases use among populations at all socioeconomic levels, urban and rural, and all racial and ethnic groups. Education programs alone had insufficient evidence as an effective method for decreasing the risk of motor vehicle injuries to children.

Safety Belts

Safety belts in vehicles are designed to decrease the risk of injury to occupants when involved in a motor vehicle collision. Laws mandating the use of safety belts decrease fatal and non-fatal injuries, and increases the use of safety belts. Washington State's Seat Belt law requires all occupants to be properly restrained. The driver is responsible for ensuring children younger than 16 years of age are properly secured.

Primary enforcement laws for seat belt use are more effective for decreasing injury and increasing seat belt use than secondary enforcement laws. Primary laws allow police to stop a motorist on the basis of being unbelted. Secondary laws allow police to ticket unbelted motorists only if they were stopped for another reason. Washington State has a primary enforcement seat belt law.

Enhanced enforcement programs increase the number of officers on patrol (supplemental programs) or promote an officer issuing more citations (targeted). Enhanced enforcement also includes publicity about the program.

Alcohol- and Marijuana-Impaired Driving

Many types of interventions aim to reduce alcohol-impaired driving and related deaths and injuries. Laws implementing a 0.08% blood alcohol concentration level for impairment decrease fatalities in collisions. Laws with a lower blood alcohol concentration for young or inexperienced drivers decrease fatalities and injuries in collisions.

Publicized sobriety checkpoints are considered a high-visibility enforcement program. Media efforts publicize the checkpoints and law enforcement officers stop drivers in a systematic manner to assess their level of alcohol impairment. Sobriety checkpoints decrease fatal and non-fatal collisions and decrease the number of drivers with a blood alcohol content above the legal limit. In Washington State, sobriety checkpoints are illegal.[18] Washington State does have emphasis patrols in which more law enforcement officers are patrolling to identify impaired drivers.[19]

Mass media campaigns can decrease alcohol-related crashes and the number of drivers who consumed alcohol, but only if they are carefully planned, well executed, attain adequate audience exposure, and are implemented in places with other ongoing alcohol-impaired driving prevention efforts.

School-based instructional programs are effective in reducing the number of students riding with a driver who has been drinking. However, there is insufficient evidence for these programs to reduce driving after drinking.

Other types of programs with insufficient evidence for reducing drinking and driving and riding with a driver who has been drinking are youth peer organizations and social norming campaigns. There were too few studies for evidence.

With the legalization of marijuana in Washington State, driving under the influence (DUI) category in motor vehicle traffic collisions was expanded to include the influence of marijuana. "When the state of Washington legalized marijuana in 2012, a new threshold "driving under the influence" (DUI) was established for marijuana. According to state law, the DUI limit is 5 nanograms per milliliter of blood for active THC concentration".[20] Road side testing for marijuana intoxication is still under development and therefore current numbers for DUIs are limited to clinical blood testing. The average active marijuana concentration associated with blood testing was 6.1 ng/mL for DUI submissions tested for marijuana in 2014.[21] There is not sufficient research on effective ways to prevent driving while under the influence of marijuana.

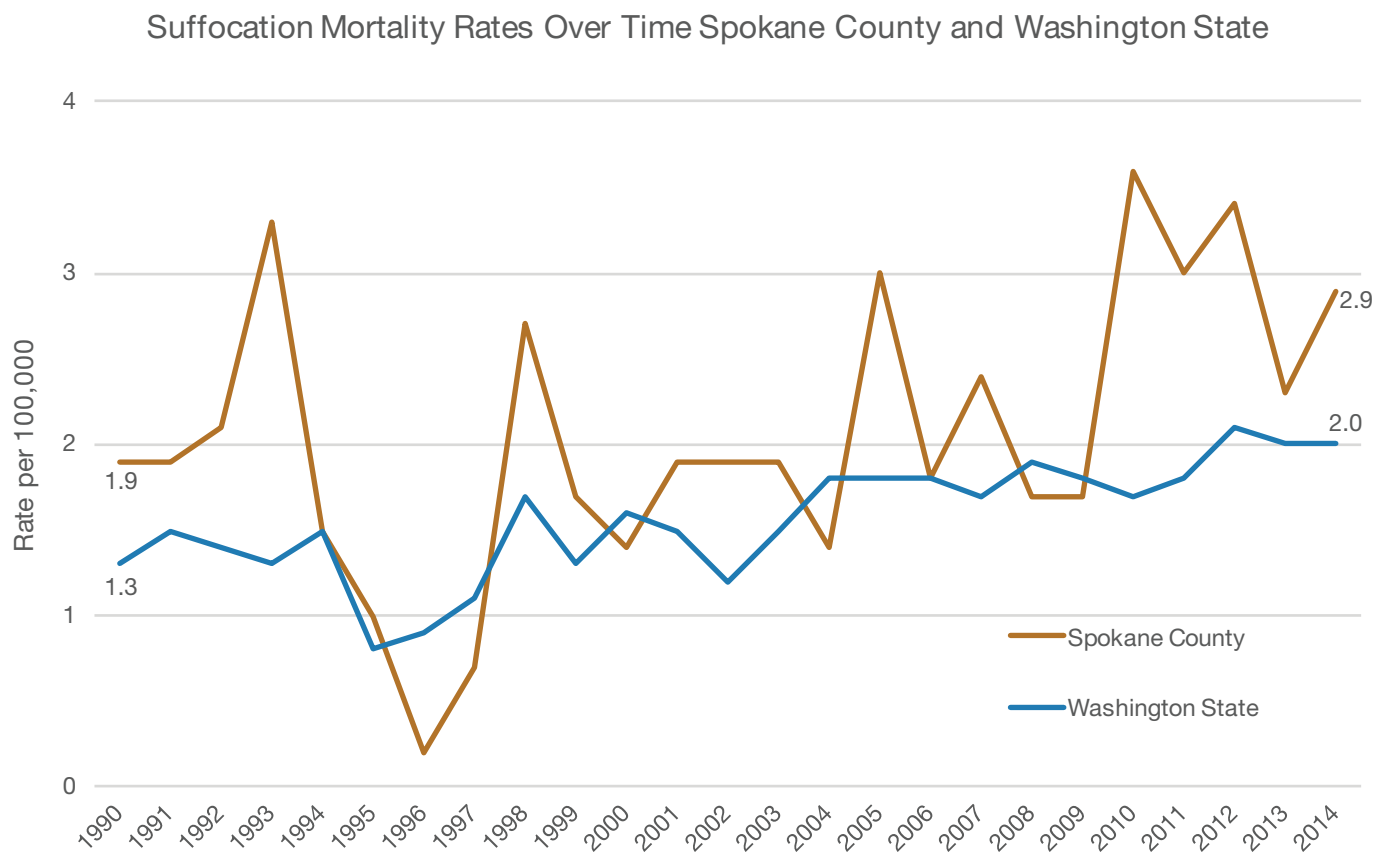
Haddon Matrix Example

Motor Vehicle Traffic Collisions				
	Host (Victim)	Agent	Physical Environment	Social/Economic
Pre-event (before crash)	Poor vision or reaction time, driving impaired (alcohol and/or drugs), speeding, risk taking, education and licensing	Failed brakes, missing lights, lack of warning system	Narrow shoulders, ill-timed signals	Cultural norms permitting speeding, red light running, DUI
Event	Health at time of crash, sitting properly in restraint, impairment	Functioning of safety equipment (seat belts, air bags, child restraints) other safety devices, speed of travel	Guardrail design, roadside features, type and size of object struck	Laws concerning use of safety equipment
Post-event	Response to EMS, severity of injury, type of injury	Integrity of fuel and battery systems, ease of extraction from vehicle	Distance of EMS personnel, Notification of EMS personnel, Accessibility to crash victims	Trauma system equipment, personnel, training; information sharing
Adapted from NHTSA/Safety 1N Num3ers, June 2015				

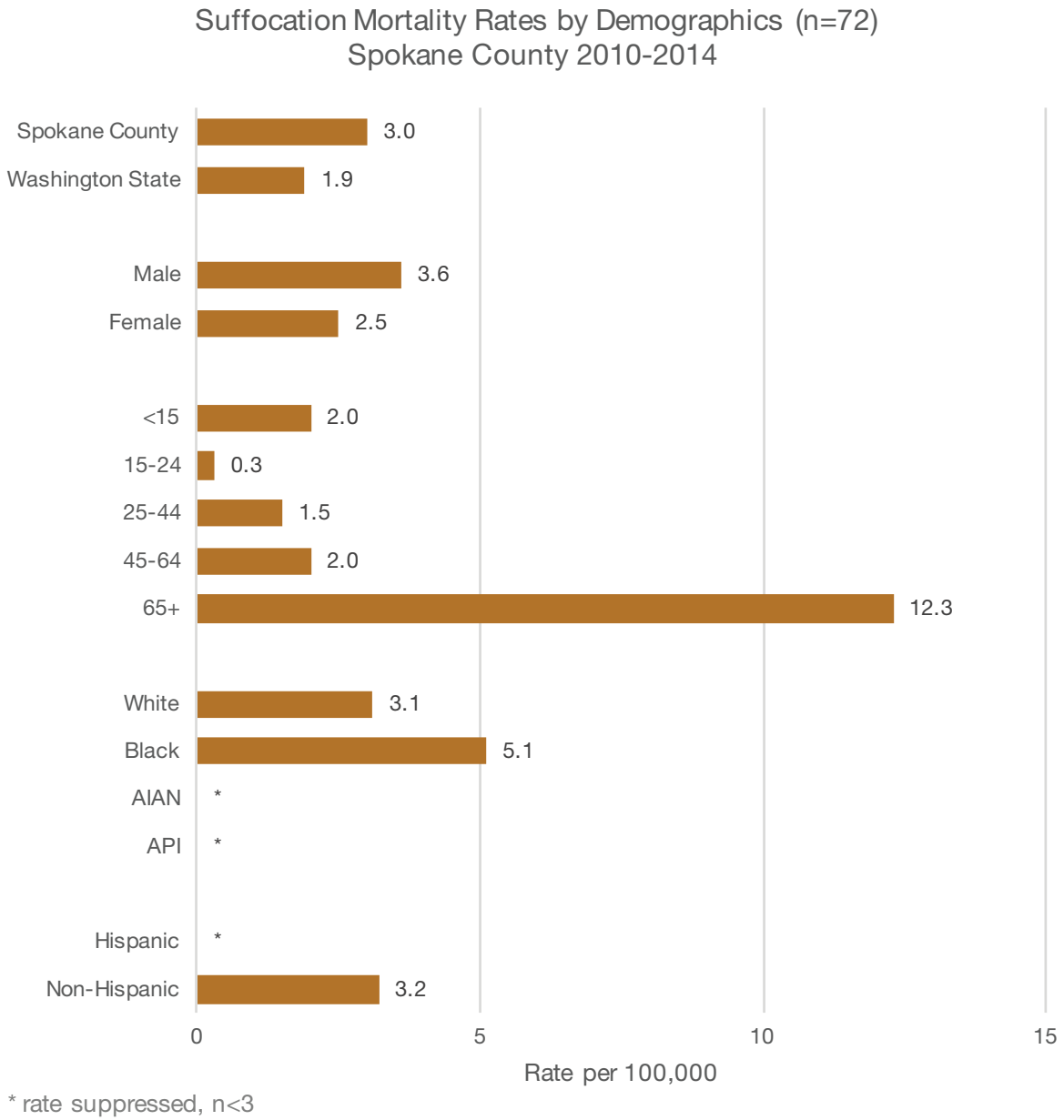
Suffocation includes unintentional threats to breathing including suffocation or strangulation in bed from linens, a mother's body, or pillow; other unintentional hanging or strangulation; not being able to breathe from a cave-in or falling earth; inhalation of gastric contents; inhalation or ingestion of food or other objects blocking the respiratory tract; being confined in a low-oxygen environment; and other threats to breathings such as suffocation by a plastic bag. Not included in this category is suffocation with intentional self-harm or intentional harm to another person.

Mortality

The rate of unintentional deaths from suffocation significantly increased over the last 25 years in both Spokane County and Washington State.

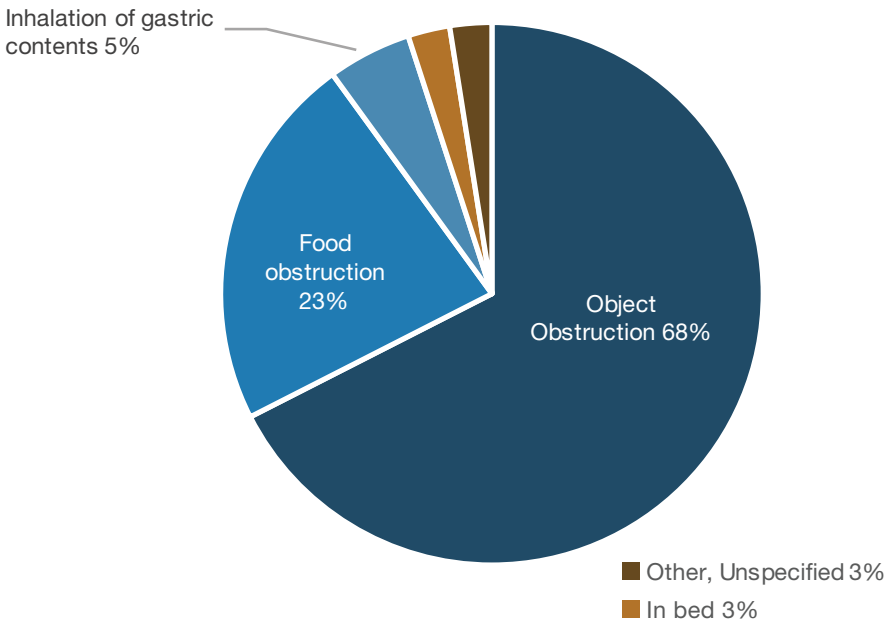


An average of 14 individuals died each year during 2010-2014 in Spokane County from suffocation. During these years, Spokane County had a higher suffocation mortality rate than Washington State. Among Spokane County residents, there were no significant differences in the rate of suffocation deaths between males and females, by age group for individuals younger than 65 years of age, or between whites and blacks. Adults 65 years of age or older had a significantly higher suffocation mortality rate than younger individuals.

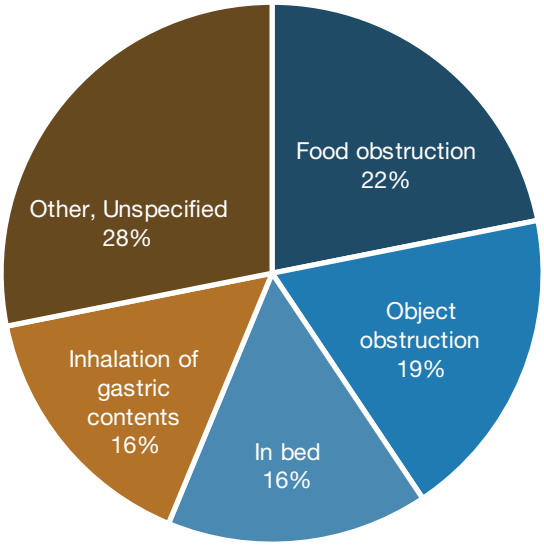


The most prevalent reason for suffocation is from having an object or food obstructing the airway. In Spokane County, the type of suffocation was distributed differently among adults 65 years of age or older compared to individuals younger than 65 years of age. Two in three suffocation deaths among seniors resulted from an object obstructing the airway. Food obstruction accounted for another 23% of suffocation deaths among seniors. Among individuals younger than 65 years of age, the type of suffocation was more evenly distributed.

