Intentional & Unintentional Injuries in Snohomish County

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Mission: To improve the health of individuals, families, and communities through disease prevention, health promotion, and protection from environmental threats.
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- See separate document for injury data tables at www.snohd.org -
EXECUTIVE SUMMARY

Introduction

- Injuries were the third leading cause of death in Snohomish County in 2007.
- Unintentional poisonings were the leading cause of injury deaths, followed by suicides and motor vehicle collisions, respectively.
- Suicide was the leading cause of injury deaths for males; unintentional poisoning was the most common cause of injury deaths for females.

Unintentional Injuries

- Unintentional injuries constituted 71% of all injury deaths.
- Unintentional injury mortality rates increased by 63% from 1992 through 2007 in Snohomish County.
- Unintentional injury mortality was greatest among older adults (65+).
- Hospital admissions for unintentional injuries increased by 30% from 1999 through 2007.

Poisonings

- Poisonings were the leading cause of mortality from unintentional injury, accounting for more than one third of all unintentional injury deaths.
- Unintentional poisoning mortality in Snohomish County increased more than 400% from 1990 through 2007.
- Unintentional poisoning mortality in Snohomish County was greatest for residents between the ages of 25 and 64.
- The main reason for the increase in unintentional poisoning deaths was the increased use of opioid painkillers, such as oxycodone (i.e., Percodan and Percoset) and hydrocodone (Vicodin).
- More than one drug was present in 84% of unintentional opioid poisoning deaths.
- The increase in opioid poisonings was caused entirely by prescription use of these drugs.

Motor Vehicle Collisions

- Motor vehicle collisions were the second leading cause of unintentional injury deaths in Snohomish County, accounting for 25% of such deaths.
- Mortality from injuries suffered in motor vehicle collisions declined by more than half from 1990 through 1992.
- Males were almost three times more likely than females to be killed in a motor vehicle collision.
- The Arlington-Stanwood and East County Health Planning Areas (HPAs) had significantly higher rates of mortality from injuries sustained in motor vehicle collisions than the rest of Snohomish County.
EXECUTIVE SUMMARY

- Speeding was cited in almost half of all motor vehicle collisions in 2007.
- Driving under the influence of alcohol or drugs was a factor in 55% of fatal collisions in 2007.
- Motorcycles represented only 3% of registered vehicles in Snohomish County during 2007, but they were involved in 20% of fatal collisions.

Falls
- Falls were the third leading cause of unintentional injury deaths and the leading cause of injury-related hospitalizations in Snohomish County from 2003 through 2007.
- There were four times as many hospital admissions for falls as for motor vehicle collisions.
- The rate of mortality from falls in Snohomish County doubled between 1990 and 2007.
- Four fifths of fatal falls in Snohomish County occurred to people aged 65 and older.
- Sixty-one percent of fatal falls involving people aged 65 and older occurred in the home, and another 29% occurred in nursing homes.
- People aged 65 and older were 30 times more likely than people younger than 25 to be hospitalized for a fall.
- People older than age 84 were seven times more likely to be hospitalized than were those between the ages of 65 and 74.

Intentional Injuries
- Intentionally inflicted injuries (violence) include assaults, murders, and suicides.
- More than one quarter of fatal injuries in Snohomish County between 2003 and 2007 were intentionally inflicted.
- More than four of five intentional injury deaths were suicide.

Suicides
- The suicide mortality rate of Snohomish County declined by 31% from 1990 through 2007.
- Men older than age 64 had the highest suicide rate, at 32 deaths per 100,000 compared with an overall average of 12 deaths per 100,000.
- Males were most likely to use firearms to commit suicide, whereas females were more likely to use poison.

Homicides
- The murder rate in Snohomish County has been steady at approximately 2.5 murders per 100,000 residents during each year since 1990, or about 16 people each year.
- Snohomish County’s homicide rate was significantly lower than Washington State’s from 2003 through 2007.
OVERVIEW

Injuries are defined as “physical damage to the body resulting from the acute exposure to thermal, mechanical, electrical, or chemical energy, or from the absence of such essentials as heat or oxygen” (1). Injuries were the third leading cause of death in the United States and were responsible for 179,065 deaths during 2006 (2). Most of these injuries (67.9%) were unintentional.

Injuries are the third leading cause of death in Snohomish County. Each year more than 300 people die of various injuries, accounting for 8.2% of all deaths. Injuries are the leading cause of hospitalizations not related to childbirth, with more than 8,000 hospitalizations each year (19% of admissions). Injury hospitalizations incurred charges of more than $288 million in Snohomish County during 2007, with an average charge per hospitalization of nearly $34,000. These numbers show that injuries are a serious health concern for the county. However, most injuries are preventable.

Injuries are classified as either intentional (assaults and suicides) or unintentional (accidents). Most deaths resulting from injuries are unintentional, but suicide is the second most common type of injury death in Snohomish County. Whereas many view injuries as random events, injuries are similar to diseases in that they are not accidental, do not occur at random, and have identified risk and protective factors making them preventable (3). Many injuries can be avoided through education, changes in the “built” environment, and public policy. For example, a 2002 Washington State statute that gives

Changing people’s perceptions of the value of preventing and responding to injury is critical to creating the social and political will to more fully support injury prevention and response.
- CDC’s Injury Center
OVERVIEW

The authority to pull over motorists who are not wearing safety belts is credited with raising the proportion of automobile passengers who wear seat belts, which in turn contributed to the significant decrease in the rate of fatal motor vehicle crashes experienced in the state in the subsequent years. Similarly, public health education and outreach efforts have increased the proportion of children riding in car seats, which lowers their chances of being injured in an automobile crash.

This report provides information to help readers and policymakers identify priority health issues, plan programs, direct interventions, educate, and obtain funding for prevention activities. The introduction provides an overview of all injuries in Snohomish County. The next chapter provides an overview of unintentional injuries. Successive chapters each discuss a specific type of injury, its impact on Snohomish County, and preventive strategies. The unintentional injuries discussed include poisonings, motor vehicle crashes, falls, suffocations, and drownings. Intentional injuries (murder or assault and suicide) are also discussed. Trend analyses show whether the incidence or prevalence of each type of injury is increasing or decreasing in the population, and other analyses show whether the incidence or mortality rates differ by sex or age. Screening and prevention strategies are presented, and, where available, data are presented about how many people are engaging in those strategies. The Appendix contains technical methods, definitions. Detailed tables of the data are available as a separate document located at www.snohd.org.
OVERVIEW

Injuries as a Leading Cause of Death

Injury deaths were the third leading cause of death in Snohomish County during 2007, but they represented only about one third of the number of deaths caused by either of the two leading causes, cancer and heart disease. Injuries were also the third leading cause of death in Washington during 2007 and the United States in 2006. In all cases, most injury deaths resulted from unintentional injuries deaths, followed by suicide.

Table 1.1 Comparison of Top 10 Leading Causes of Death
Snohomish County, Washington State, & the United States

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cancer</td>
<td>Cancer</td>
<td>Heart disease</td>
</tr>
<tr>
<td>2</td>
<td>Heart disease</td>
<td>Heart disease</td>
<td>Cancer</td>
</tr>
<tr>
<td>3</td>
<td>Injuries</td>
<td>Dementia</td>
<td>Injuries</td>
</tr>
<tr>
<td></td>
<td>Unintentional 6.1%</td>
<td></td>
<td>Unintentional 5.0%</td>
</tr>
<tr>
<td></td>
<td>Intentional 2.1%</td>
<td></td>
<td>Intentional 2.1%</td>
</tr>
<tr>
<td>4</td>
<td>Dementia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>COPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Stroke</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Diabetes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Chronic liver disease</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Influenza/pneumonia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Septicemia</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COPD, chronic obstructive pulmonary disease.
The rate of injury mortality declined in both Snohomish County and Washington State during the early 1990s and remained fairly stable after that time.

For most of the period from 1990 through 2007, Snohomish County experienced a lower injury-related mortality rate than the state, but this difference was not significant after 2000.

*Includes both intentional and unintentional injuries.

Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
Approximately 350 Snohomish County residents died of injuries each year from 2003 through 2007.

Snohomish County’s injury mortality rate was not significantly different from that of Washington State.

Males had an injury mortality rate that was twice that of females ($P < 0.001$).

Injury mortality rates increased with age ($P < 0.001$).

American Indians had a significantly higher injury mortality rate than members of other races ($P = 0.005$).

Asians and Pacific Islanders had a significantly lower injury mortality rate than other races ($P < 0.001$).