Suffocation Type, 65+ Years of Age (N=40), Spokane County, 2010-2014



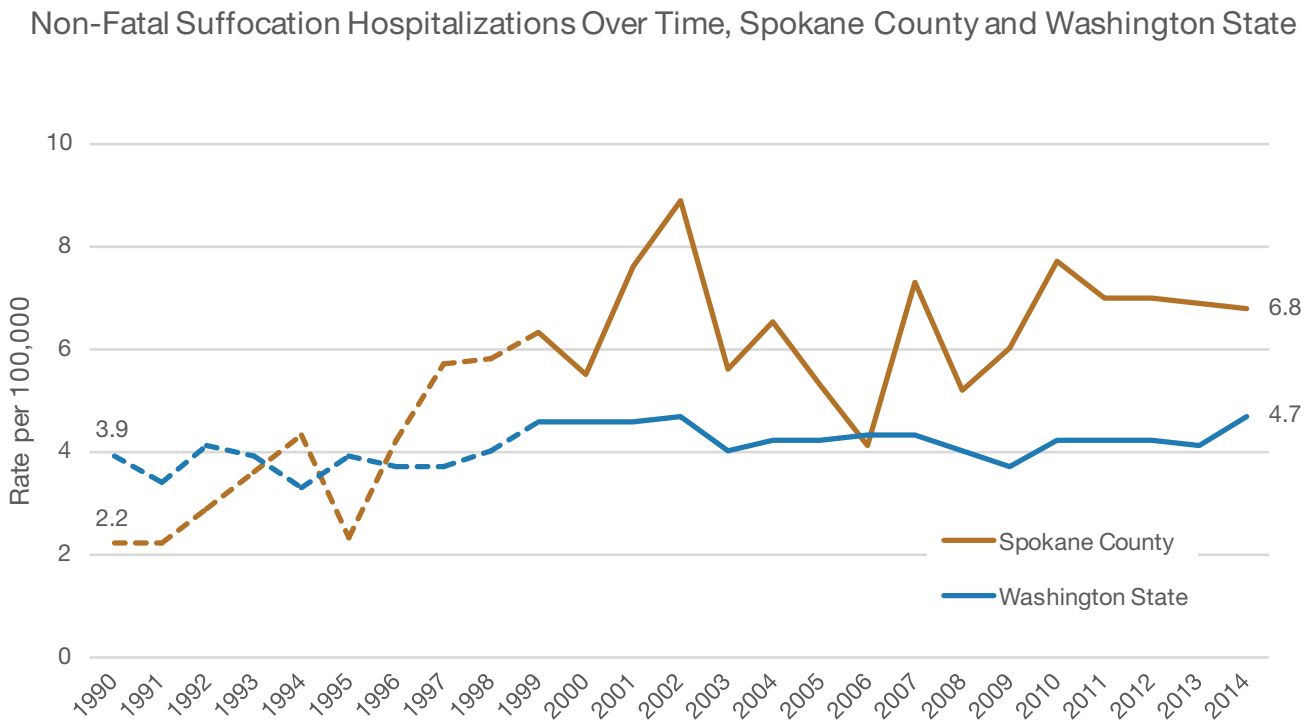
Suffocation Type, 0-64 Years of Age (N=32), Spokane County, 2010-2014



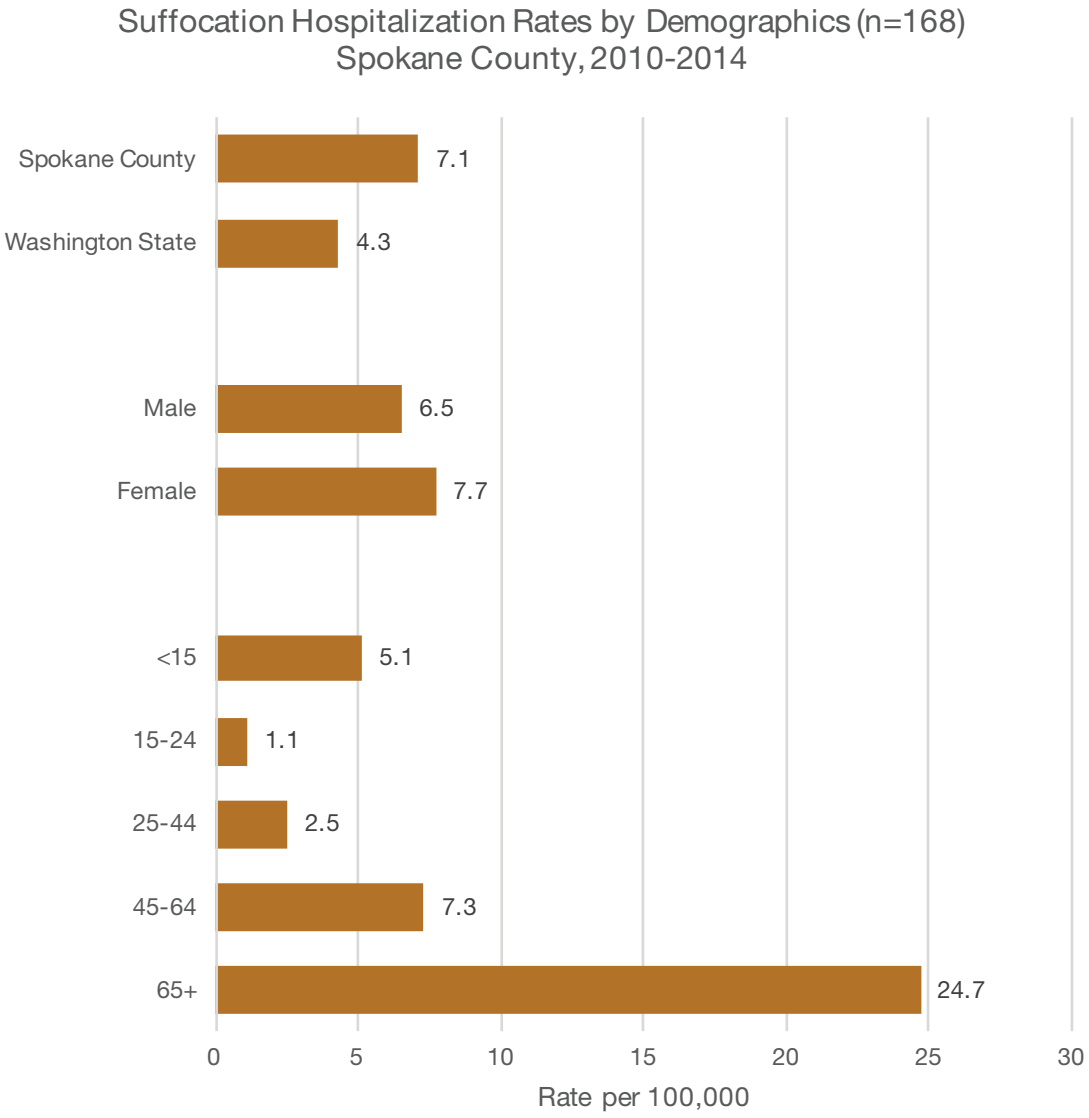
Note: Suffocation in bed includes suffocation and strangulation due to bed linens, mother's body, or a pillow.

Non-Fatal Hospitalizations

From 1990-1999, Spokane County had an increase in the rate of non-fatal hospitalizations from suffocation. Since then, there was variability in the rate, but no trend either increasing or decreasing. Statewide, the suffocation hospitalization rate also increased during the 1990s. The rate was stable since 2000.



Each year during 2010-2014, an average of 34 individuals were hospitalized from suffocation. Spokane County had a higher rate of these hospitalizations than Washington State. In Spokane County, there was no difference in suffocation hospitalizations between males and females. Overall, the likelihood of a suffocation hospitalization increased with age.



Prevention

Education of Risks

Education on suffocation risks informs a community on how to decrease suffocations.[22] Caregivers for both children and individuals with difficulties chewing and swallowing should know the appropriate foods and sizes for these individuals. Cardiopulmonary resuscitation (CPR) training should be encouraged for parents and other caregivers.

Toys

Toys with small parts that may pose a suffocation risk to small children have regulations to meet. Product designs must pass tests of small parts for children younger than three years of age. Recalls help remove items that are found to have an increased risk for injury.[23]

Bed Sharing

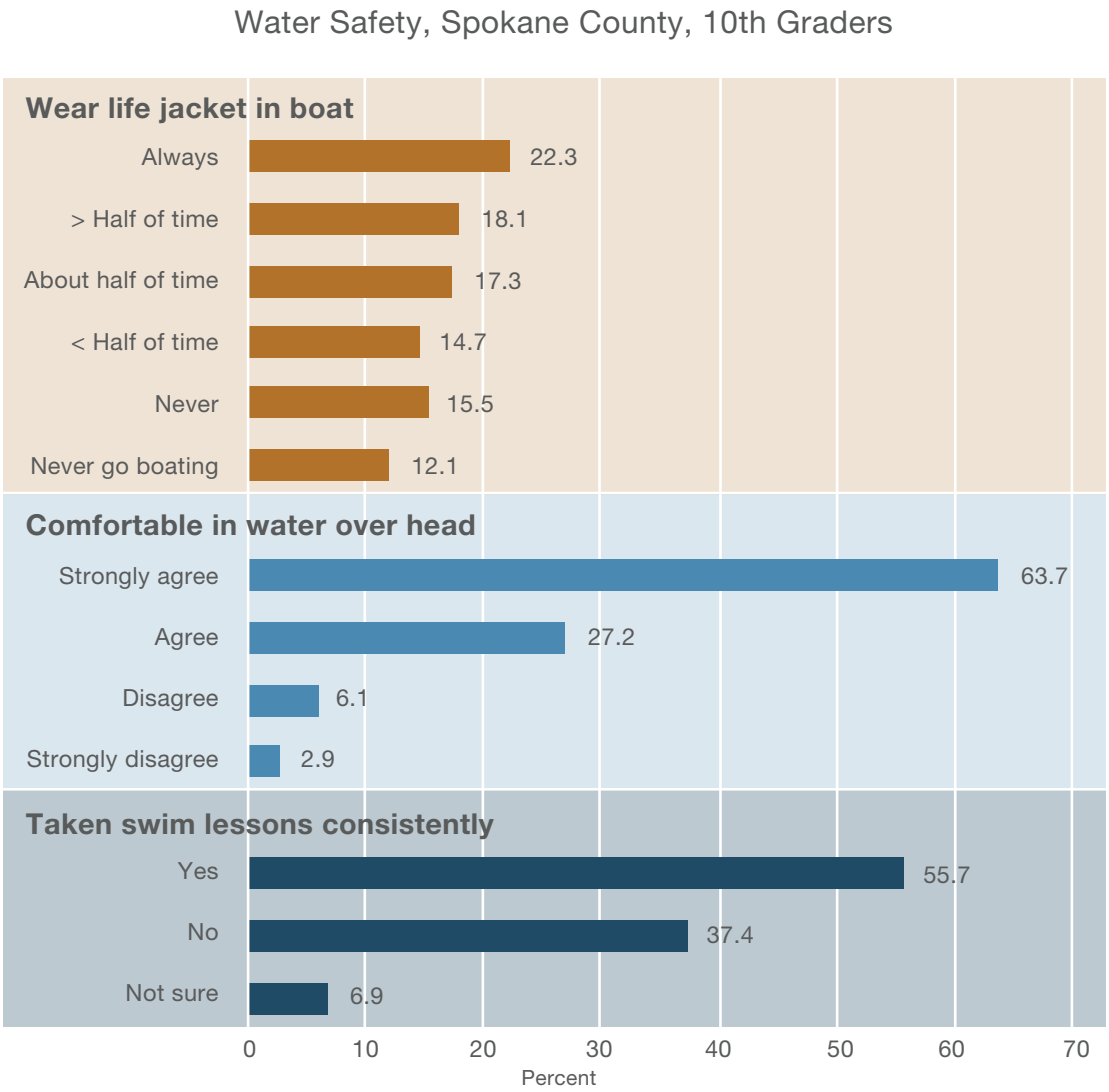
Infants can suffocate when a person sleeping in the same bed lays over them, or they may suffocate when getting entangled with, or trapped by, bedding, pillows, or other parts of furniture.[24] Infants should be placed alone to sleep in a crib or other bed designed for an infant.[25]

Drowning includes drowning and submersion while in, or from a fall into:

- Bathtubs
- Swimming pools
- Natural water, such as a lake, sea, river, or stream
- Other water sources, such as a tank or reservoir

It does not include drowning or submersion with the intent for self-harm or harm to another.

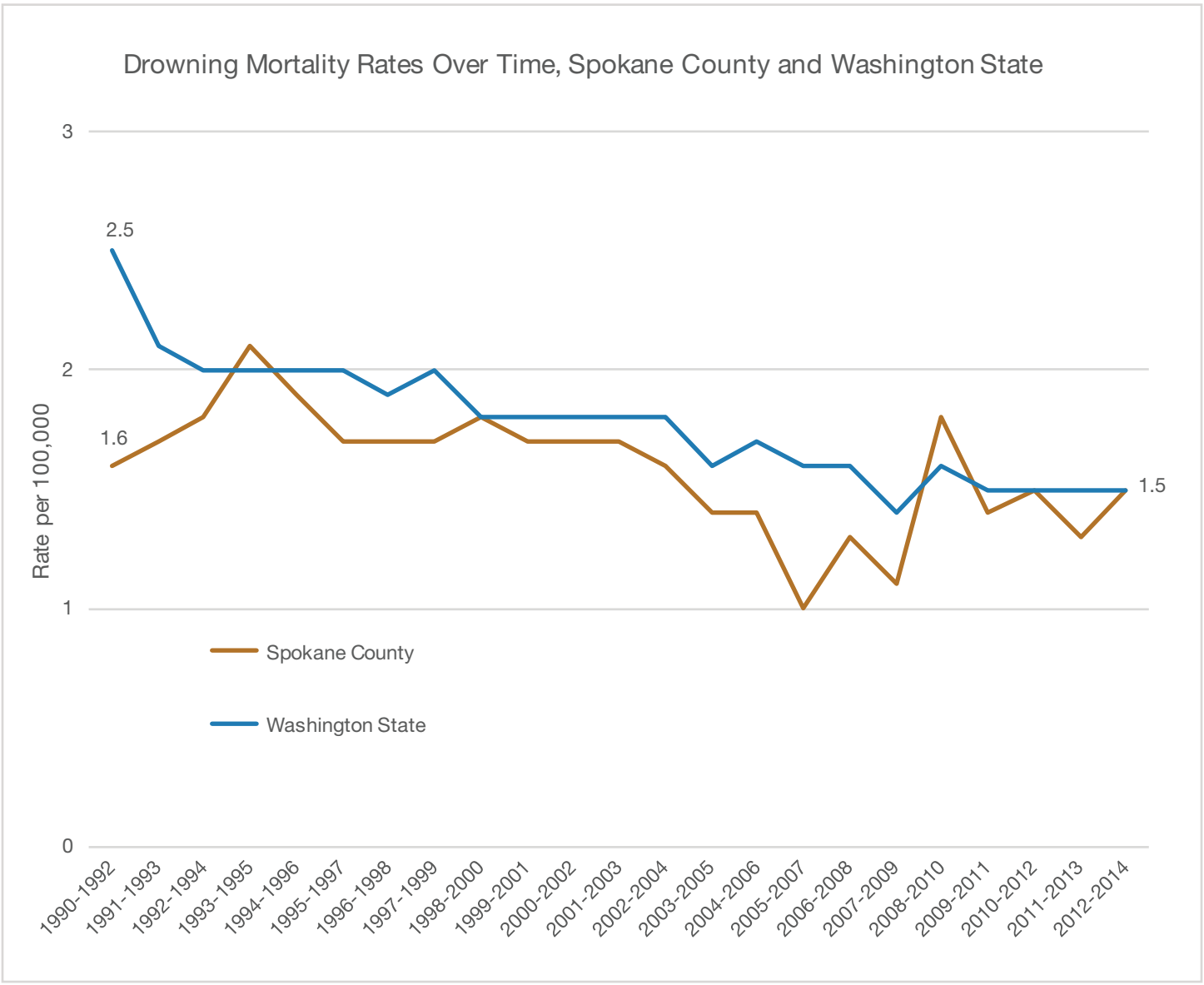
"The main factors that affect drowning risk are lack of swimming ability, lack of barriers to prevent unsupervised water access, lack of close supervision while swimming, location, failure to wear life jackets, alcohol use, and seizure disorders."[26] Among Spokane County youth in 10th grade, 56% report having taken formal swimming lessons and 91% report they are comfortable playing and swimming in water over their head. Less than one-quarter of the youth report always wearing a life vest when in a small boat like a canoe, raft, or small motorboat.[27]