The injury mortality rate of Hispanics did not differ significantly from that of non-Hispanics.
**Intentionality**

Injuries can occur from unintended circumstances, or they can be intentionally inflicted. Injuries intentionally inflicted on another person are termed *assault* unless the victim dies, in which case it becomes *homicide*. Injuries purposefully inflicted on oneself are suicide attempts. It is not always clear whether or not an injury was intentional. For example, people hospitalized for an injury may not be willing to admit that they were trying to commit suicide. Some injury deaths occur in circumstances in which it is impossible to determine whether the death was a suicide or a homicide. This is particularly true for drownings and poisonings.

**Figure 1.3 Intent of Injury Deaths, Snohomish County (n = 1,734), 2003 - 2007**

![Pie chart showing distribution of injury intent]

Numbers may not total 100% due to rounding.
Data Source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.

In Snohomish County from 2003 through 2007, 70.6% of injury deaths were unintentional. Intentional injuries were responsible for 26.8% of injury deaths, with suicides accounting for 22.1% of injury deaths and homicides accounting for 4.7%. In 2.5% of injury deaths, it was not possible to determine whether or not the injury was intentional. Deaths for which it was not possible to determine intent have been excluded from most analyses in this report.
**OVERVIEW**

Although some types of injuries are almost always unintentional (e.g., car crashes), other types are nearly always intentional. In Snohomish County between 2003 and 2007, more than half of all deaths from cutting and piercing wounds were homicides, and an additional 33% were suicides. During this same period, four of five deaths from gunshot wounds were suicides, and nearly all the rest were homicides. Two thirds of suffocation deaths (66.0%) were deemed to be suicides, but most of the remaining deaths were unintentional. It was not possible to determine intent for 10% of drowning victims, which is a much higher proportion than for any other type of injury.

**Table 1.2 Intentionality of Fatal Injuries**

<table>
<thead>
<tr>
<th></th>
<th>Homicide</th>
<th>Suicide</th>
<th>Unintentional</th>
<th>Not Determined</th>
<th>Total Deaths</th>
</tr>
</thead>
</table>
|                     | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % | Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Deaths % |Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
Types of Injuries

Unintentional poisoning was the most common form of injury-related death in 2007, accounting for one quarter of all injury deaths (24.9%). Suicide was responsible for another 22.7%. Before 2004, motor vehicle crashes were the most common injury cause of death, but decreases in motor vehicle collision deaths combined with increases in unintentional poisonings have led to poisonings becoming the most common form of injury death (see the report *Unintentional Poisonings in Snohomish County*).

**Figure 1.4 Causes of Injury* Death Snohomish County (n = 1,690), 2003 - 2007**

*All injuries are unintentional except for homicide and suicide. Injuries of undetermined intent are excluded.

**“Other” includes injuries caused by smoke and/or fire, nature or the environment, machinery, transportation other than motor vehicles, etc.

Numbers may not total 100% due to rounding.

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

Fatal Injuries by Age Group

Age affects both a person’s chances of dying from an injury and the types of injury from which they die. Injuries account for a higher proportion of deaths in young people than in older ones. Injuries were the leading cause of death for people between 15 and 24, largely because there were comparatively few deaths from other causes. Although injuries represent a small proportion of deaths in older adults, this group has higher rates of injury mortality than younger age groups. For example, from 2003 through 2007, suicides represented 15% of deaths among people aged between 15 and 24 and 0.4% of deaths among those 65 and older. However, there were only 10 suicides per 100,000 people between the ages of 15 and 24, but there were 18 suicides per 100,000 among people 65 and older. This is because of the large number deaths from other causes (particularly chronic diseases) in older adults, so injury deaths constitute a smaller proportion of all deaths in this age group.

Table 1.3 Leading Injury Fatalities by Age Group
Snohomish County, 2003 - 2007

<table>
<thead>
<tr>
<th>Age &lt;15 (N = 289)</th>
<th>Age 15-24 (N = 288)</th>
<th>Age 25-44 (N = 1,081)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Injury</strong></td>
<td>% of All Deaths</td>
<td><strong>Type of Injury</strong></td>
</tr>
<tr>
<td>Motor vehicle crashes</td>
<td>4.5</td>
<td>Motor vehicle crashes</td>
</tr>
<tr>
<td>Drownings</td>
<td>2.8</td>
<td>Suicides</td>
</tr>
<tr>
<td>Homicides</td>
<td>1.7</td>
<td>Poisonings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Homicides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drownings</td>
</tr>
<tr>
<td>Age 45-64 (N = 4,141)</td>
<td>Age 65+ (N = 15,243)</td>
<td>Overall (N = 21,042)</td>
</tr>
<tr>
<td><strong>Type of Injury</strong></td>
<td>% of All Deaths</td>
<td><strong>Type of Injury</strong></td>
</tr>
<tr>
<td>Poisonings</td>
<td>4.3</td>
<td>Falls</td>
</tr>
<tr>
<td>Suicides</td>
<td>3.6</td>
<td>Suicides</td>
</tr>
<tr>
<td>Motor vehicle crashes</td>
<td>1.9</td>
<td>Motor vehicle crashes</td>
</tr>
<tr>
<td>Falls</td>
<td>0.7</td>
<td>Poisonings</td>
</tr>
<tr>
<td>Homicides</td>
<td>0.4</td>
<td></td>
</tr>
</tbody>
</table>