Source: Washington State Department of Health, Healthy Youth Survey, 2014

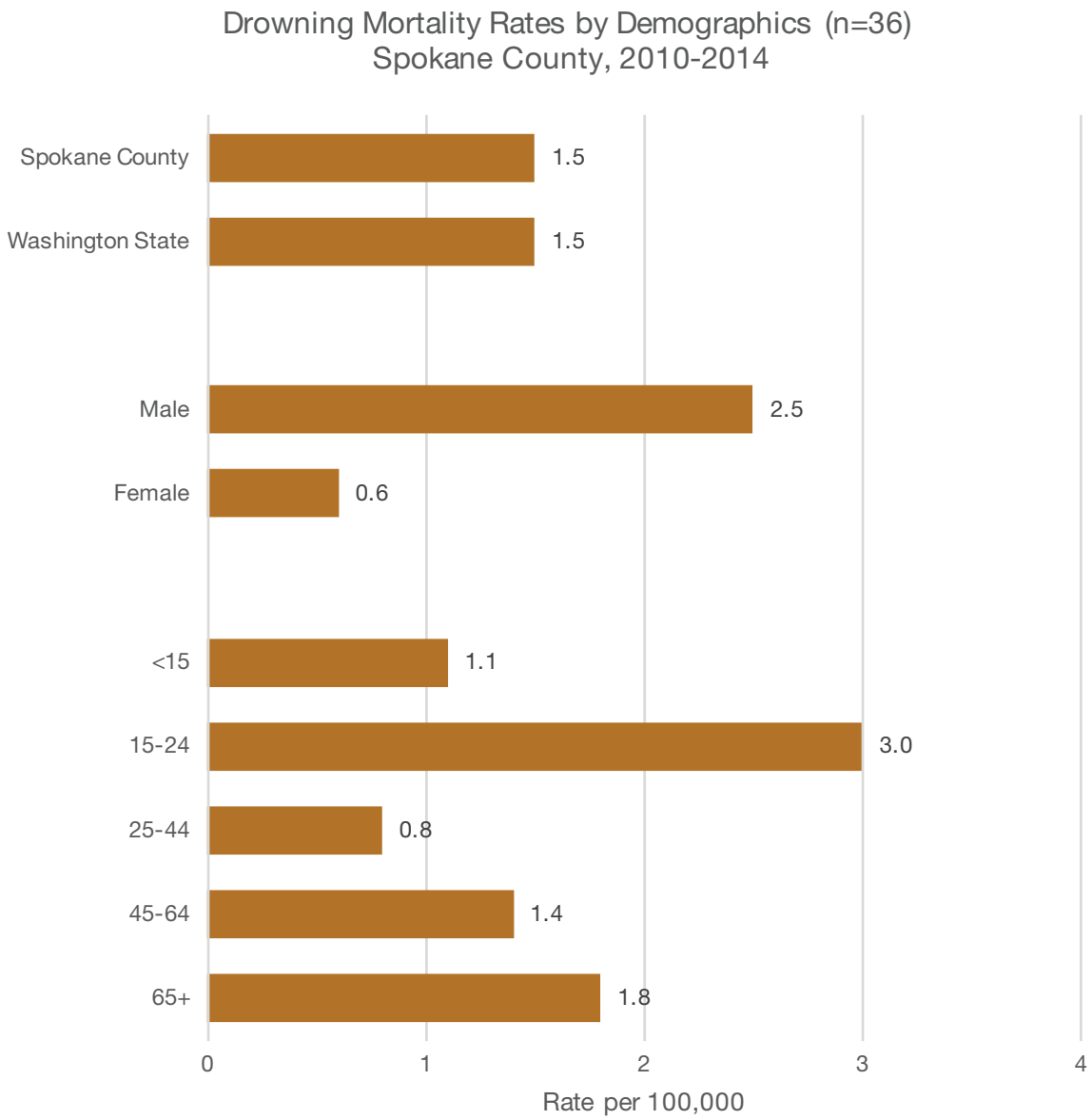
Mortality

There was no trend in the rate of unintentional drowning over the last 25 years in Spokane County. Statewide there was a decreasing trend for that same time period. A three-year rolling average was used to stabilize the rates.

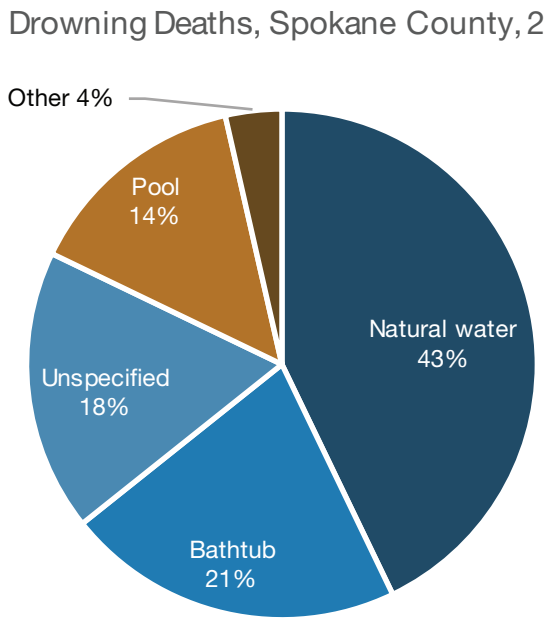


FATAL

An average of seven people died each year from drowning during 2010-2014 in Spokane County. There was no difference in the drowning rate between Spokane County and Washington State. In Spokane County, males had a significantly higher drowning rate than females. Individuals 15 to 24 years of age had the highest drowning rate. The next older age group (25 to 44 years) had a significantly lower drowning rate. There was no difference in the rate for other age groups. There were too few cases by race and Hispanic ethnicity to report drowning rates.

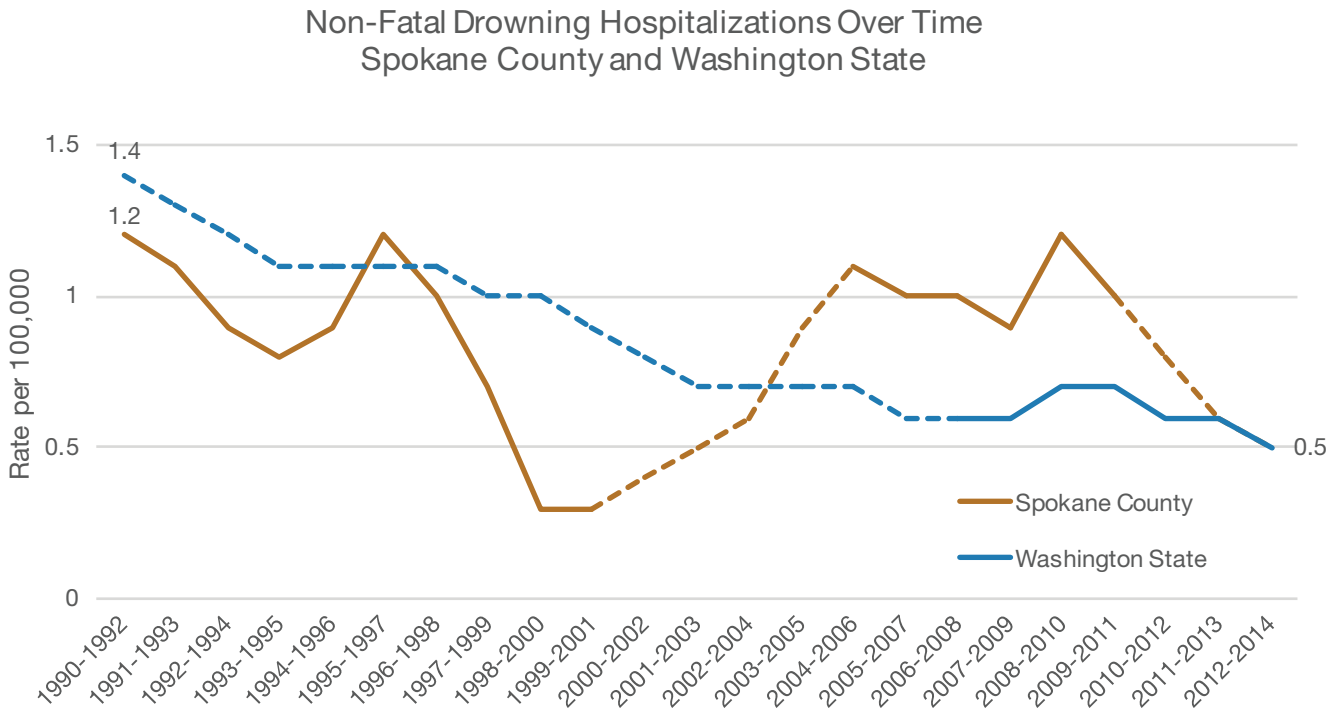


The highest proportion of drowning deaths occurred in natural water, such as a river, lake, stream, or sea. Second were drowning deaths in a bathtub.



Non-Fatal Hospitalizations

A three-year rolling average was used to present non-fatal drowning hospitalizations. In Spokane County, there was a significant increase from 1999-2001 to 2004-2006. There was a subsequent decrease from 2009-2011 to 2012-2014. Statewide there was a decreasing trend in drowning hospitalizations from 1990-1992 to 2006-2008.



During 2010-2014, there was an average of 12 individuals hospitalized yearly from a non-fatal drowning. The 2010-2014 drowning hospitalization rate was similar for Spokane County (0.7 per 100,000) and Washington State (0.6 per 100,000). There were too few Spokane County drowning hospitalizations for analysis by demographic stratifications, even when aggregating years.

Prevention

Drowning is often swift, silent, and can occur in as little as 30 seconds. Most young children who drowned in pools were last seen in the home, were out of sight less than five minutes, and were in the care of one or both parents at the time. When children are in a tub, pool, or other body of water, an adult should actively supervise. Caregivers should avoid distractions like reading, playing cards, texting, or talking on the phone while supervising. Designate an adult to watch the children, who can pass the responsibility to another adult. Adults and older children should always swim with a buddy when at a pool that is not lifeguarded. Even good swimmers can drown if they are injured or have a medical emergency.

In Spokane County, a pool or hot tub with water more than 24" deep is required to have a fence.[28] This keeps children out of the pool when unattended. In many homes, the yard is fenced but doors open directly from the house onto the pool area (called three-sided fencing). This is not as safe as adding another fence to completely separate the swimming pool (called four-sided fencing). More than half of all swimming pool drownings among young children could be prevented by four-sided fencing that completely separates the pool from the house and the yard.

Generally, around one-half of drowning victims in Washington State did not intend to be immersed in water. They were fishing in or near a river, riding in a boat or wading, but slipped and fell in cold or swift water. Washington's lakes and rivers are cold enough to cause hypothermia, even in the summer and even among the strongest swimmers. Life jackets should be worn when boating or participating in other activities on bodies of water. In Spokane County, it is required for anyone floating the Spokane River to wear a life jacket. This includes individuals floating in inner tubes. There are programs that loan life jackets to allow people to enjoy the water if they do not have one.

In addition, when swimming in lakes, rivers or other natural water, know your limits and know the water conditions. Drowning often happens when someone swims and gets too tired, e.g., when trying to swim across a lake or river. Cold water and currents can overpower the skills of even a good swimmer or athlete. Make sure to swim with a buddy and have a plan. Teens most often drown when they are with friends who may not know they are in trouble and do not know how to respond. Learn first aid and CPR, and learn safe ways of rescuing others without putting yourself in danger. Don't use alcohol and drugs around water. One half of all drownings in teen males are tied to alcohol use. Alcohol affects judgment and swimming skills. It also increases the effects of hypothermia.

Haddon Matrix Example

Drowning				
	Host	Agent	Physical Environment	Social/Economic
Pre-event	Lack of education about open water or swimming lessons, medical conditions, lack of supervision, alcohol consumption	No life jacket available, lack of lifeguards, unprotected water hazards	No access to lifeguarded or regulated swim areas, no life jacket loaner program, lack of open container laws, lack of signage	Low adult use of life jackets, lack of supervision or child care, lack of fencing legislation, lack of authority to close high-risk waterways, boating while intoxicated accepted
Event	Poor swimming ability, not wearing a life jacket, rescuer unable to swim and/or lacks rescue skills, overestimation of swimming ability	No life jacket use – child or adult	No lifeguarded swim areas: variable water depth, unstable footing, snags in water, lack of escape mechanisms, e.g., ladder, ropes, floatation devices	Low adult use of life jacket, poor access to information and resources for minimizing risk, inadequate infrastructure to call for emergency health services
Post-event	Lack of water survival skills, lack of CPR training, delay in rescue, inaccessible first aid kits, lack of knowledge by caregiver about what to do immediately	Victim carried away from shore by current	No life guards, long response time by emergency respondents or fire department	Low adult use of life jacket, inadequate care, poor access to acute care hospitals, little community support for victims and families

Adapted from: Peden M, Oyegbite K, Ozanne-Smith J, Hyder A, Branche C, Rahman AKM, Rivara F, and Bartolomeos K (eds). World Report on Child Injury Prevention (2008).
Information on Haddon Matrix: Christoffel T and Gallagher SS. Injury Prevention and Public Health. Aspen Publishers, Inc. Gaithersburg, Maryland, 1999.
Developed by Seattle Children's Hospital and Washington State Department of Health. To learn more, visit: www.seattlechildrens.org/dp. Supported by grant #1U7CE001778-01 from the Centers for Disease Control and Prevention. Its contents are solely the responsibility of the authors, and do not represent the official views of the Centers for Disease Control and Prevention.

SECTION [5]

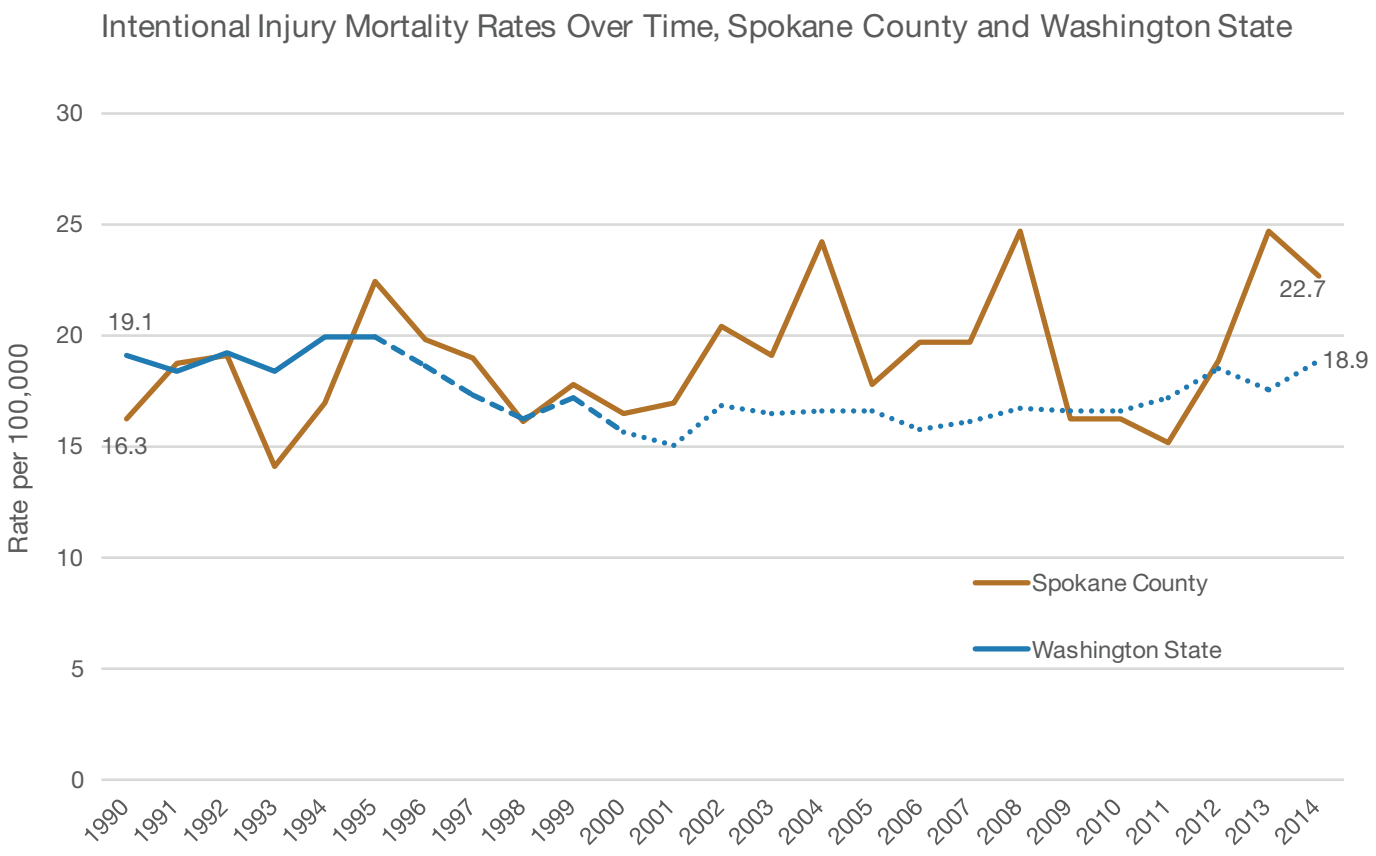
INTENTIONAL INJURY

Section 5 describes injuries that were intentional in manner. This excludes unintentional injuries and injuries where the manner was unknown or undetermined. Data is described over time and by demographics, first for fatal intentional injuries and then for non-fatal intentional injuries requiring inpatient hospitalization. Additional information is provided as available and appropriate to the discussion.