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

- Poisonings were the leading type of injury death from the age of 25 through age 64.
- Suicides were the second leading type of injury death for everyone over the age of 14.
- Motor vehicle crashes were the leading type of injury death for people younger than 25. They were the third leading type of injury death in all other age groups.
In general, the proportion of fatal injuries occurring in a public place declined with age \((P = 0.03)\). Most fatalities in younger age groups are the result of a motor vehicle collision, which occur in public places (i.e., roads and highways).

Conversely, the proportion of injury deaths that occurred in the home increased with age.

Approximately one in five injury deaths to people age 65 or older occurred in a nursing home.
OVERVIEW

Fatal Injuries by Sex
The types of injury deaths differ by sex. Suicide and motor vehicle crashes were much more common causes of death for males than for females. Falls were a more common form of death for women because women live longer (on average) than men. Thus, they are more likely to die of falling than men are.

Table 1.4 Leading Causes of Fatal Injuries by Sex
Snohomish County, 2003 - 2007

<table>
<thead>
<tr>
<th></th>
<th>Males (n =1,137)</th>
<th>% of Injury Deaths</th>
<th>Females (n = 553)</th>
<th>% of Injury Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Suicides</td>
<td>25.6</td>
<td>Poisonings</td>
<td>28.8</td>
</tr>
<tr>
<td>2</td>
<td>Poisonings</td>
<td>23.0</td>
<td>Falls</td>
<td>24.8</td>
</tr>
<tr>
<td>3</td>
<td>Motor vehicle crashes</td>
<td>19.1</td>
<td>Suicides</td>
<td>16.6</td>
</tr>
<tr>
<td>4</td>
<td>Falls</td>
<td>12.6</td>
<td>Motor vehicle collisions</td>
<td>13.9</td>
</tr>
<tr>
<td>5</td>
<td>Homicides</td>
<td>5.4</td>
<td>Suffocations</td>
<td>4.2</td>
</tr>
<tr>
<td>6</td>
<td>Drownings</td>
<td>3.0</td>
<td>Homicides</td>
<td>3.6</td>
</tr>
<tr>
<td>7</td>
<td>Suffocations</td>
<td>1.7</td>
<td>Drownings</td>
<td>1.6</td>
</tr>
<tr>
<td>8</td>
<td>Smoke/fire injuries</td>
<td>1.1</td>
<td>Smoke/fire injuries</td>
<td>1.4</td>
</tr>
</tbody>
</table>

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

Years of Potential Life Lost
One way to determine the impact of a particular cause of death is to examine the years of potential life lost (YPLL) for each death. YPLL is a measure of productivity lost to the community as a result of premature deaths. It is defined as the difference between the age at which a person dies and the age of 65 (the average age of retirement when the measure was created). This represents the years of working life lost as a result of a person’s death. For example, a person who dies at age 50 is considered to have lost 15 years of potentially productive life, because 65 – 50 = 15. If a person is 70 years old at death, he or she has lost zero years of potentially productive life, having lived past age 65.
The following table shows the total YPLL for each of the leading injury causes of death in Snohomish County and the average number of years lost per death. Injury deaths generally cause the loss of more YPLL than the other major cause of death, chronic disease. On average, an injury death will cost 19.5 YPLL, whereas the average loss from a chronic disease death is only 3.1 years.

The average YPLL vary greatly according to the type of injury. The greatest average number of YPLL occurs in drowning deaths, which result in an average of 31.4 years of life per death. In contrast, falls cause an average loss of only 2.8 years of productive life because the vast majority of deaths from falls (83%) occur in people 65 and older. These differences can also be observed in the average age at death, which was 35.3 for drowning victims and 78.5 for those who died from a fall. In general, falls and suffocation tend to occur mostly in older adults, whereas the other causes of injury death tend to be more evenly distributed across ages.