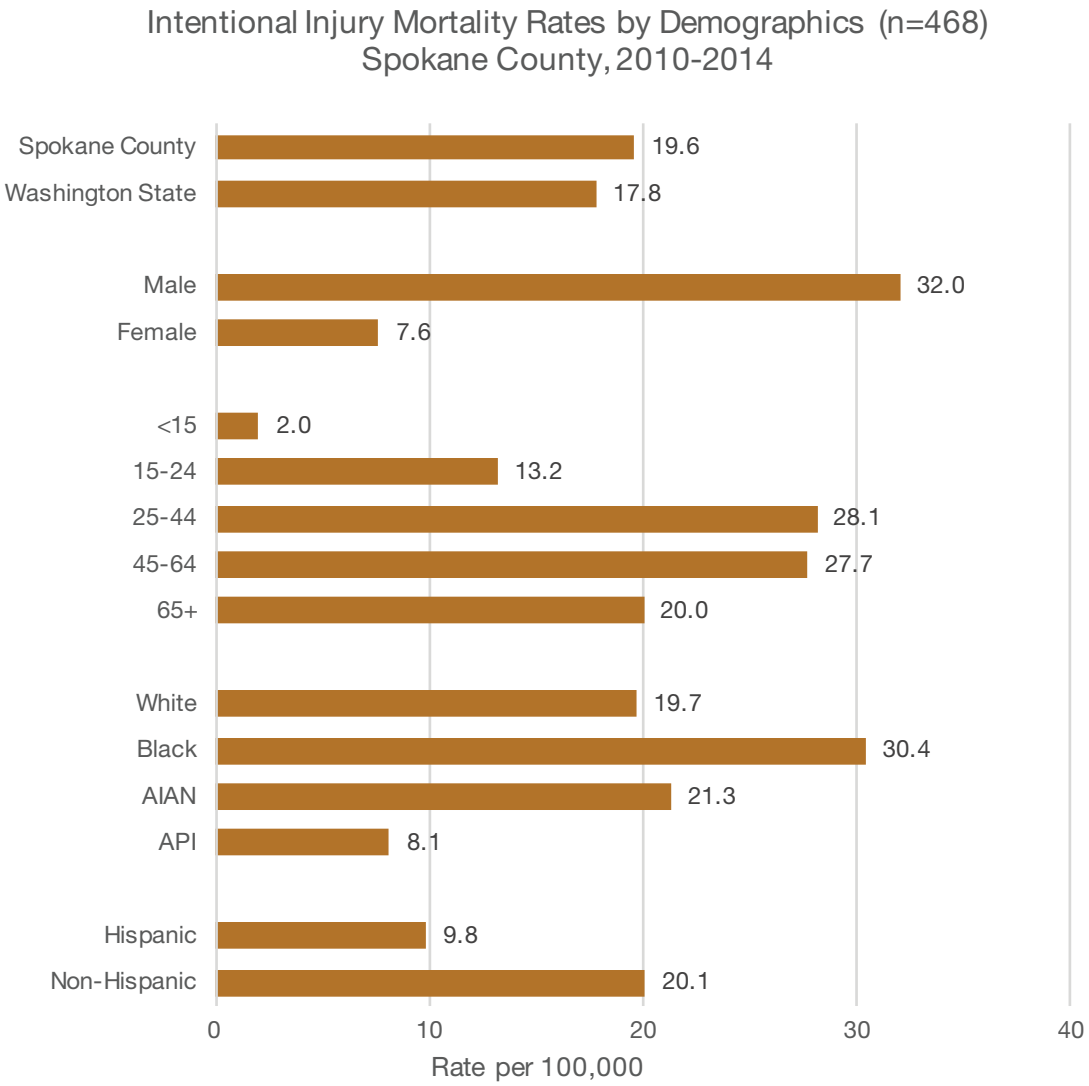
Subsections of Section 5 provide data in the same format, but for specific types of intentional injuries. Data is described over time and by demographics for both fatal and non-fatal hospitalization injuries. A description of prevention measures for each specific type of intentional injury concludes each subsection.

Intentional injuries include those with a manner of injury of either self-harm (suicide or attempted suicide) or from the intent to harm another person (homicide or assault). Another term for intentional injuries is violence. Individuals who experience violence, from others or themselves, are more likely to report poor health, lower quality of life, have mental health problems, and youth are more likely to be failing in school.[29]

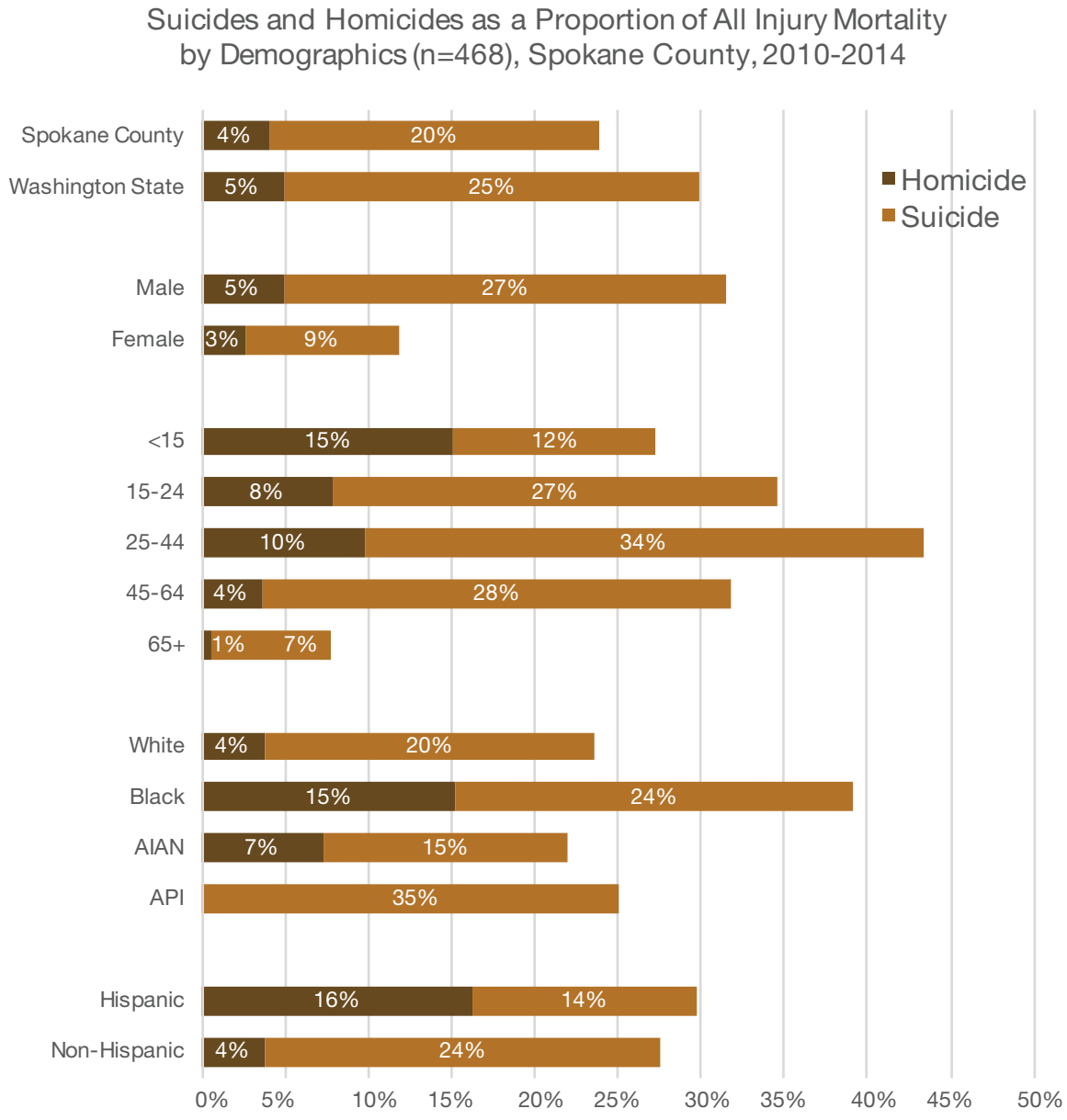
The intentional injury mortality rate in Spokane County was variable over the last 25 years with no identifiable trend. Statewide, the intentional injury mortality rate significantly decreased from 1995-2000, then increased from 2000-2014.



During 2010-2014, Spokane County had a statistically significant higher intentional injury mortality rate than Washington State. An average of 94 people died each year in Spokane County from an intentional injury. Males had a higher intentional injury mortality rate than females and adults 25 to 64 years of age had significantly higher intentional injury rates than younger individuals or seniors. Compared to whites, Asians/Pacific Islanders had a significantly lower intentional injury mortality rate. There was no difference for other races. Hispanics had a lower rate than non-Hispanics.

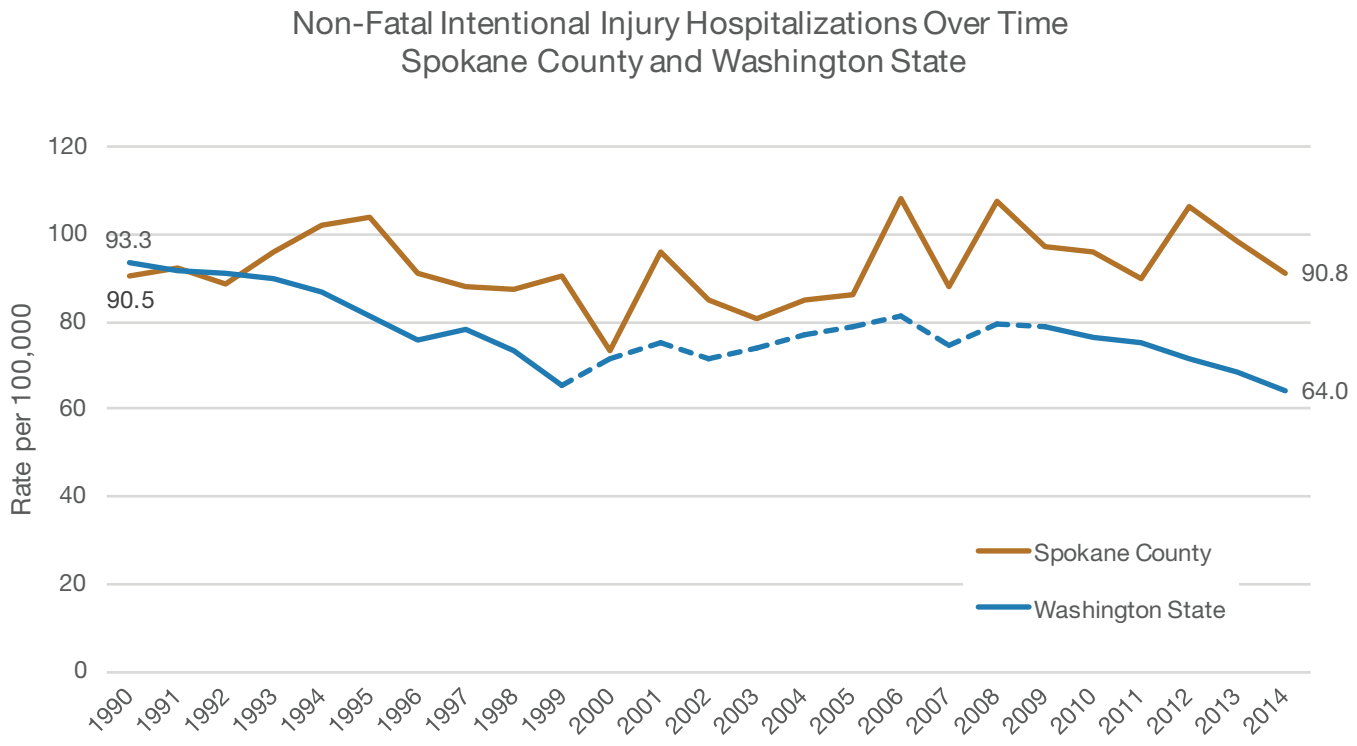


In Spokane County during 2010-2014, one in four injury deaths was from an intentional injury. Statewide, 30% of injury deaths were intentional. Males in Spokane County had a higher proportion of injury deaths from intentional injury than females. Adults 25 to 44 years of age had the highest proportion of injury deaths from intentional injury. Compared to this age group, adults 45 years of age or older had a statistically significant lower proportion of intentional injury among injury deaths. The difference between younger age groups was not statistically significant. Compared to whites, blacks had a higher proportion of injury deaths from intentional injury. There was no difference between Hispanics and non-Hispanics in the proportion of injury deaths from an intentional injury.

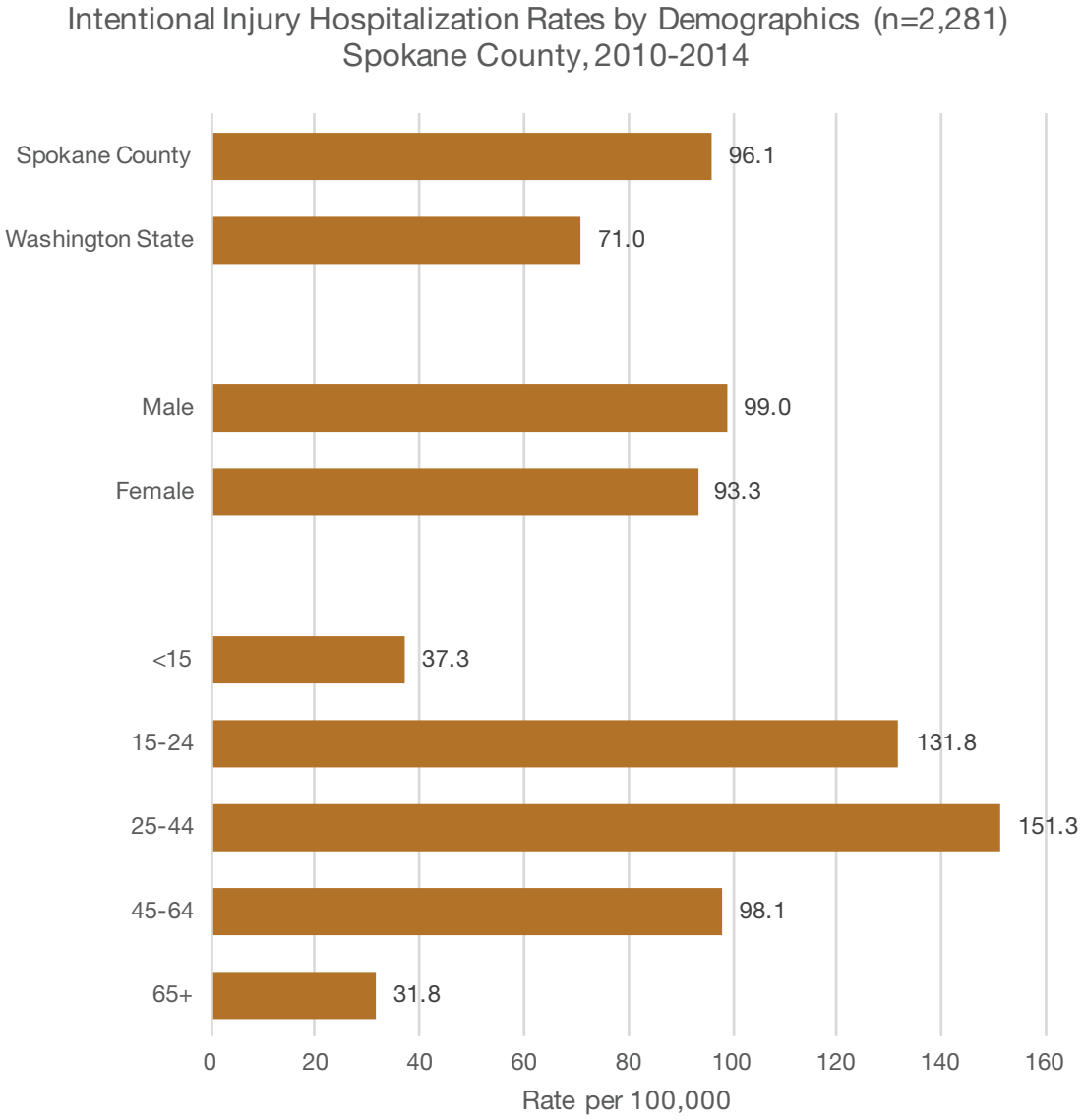


NON-FATAL HOSPITALIZATIONS

Over the last 25 years, there was no trend in the rate of non-fatal hospitalizations from intentional injuries in Spokane County. Statewide, there were three significant trends in the intentional injury hospitalization rate: 1) the rate decreased from 1990-1999 2) increased from 1999-2009 3) then decreased again from 2009-2014.

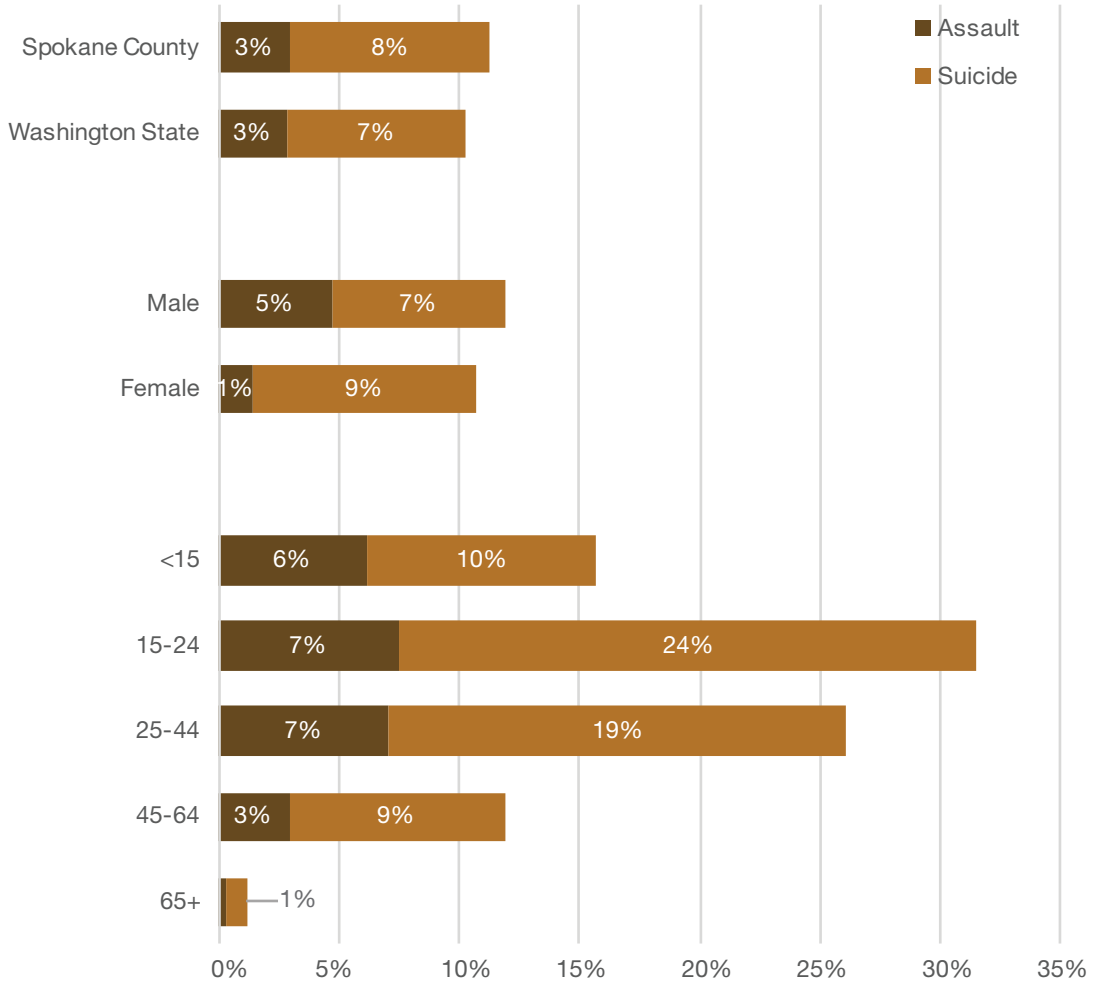


During 2010-2014, approximately 450 Spokane County residents were hospitalized annually from an intentional injury and the rate was significantly higher in Spokane County than in Washington State. In Spokane County, adults 24 to 44 years of age had a significantly higher intentional injury hospitalization rate than all other age groups. There was no difference in the rate between male and females.



During 2010-2014, approximately one in 10 hospitalizations from a non-fatal injury were from an intentional injury. In Spokane County, 8% of injury hospitalizations were from a suicide attempt and 3% were from an assault. The proportions were similar statewide. The proportion of injury hospitalizations for intentional injuries was similar for males and females, and both were approximately one in 10 of the injury hospitalizations. There were differences by age in Spokane County for the proportion of injury hospitalizations that were from intentional injuries. Individuals 15 to 24 years of age had a significantly higher proportion than any other age group, with nearly one in three injury hospitalizations from intentional injuries. The proportion of intentional injury hospitalizations decreased as age increased. The highest proportion of injury hospitalizations due to an assault occurred among individuals 15 to 44 years of age.

Suicide Attempts and Assaults as a Proportion of All Non-Fatal Injury Hospitalizations by Demographics (n=468), Spokane County, 2010-2014

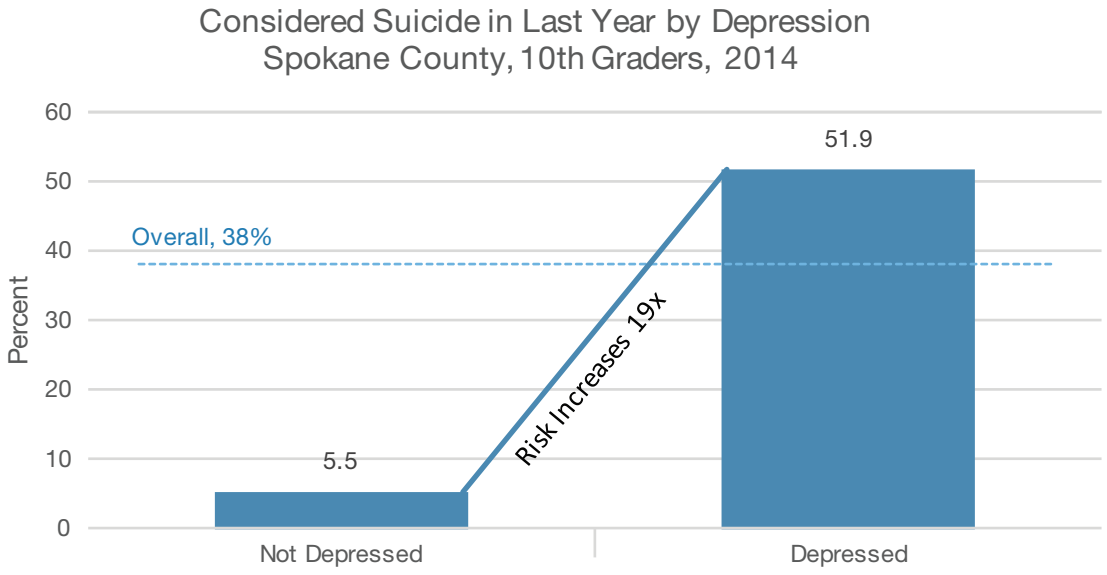


Suicide is the eighth leading cause of death in Spokane County. It is the second leading cause of death among individuals 15 to 44 years of age.[30] More people attempt suicide than die from suicide. Nationally, there are approximately 11 suicide attempts for every one death from suicide.[31] People who survive a suicide attempt may then have a serious injury, such as a broken bone, traumatic brain injury, or organ damage. Additionally, family and friends of people who commit suicide may experience feelings of shock, anger, or guilt about the suicide.[32]

Suicide affects people across the lifespan, all genders, and all race and ethnicities. While all groups are impacted, some people may be more at risk than other. Factors that increase the risk for suicide are below.[33] If an individual has a risk factor, it does not mean they will attempt suicide, it only increases the likelihood that they may.

- Depression, other mental disorders, or substance abuse disorder
- A prior suicide attempt
- Family history of a mental disorder or substance abuse
- Family history of suicide
- Family violence, including physical or sexual abuse
- Having guns or other firearms in the home
- Incarceration (being in prison or jail)
- Being exposed to others' suicidal behavior, such as that of family members, peers, or media figures

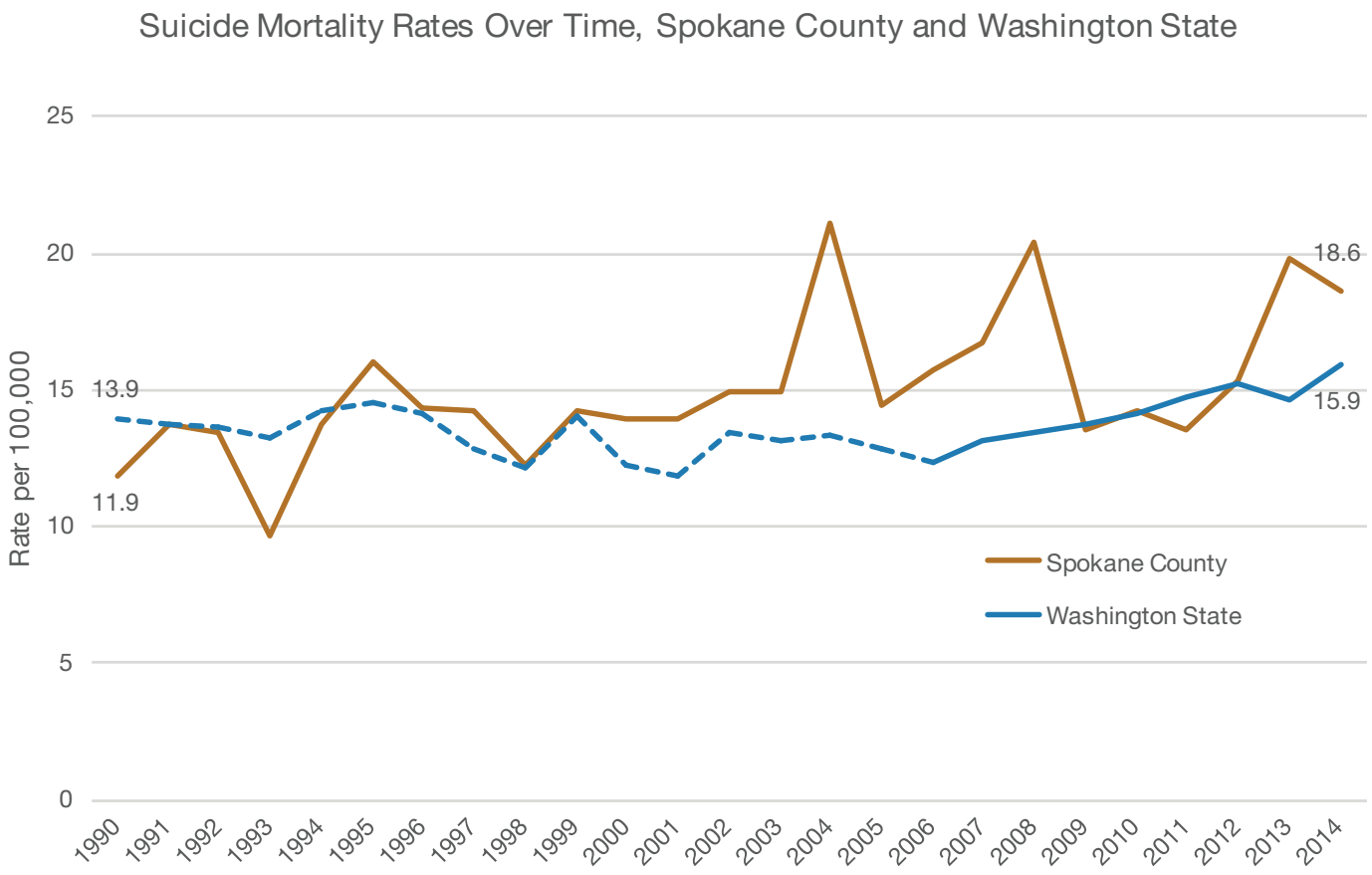
Among 10th grade youth in Spokane County, 38% reported being depressed. Youth who were depressed were 19 times more likely to report having seriously considered suicide in the last year.[34]



Source: Washington State Department of Health, Healthy Youth Survey, 2014.

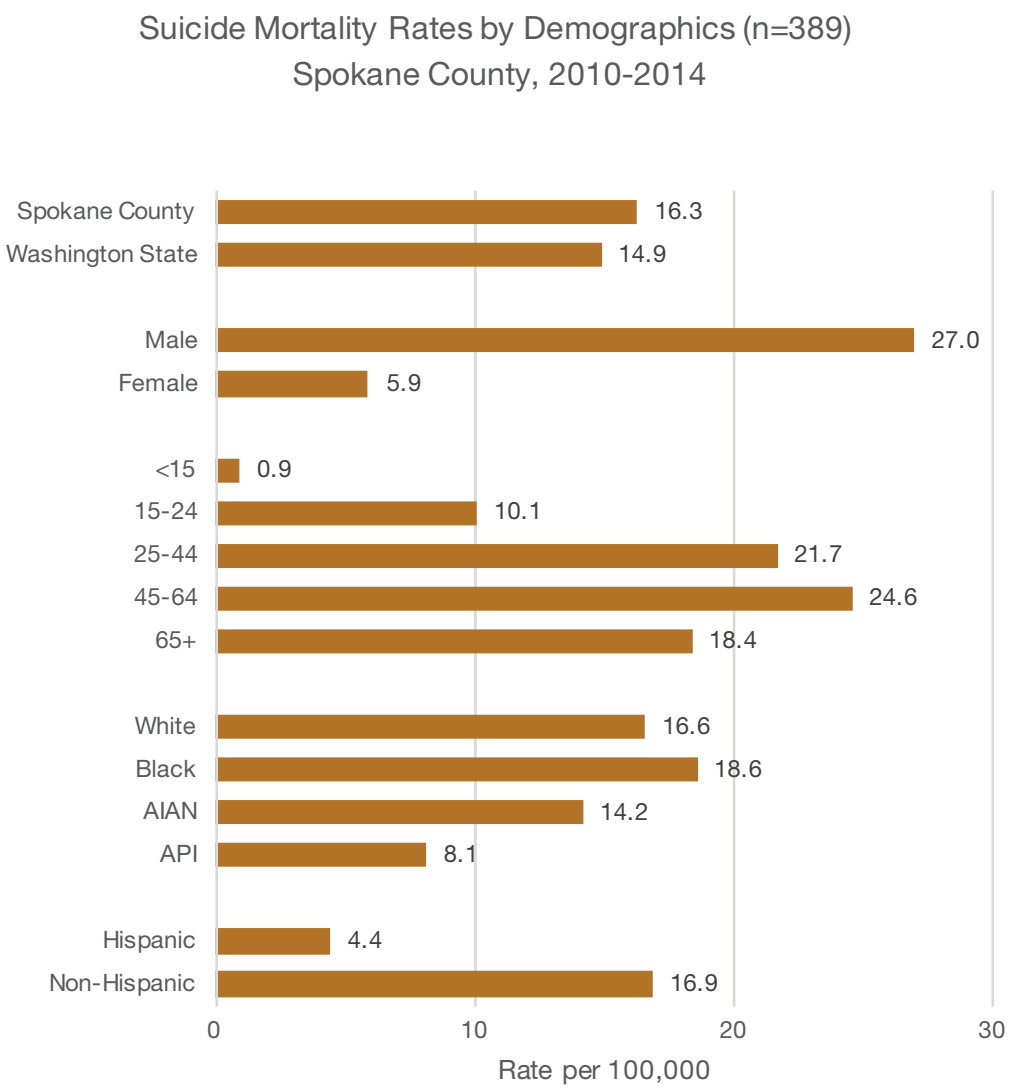
Mortality

Even though the proportion of injury deaths from suicide decreased over the past 25 years, Spokane County had an increasing trend in suicide rates over the last 25 years. Statewide there was a decreasing trend from 1990-2006 and then an increasing trend from 2006-2014.

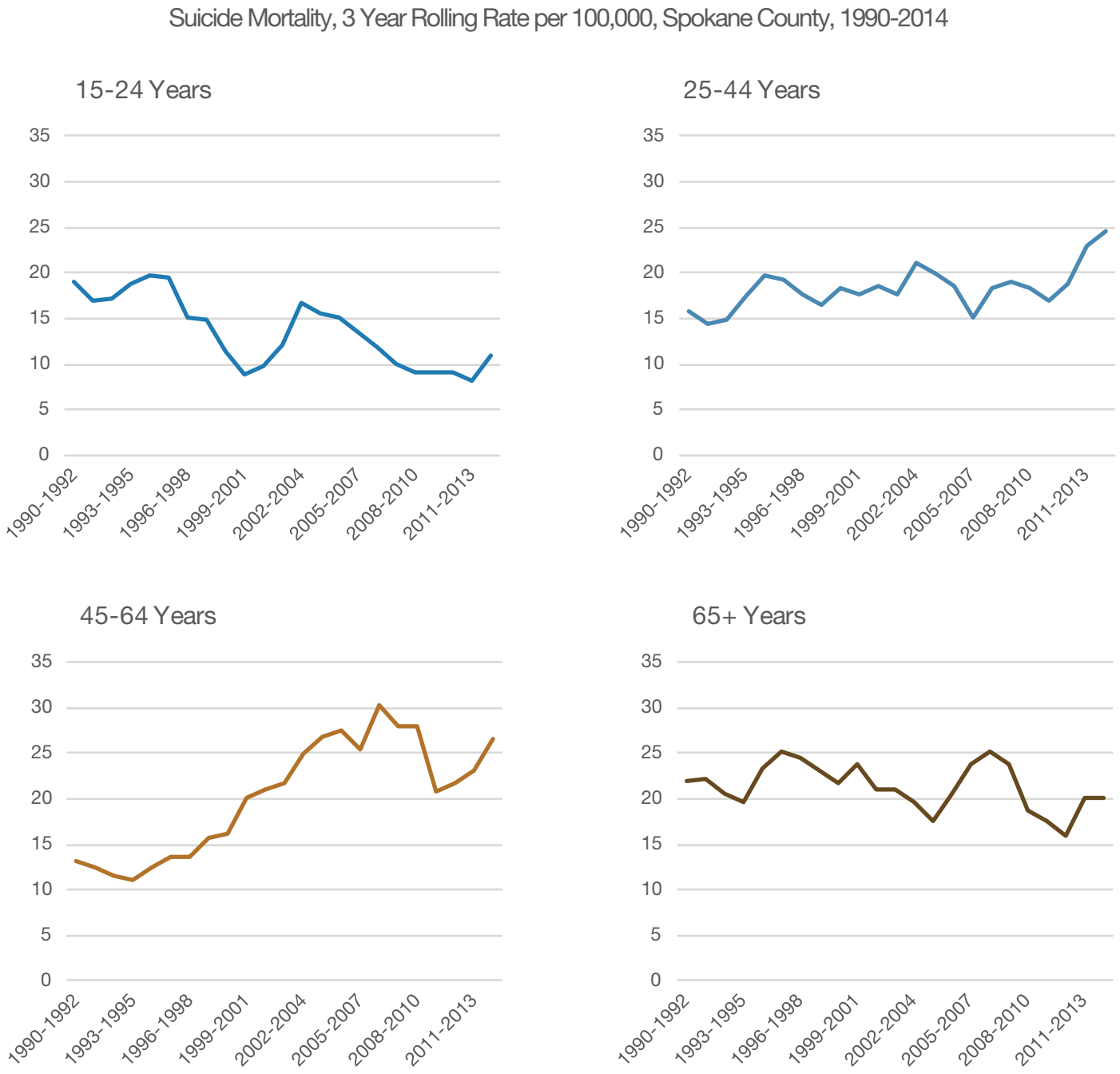


FATAL

During 2010-2014, an average of 78 people died each year from suicide in Spokane County. The five-year suicide rate was similar for Spokane County and Washington State. Spokane County males had a significantly higher suicide rate than females. Men tended to use more lethal means when attempting suicide, which is reflected in the higher suicide rate for men. Compared to individuals 15 to 24 years of age, adults 25 years of age or older had higher suicide rates. Compared to whites, there was no difference in the suicide rate for Spokane County among other races. Hispanics had a significantly lower suicide rate than non-Hispanics.



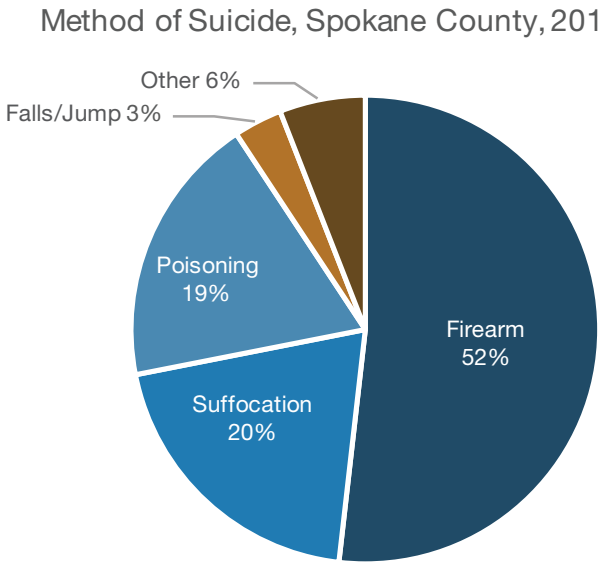
In Spokane County, the suicide rate had some statistically significant trends over time for different age groups. A three year rolling rate was used to stabilize the rate. There were too few suicides among youth younger than 15 years of age for trend analysis. Individuals 15 to 24 years of age had decreasing trends from 1997-2001 and again from 2004-2012. There was no trend for individuals 25 to 44 years of age; the rate was stable. Individuals 45 to 64 years of age had an increasing trend from 1994-2008. There was a decreasing trend among seniors from 2008-2012.



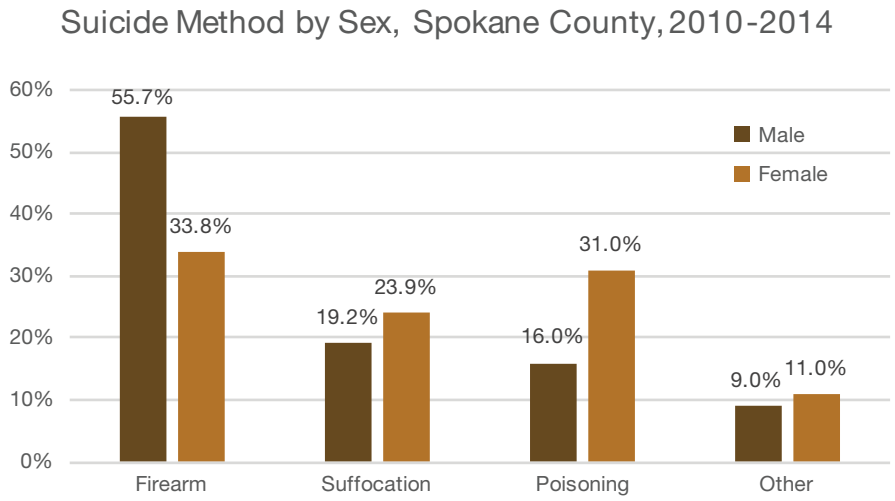
The most prevalent manner in which suicide occurred was the use of a firearm. More than half of suicides in Spokane County during 2010-2014 were due to a firearm. Among the firearm suicides, 44% used a handgun and 20% used a rifle or shotgun. In 36% of the deaths, the type of firearm was not specified.

The second most prevalent manner was suffocation. This includes hanging, strangulation, and suffocation.

Third was poisoning. Among poisoning suicides, more than half were due to an unspecified drug or medication. Almost one in four (22%) were from gasses or vapors. Ten percent were from narcotics or hallucinogens. Another 10% were from sedatives or hypnotic drugs.

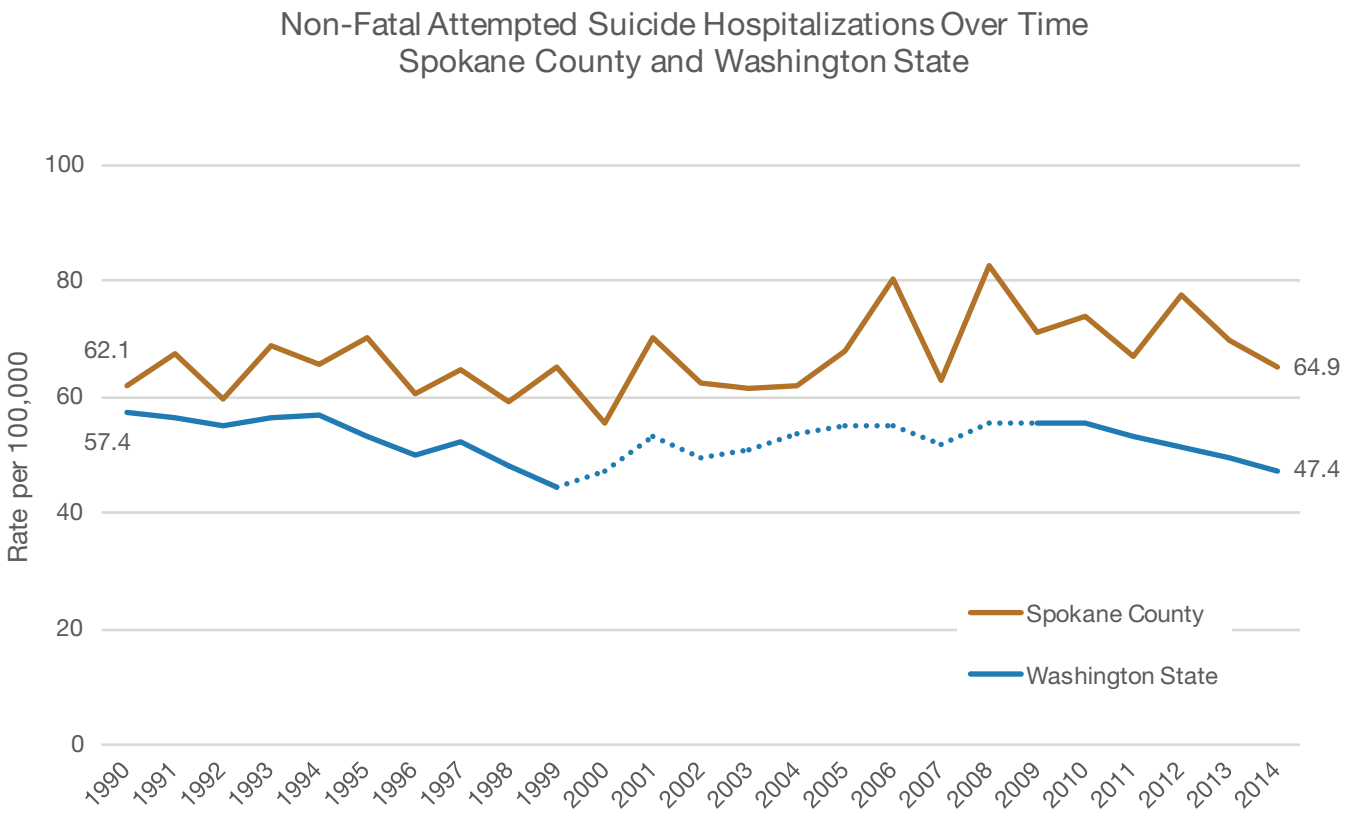


Males had a higher proportion of use of a firearm for completing suicide than females. Females had a higher proportion of suicide by poisoning.

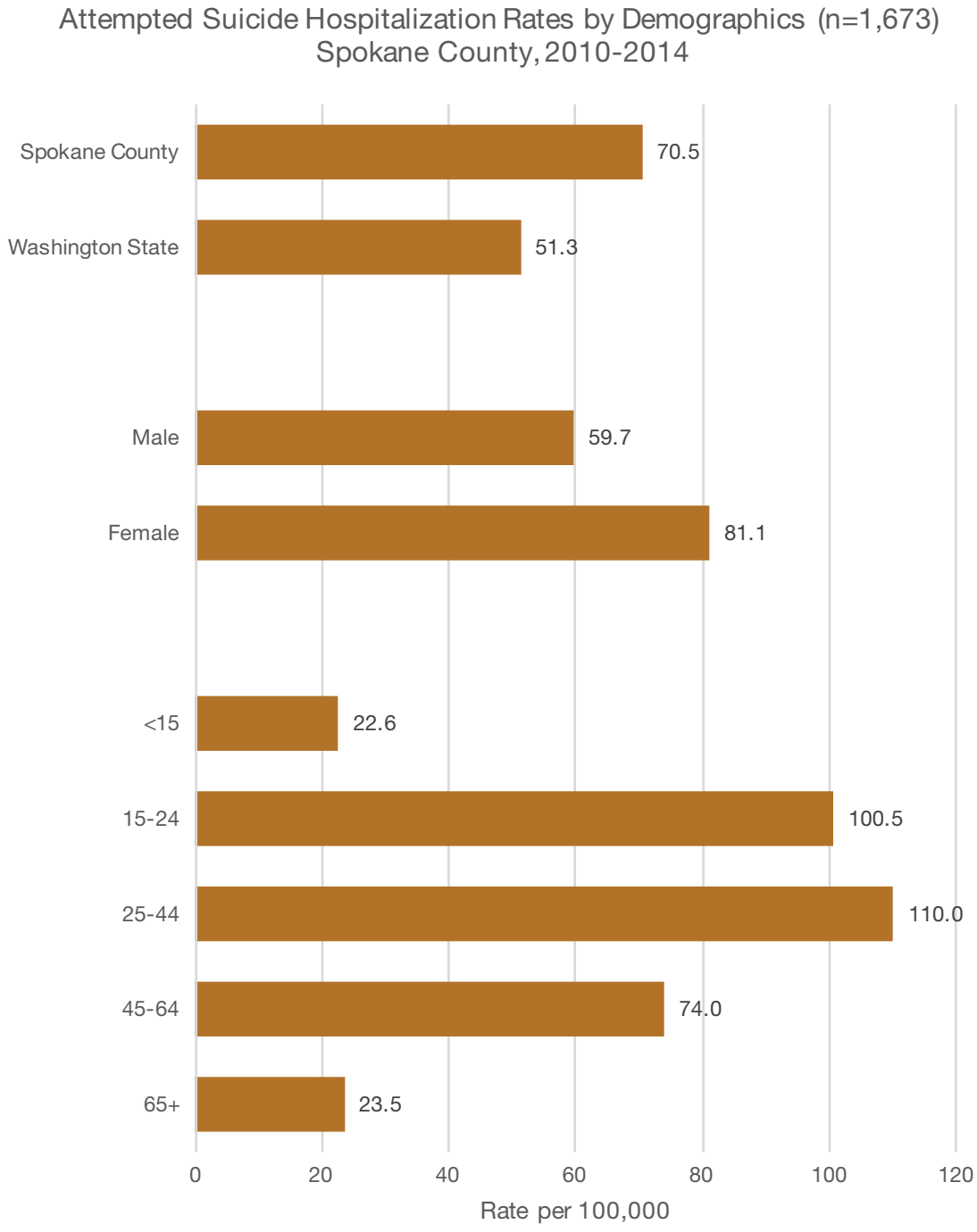


Non-Fatal Hospitalizations

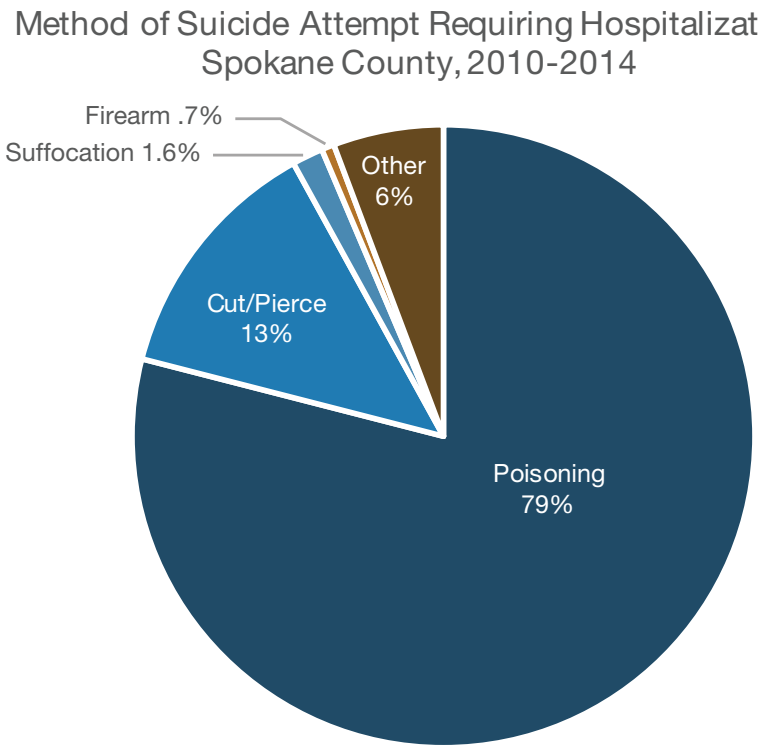
The rate of suicide attempts ending in a hospitalization varied from year to year in Spokane County over the last 25 years. Overall, the suicide attempt rate increased a small amount. This increase was statistically significant. Washington State had three significant trends during that time: 1) the suicide attempt rate decreased from 1990-1999 2) increased from 1999-2009 3) then decreased again from 2009-2014.



During 2010-2014, approximately 330 Spokane County residents were hospitalized annually from an attempted suicide. The rate of hospitalization from non-fatal suicide attempts was significantly higher in Spokane County than in Washington State. Females had a significantly higher suicide attempt rate than males. Adults 25 to 44 years of age had the highest suicide attempt rate. The rate was significantly lower for children younger than 15 years of age and adults 45 years of age or older.



The majority of suicide attempts resulting in a hospitalization in Spokane County during 2010-2014 were from poisoning. This was followed by cutting or piercing injuries. The manner of suicide attempts was similar for males and females.



Prevention

There are many best-practice interventions for suicide prevention. A listing of these can be found on the Suicide Prevention Resource Center, Best Practices Registry.[35] Many focus on education and training.

Examples of youth-based suicide prevention include Lifelines, a school-based curriculum to increase positive outcomes and prevent suicide. Sources of Strength is another youth program for school implementation that trains youth as peer leaders with support from adults. There are one-on-one conversations, development of posters, classroom presentations, and individual and media messaging. Through these tactics, the peer group norms are changed to reduce the acceptability of suicide as a response to distress and to increase the acceptability of seeking help, to improve communication between youth and adults, and to develop healthy coping attitudes.

Question, Persuade, and Refer (QPR) gatekeeper training is another example of training to reduce suicide and can be utilized for all age groups. The program trains gatekeepers who are defined as someone who is in a position to recognize if someone is at risk of suicide and refer them to help. Gatekeepers can be anyone who has regular interaction with others, such as parents, friends, neighbors, teachers, coaches, case workers, or police officers.

Prevent Suicide Spokane Coalition is a grassroots group that focuses on best-practice interventions including training of professionals and community members in QPR, SafeTALK (a half-day training to become a suicide-alert helper) and Applied Suicide Intervention Skills Training (ASIST) that certifies individuals in suicide first aid. SafeTALK and ASIST are both programs of Living Works Education, an international suicide prevention training organization. Other best practices addressed by this coalition are guidelines for responsible media reporting on suicide, www.reportingonsuicide.org, and reducing access to means of suicide.

Some interventions are based on medical treatment. Multisystemic Therapy is an intensive family- and community-based treatment program that focuses on addressing all environmental systems that impact chronic and violent juvenile offenders, including psychiatric treatment in the home of a suicidal child.

Specific to seniors, Prevention of Suicide in Primary Care Elderly: Collaborative Trial (PROSPECT) is a National institute of Mental Health-funded collaborative study that is testing a specific approach to suicide risk prevention. It aims to reduce suicidal ideation and depression among seniors by enlisting primary care physicians to recognize depression and suicidal ideation and helping providers to manage treatment.

It is important to note that while some non-fatal suicide attempts result in hospitalization, some self-injurious behaviors may be perceived as a suicide attempt when in fact there was not a clear intent to die. Self-injury, also known as cutting or self-mutilation, occurs when someone intentionally and repeatedly harms herself/himself. The method most often used is cutting but other common behaviors include burning, punching, and drinking something harmful, like bleach or detergent.[36]

Self-injury is often thought to be directly linked with suicide because sometimes people who self-harm will later attempt suicide, but this is not always the case. Self-injury hospitalizations are often recorded as a non-fatal suicide attempt. However, from a prevention perspective it is important to identify the behavior and ask clearly whether or not there is an intent to die or if the behavior is a way to cope with life. Information on treatment of self-injury is available from S.A.F.E. Alternatives® at http://selfinjury.com.

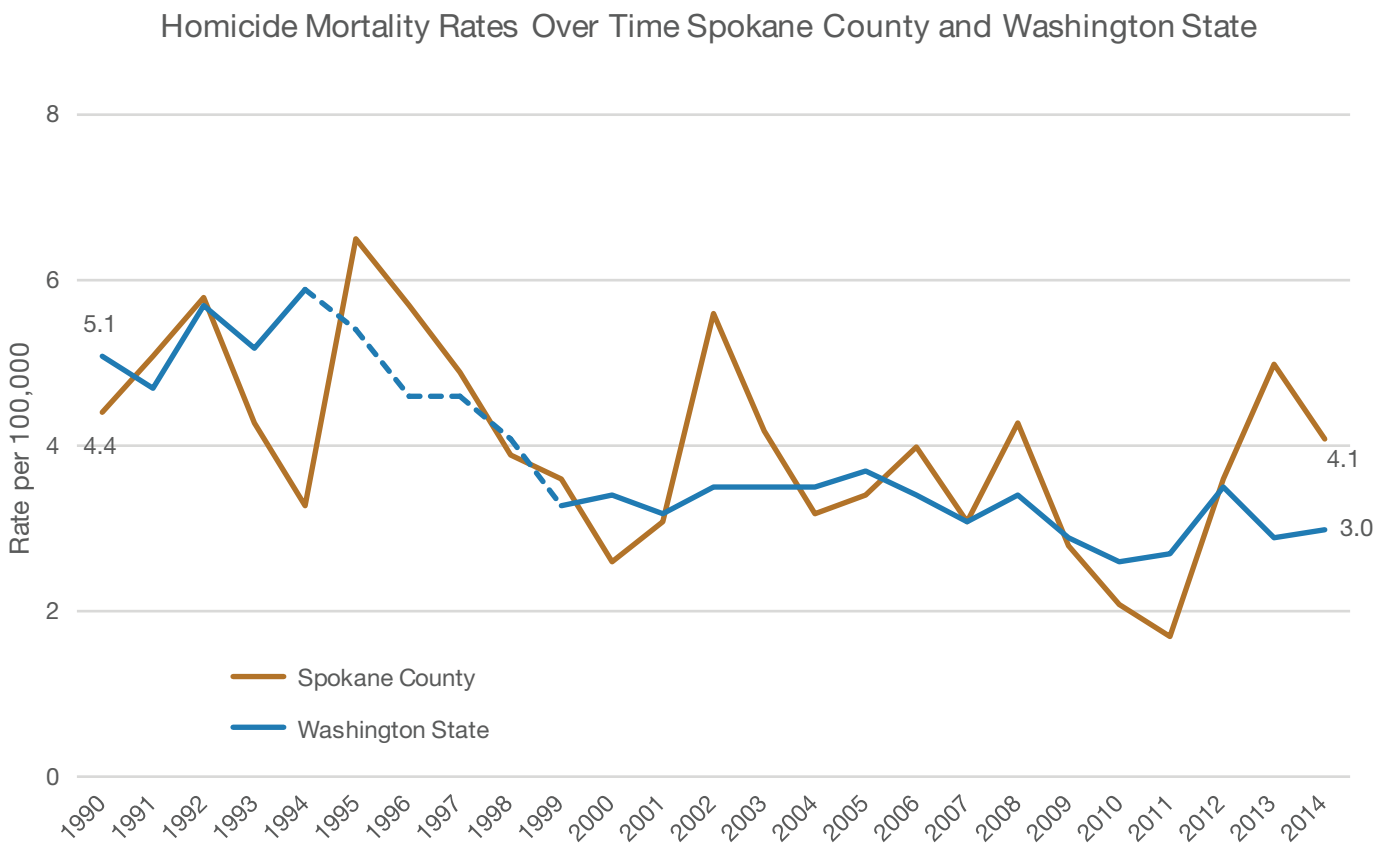
Haddon Matrix Example

Suicide				
	Host	Agent	Physical Environment	Social/Economic
Pre-event	Resilience/coping, distress, psychopath, substance use disorders, etc.	Alcohol, drugs; access to diverse means	Access, potential of rescue	Family and community support vs. conflict; victimization, economic distress
Event	Intent, "vigor" of attempt	Lethality of means	Isolation ± interruption	
Post-event	Injury and frailty, reasons for living	Detoxify; repair wounds	Emergency care	Registration; coordinated aftercare
Haddon Jr, W: The changing approach to the epidemiology, prevention, and amelioration of trauma: the transition to approaches etiologically rather than descriptively based. American J Pub Hlth 1968;58:1431-8				

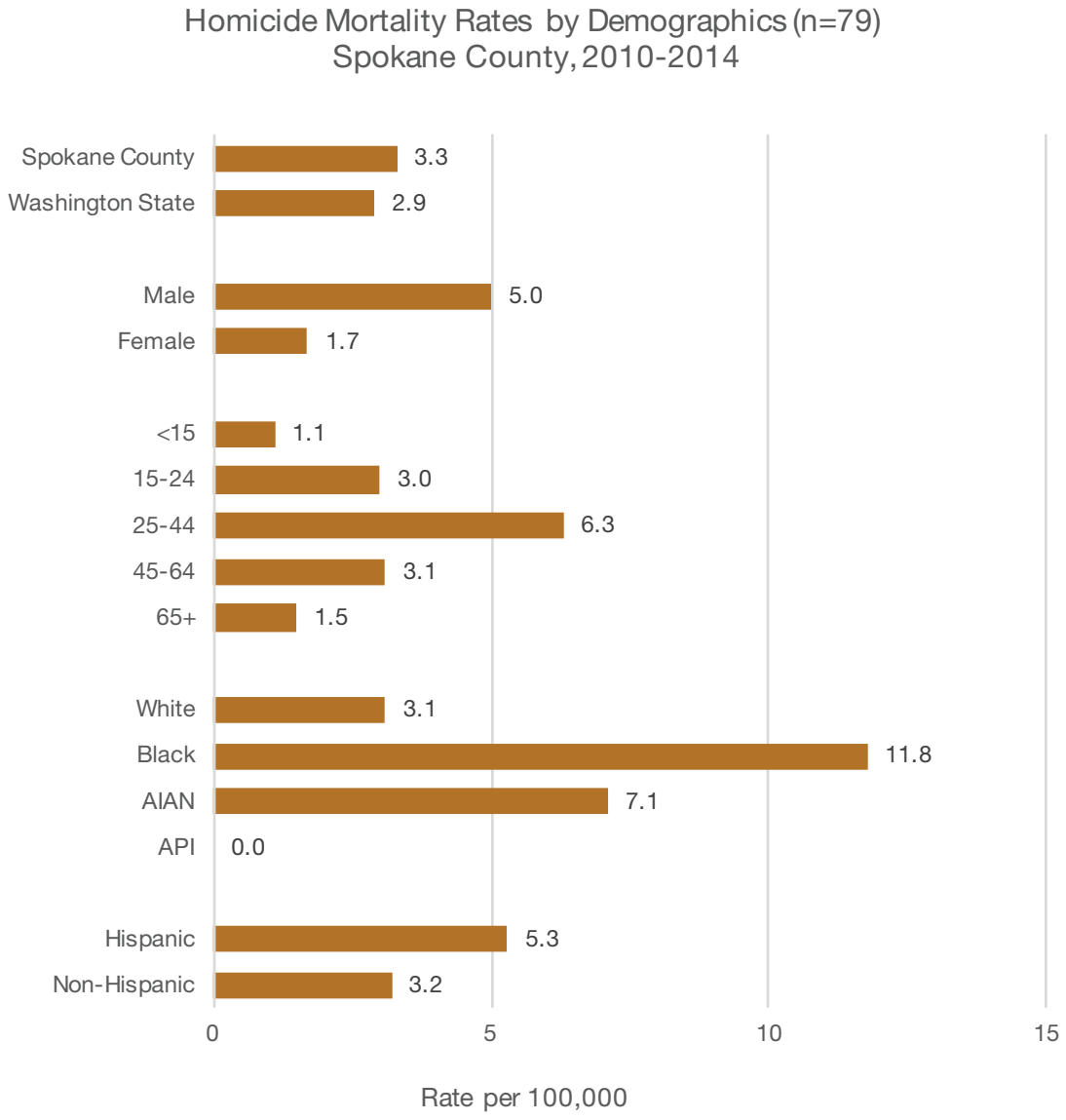
An attack on another person with the intent to harm is labeled homicide when the attack is fatal and assault when it is non-fatal. When assessing homicide and assault in Spokane County, a closely associated measure is violent crimes reported by law enforcement. There were 1,600 violent crimes reported in Spokane County in 2014. More than one-half (54%) were aggravated assaults. One-third were robberies, 12% were rapes, and 1% were homicides.[37]

Mortality

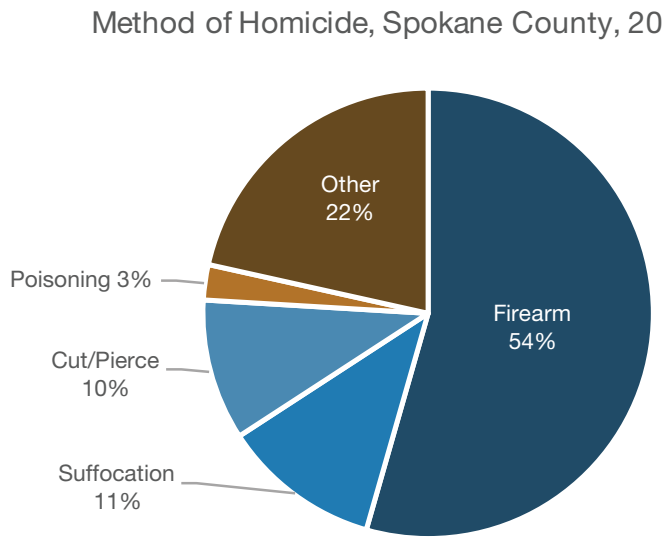
During the last 25 years, there were an average of fewer than 20 homicides per year in Spokane County. This small number of homicides makes the rate vary with the change of a few more or less homicides. Overall, the homicide rate in Spokane County significantly decreased during this time period. Statewide, there was a significant decrease from 1994-1999. From 1999-2014, the state's rate continued to decrease, but at a slower rate.



During 2010-2014, there was an average of 16 homicides per year in Spokane County. The homicide death rates were similar for Spokane County and Washington State. In Spokane County, males had a higher homicide death rate than females. Adults 25 to 44 years of age had the highest homicide death rate. Children and seniors had significantly lower homicide death rates compared to that age group. Blacks had a higher homicide death rate than whites. Differences for other races were not statistically significant. There was no difference in the homicide death rate between Hispanics and non-Hispanics.

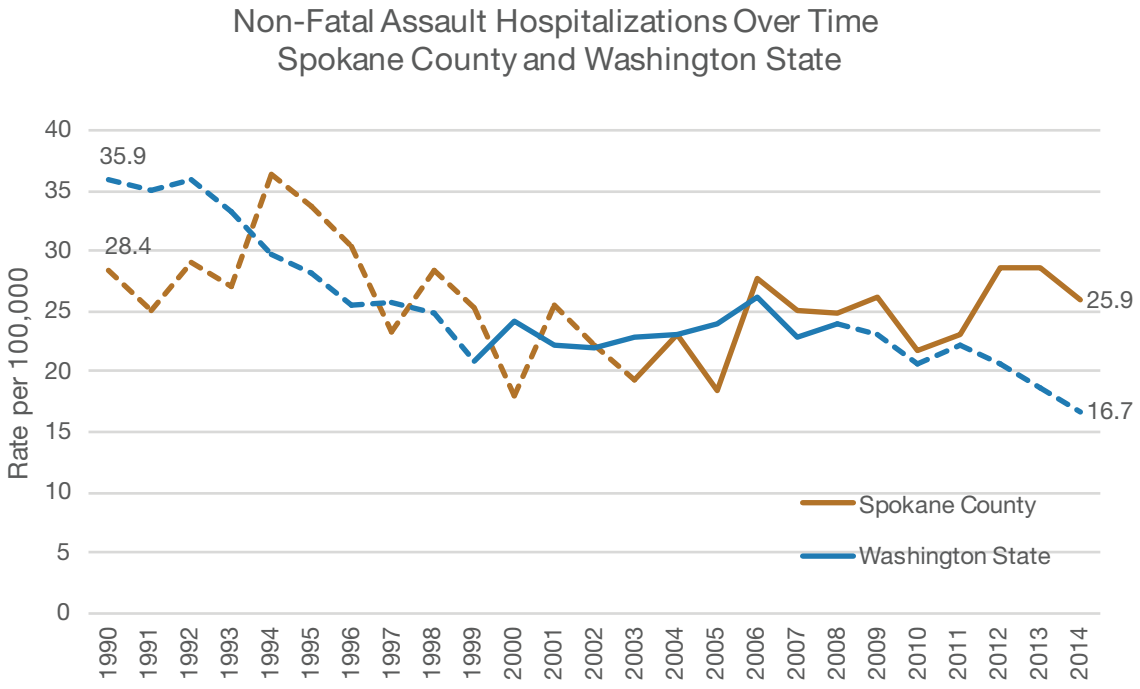


More than half of homicides in Spokane County during 2010-2014 were from the use a firearm.

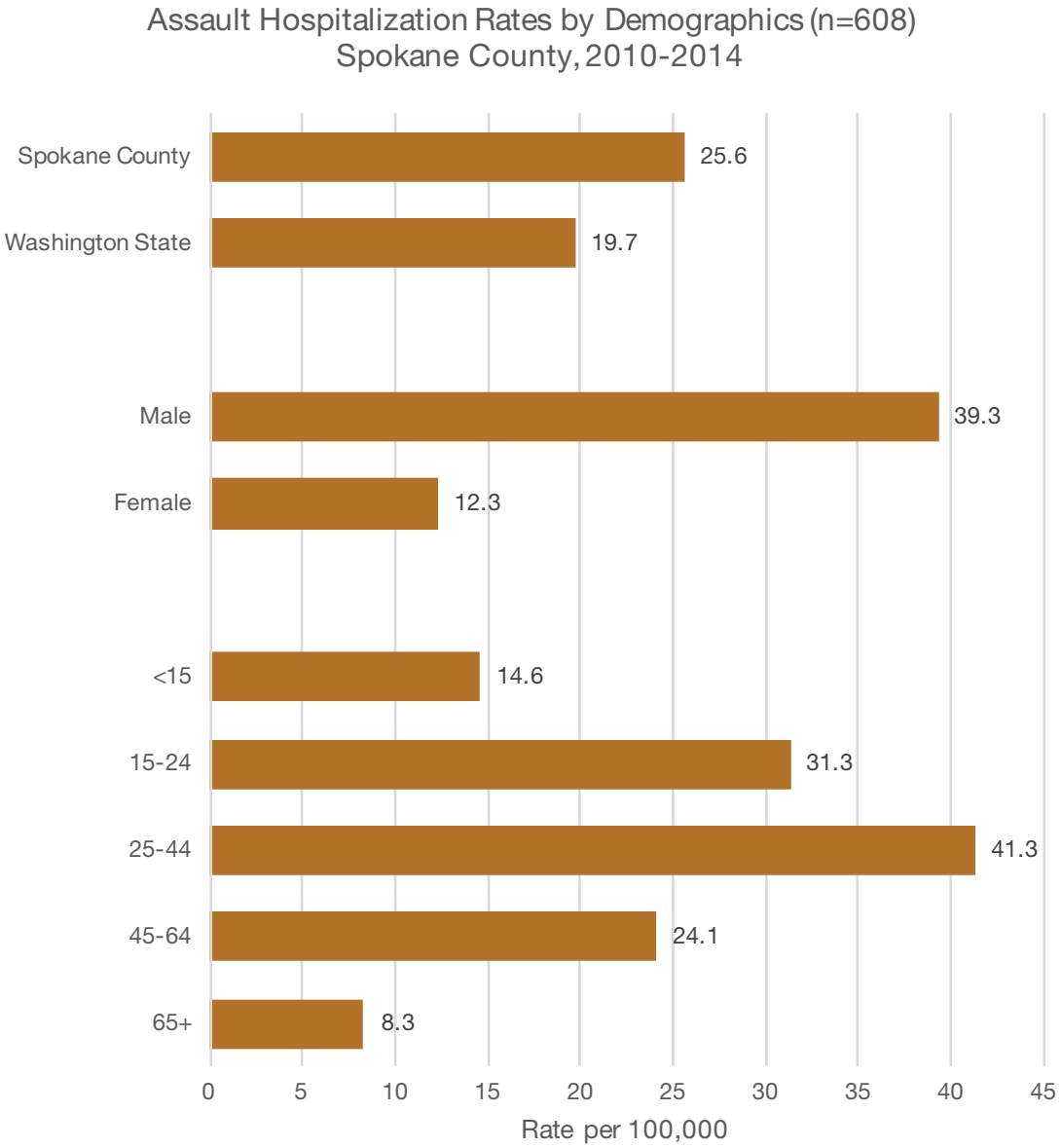


Non-Fatal Hospitalizations

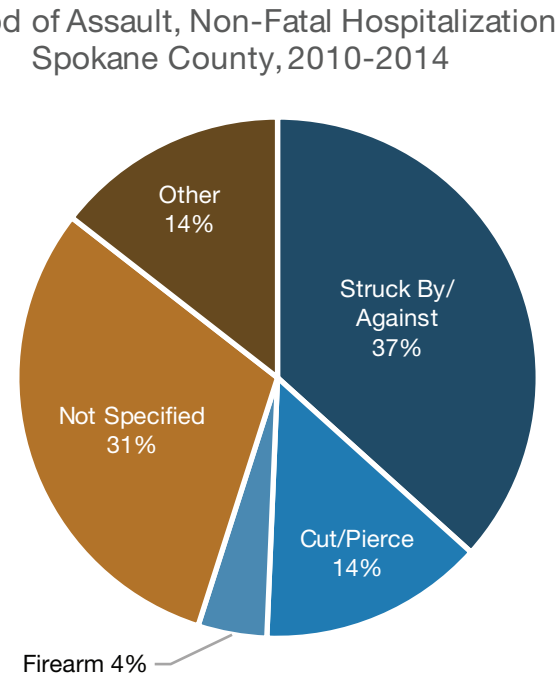
Small changes in the number of assaults ending in hospitalization makes the rate variable. In Spokane County, the rate of non-fatal hospitalizations from an assault significantly decreased from 1990-2003. There was no trend since then. Statewide, the assault hospitalization rate decreased in from 1990-1999, then again from 2008-2014.



On average, 120 assaults per year required hospitalization in Spokane County during 2010-2014. The non-fatal assault hospitalization rate was significantly higher than the Washington State rate. In Spokane County, males had a significantly higher assault hospitalization rate than did females. Adults 25 to 44 years of age had the highest assault hospitalization rate. All other age groups had a significantly lower assault hospitalization rate.



More than one-third of non-fatal hospitalizations from an assault were due to being struck by or against something. This category included a physical fight between two people. Nearly one-third of these hospitalizations did not have a specified method by which the assault occurred.



Prevention

Violence against others is a complicated topic. Homicides and assaults requiring hospitalization are the most severe and immediately recognizable outcome of violence against another person. Risk for violence against others includes factors of the individual such as:

- History of violence in their life
- Mental health or substance abuse challenges
- Poor coping skills
- Lack of social support
- Family conflict

Environmental factors associated with violence against others include community violence, cultural norms supporting aggression, weak policies or laws, neighborhood poverty, and media violence.[38]

In identifying measures to prevent injury due to violence it is necessary to think about the means for violence, primarily the weapons of violence. A weapon is defined as 1) something used to injure, defeat, or destroy and 2) a means of contending against another.[39] As such, it is difficult to identify measures to prevent injury from an agent designed to, and used with intent to, harm.

Spokane Regional Health District presents a fuller examination of violence in Spokane County in its report Confronting Violence.[40]

Haddon Matrix Example

Homicide/Assault				
	Host (Victim)	Agent	Physical Environment	Social/Economic
Pre-event	Skills in conflict negotiation and anger management	Availability of guns	Level of law enforcement in community	Violence in media (e.g. TV, video games)
Event	Body's resistance to agent	Size and type of bullet	Other people present	Community norms regarding intervening
Post-event	Hemorrhage	Location of bullet fragments	Distance to emergency medical care	Rapid access to emergency care

Adapted from:
Sorenson SB. (2002). Preventing Traumatic Stress: Public Health Approaches. Retrieved from http://repository.upennn.edu/spp_papers/77 on 06/13/16.
Degutis L. (2006). Epidemiology of Violence in Forensic nursing a handbook for practice. (pp. 31-44). Sudbury, MA. Jones and Bartlett.

CONCLUSION

When many Spokane County residents (like many Americans) hear the word health, they reflexively think of disease. Because injuries are often characterized as "accidents," they don't get the attention or the resources like those afforded to the health care system. But injuries are major health concerns and—like many diseases—they are also preventable.

As the report makes clear, falls, poisonings, motor vehicle collisions, homicide, suicide, and many other types of injuries are important concerns for the Spokane community. In addition to their immediate health impact, the effects of injuries and violence extend well beyond the injured person or victim of violence, affecting family members, friends, coworkers, employers, and communities. Injury prevention deserves more visibility in Spokane County.

Preventing injuries is a complex process balancing societal needs and changes and individual desires. Effective prevention of injuries involves changes to the environment, mechanisms that may cause or prevent injury, policies or laws that help protect individuals, and education of individuals. There are successes in preventing injury that should be acknowledged and from which to learn. Injury-related deaths have decreased markedly, through advances like workplace injury prevention, prescription drug monitoring programs, seat belt safety laws, and more. Celebrating those successes and looking to their underlying best practices is key to moving this work forward.

Locally, SRHD partners with a variety of organizations to help prevent injuries. To name a few examples, staff partner with the area's Senior Falls Prevention program to work with senior-serving organizations and health care providers to decrease the risk of falls among the senior population. The SRHD houses the Medical Reserve Corps of Eastern Washington, which trains volunteers in suicide prevention using the QPR model. SRHD's Water Recreation program works closely with the Inland Northwest Drowning Prevention Coalition to offer discounts on life jackets and prevention education and awareness in the community.

Within SRHD, programs actively promote injury prevention. The health district's Neighborhoods Matter program staff work on neighborhood safety issues. Staff collaborated with residents in Spokane's East Central, North East, and Airway Heights neighborhoods to organize wellness and safety fairs that include a focus on injury prevention, such as bike safety and home safety. The health district's Opioid Treatment Program provides treatment services to individuals addicted to opioids, which, as mentioned, may cause poisoning with overuse. SRHD's Needle Exchange program distributes Naloxone, an injectable medicine used to reverse the effects of opioid poisoning. Due to the limited supply of Naloxone, the Needle Exchange program provides those kits to individuals who have previously overdosed or have been present when someone has overdosed. The Nurse Family Partnership has public health nurses providing services to low-income mothers. As part of the services, these nurses provide education on safe sleeping for infants, which addresses risk factors for suffocation.

The Spokane community provides additional injury prevention opportunities. Safe Kids Spokane coalition, part of a global organization dedicated to preventing injuries to children, is led locally by Providence Sacred Heart Medical Center and Children's Hospital and provides car-seat checkups, safety workshops, and sports clinics to help prevent childhood injuries. Law enforcement partners in providing car seat check-ups and education. Apart from their work with Safe Kids, law enforcement provides further injury prevention in the community by offering drug take-back events. Prevent Suicide Spokane is a coalition that offers resources, training, and increased awareness in an effort to decrease suicide.

Continued reach and impact in terms of preventing injuries will depend on successfully communicating the scope and burden of local injuries across a range of causes and mechanisms. Readers of this report can actively seek to work more closely together across disciplinary fields, academic institutions, nonprofit organizations, and local, city, state, and federal governments.

It is time to be ambitious, and it is time to be effective. Stakeholders can build on the framework presented in this report to characterize injuries as predictable and preventable. The Haddon Matrix can be used to facilitate brainstorming around cause and prevention of injuries, which may lead to innovative ideas to prevent further harm in Spokane County. Thought leaders can seize opportunities to implement local strategies that disrupt the connections between individuals, mechanisms of injury, and the physical and social circumstances that cause harm. Policy may be effective to drive changes that could impact injury outcomes. These efforts should be approached with consciousness at all levels—individual, community and environmental.

Together, stakeholders can strengthen the reach and impact of injury prevention efforts, turn the tide on those injuries being perceived as inevitable, and make the field of injury prevention more visible.

METHODOLOGY

Information about fatal injuries came from death certificate data provided by Washington State Department of Health (DOH). Causes of death and contributing factors were categorized using ICD-10 codes. Types of injury were grouped using the National Center for Health Statistics (NCHS) classification scheme for 113 causes of death.

All fatal unintentional injuries were included in the overall description of injuries and included ICD-10 codes V01-X59, Y85, Y86. Fatal intentional injuries included those from self-harm (labeled suicide) and those from harm to others (labeled homicide). Intentional fatal injuries included ICD-10 codes X60-X84, Y87.0, X85-Y09, Y87.1. Additional categories of fatal injuries were those where intent could not be determined and those from a legal intervention or war. Undetermined fatal injuries included ICD-10 codes Y10-Y34, Y87.2, Y89.9. Fatal injuries from legal intervention/war included ICD-10 codes Y35-Y36, Y89(.0, .1).

Information about non-fatal injuries came from inpatient hospitalization records provided by DOH. Causes of hospitalization and contributing factors were categorized using ICD-9 codes. Types of non-fatal injuries were classified using NCHS classifications.

All unintentional non-fatal injuries were included in the overall description of injuries and included ICD-9 codes E800-E869, E880-E929. Non-fatal intentional injuries included those from self-harm (labeled attempted suicide) and those from harm to others (labeled assault). Intentional non-fatal injuries included ICD-9 codes E950-E959, E960-E969. Additional categories of non-fatal injuries were those where intent could not be determined and those from a legal intervention or war. Undetermined non-fatal injuries included ICD-9 codes E980-E989. Fatal injuries from legal intervention/war included ICD-9 codes E970-E978, E990-E999.

Tests for significance were used to identify changes over time, differences between geography, and demographic groups with an increased risk for injury. The chi-square test and regression analysis was used to identify statistically significant differences. Testing for trends over time was done using Joinpoint trend analysis software available from the National Cancer Institute. Joinpoint provided a more detailed analysis of when changes in trends occur.

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