Intentional deaths (i.e., those resulting from suicide or homicide) result in great loss of YPLL. Homicides cost an average of 29.8 years of life lost, which is almost as great as the average loss from drowning. Suicide is more common but results in fewer average YPLLS. This is because homicide occurs most often to young people, whereas suicide affects all age groups. One third of murders (32.9%) in Snohomish County between 2003 and 2007 occurred to people younger than 25 compared with only 11.8% of suicides. In contrast, 14.1% of suicides occurred in people 65 and older, whereas only 8.5% of murders happened to people in this age group.

<table>
<thead>
<tr>
<th>Unintentional Deaths</th>
<th>Number of Deaths</th>
<th>Total YPLL &lt;65</th>
<th>Average YPLL per Death</th>
<th>Average Age at Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poisonings</td>
<td>420</td>
<td>9,755</td>
<td>23.2</td>
<td>42.0</td>
</tr>
<tr>
<td>Motor vehicle crashes</td>
<td>308</td>
<td>7,983</td>
<td>25.9</td>
<td>41.0</td>
</tr>
<tr>
<td>Falls</td>
<td>280</td>
<td>784</td>
<td>2.8</td>
<td>78.5</td>
</tr>
<tr>
<td>Suffocations</td>
<td>42</td>
<td>590</td>
<td>14.0</td>
<td>58.7</td>
</tr>
<tr>
<td>Drownings</td>
<td>41</td>
<td>1,289</td>
<td>31.4</td>
<td>35.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intentional deaths</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicides</td>
<td>383</td>
<td>8,018</td>
<td>20.9</td>
<td>45.6</td>
</tr>
<tr>
<td>Homicides</td>
<td>82</td>
<td>2,445</td>
<td>29.8</td>
<td>36.5</td>
</tr>
<tr>
<td>All Injuries</td>
<td>1,690</td>
<td>33,019</td>
<td>19.5</td>
<td>49.6</td>
</tr>
<tr>
<td>Chronic diseases</td>
<td>18,354</td>
<td>56,185</td>
<td>3.1</td>
<td>75.0</td>
</tr>
</tbody>
</table>

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

Snohomish County's injury hospitalization rate increased from 1,212 admissions per 100,000 residents in 1990 to 1,414 per 100,000 in 2007, an overall increase of 16.7%.

Washington’s injury hospitalization rate increased by 16.0% between 1990 and 2007.

Both Snohomish County and Washington State experienced significant decreases in injury hospitalizations from 1990 through 1997. After 1999 both areas showed significant increases.

Injuries were the leading cause of hospitalizations that were not related to childbirth, accounting for 19% of all such hospitalizations in 2007 and 20% of all hospital charges.

Injury hospitalizations represented 13.8% of non-childbirth admissions in 1990 and 18.9% in 2007.

The proportion of hospitalizations for injuries increased significantly between 1990 and 2007 ($P < 0.001$).

This increase was due entirely to an increase in unintentional injury hospitalizations; admissions for attempted suicide and assault decreased during this period.

The following table shows the relative impact of the leading causes of non-childbirth hospitalizations in Snohomish County in 2007, including the average charges associated with each type of admission. Note that this table includes only people actually admitted to the hospital. It does not include people seen in emergency departments (EDs) and subsequently sent home. Uniform data systems used to track ED use are not currently in place.

Table 1.6 Leading Causes of Non-Childbirth Hospitalizations
Snohomish County \((n = 63,298)\), 2007

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number of Hospitalizations</th>
<th>% of Hospitalizations</th>
<th>Average Stay (days)</th>
<th>Average Charges per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injuries</td>
<td>8,536</td>
<td>18.9</td>
<td>5.6</td>
<td>$7,299</td>
</tr>
<tr>
<td>Digestive system diseases</td>
<td>5,486</td>
<td>12.2</td>
<td>4.0</td>
<td>$7,252</td>
</tr>
<tr>
<td>Diseases of the heart</td>
<td>4,808</td>
<td>10.7</td>
<td>3.5</td>
<td>$17,594</td>
</tr>
<tr>
<td>Respiratory disease</td>
<td>4,322</td>
<td>9.6</td>
<td>4.7</td>
<td>$5,363</td>
</tr>
<tr>
<td>Alcohol-related</td>
<td>2,782</td>
<td>6.2</td>
<td>3.0</td>
<td>$5,373</td>
</tr>
<tr>
<td>Genitourinary disease</td>
<td>2,741</td>
<td>6.1</td>
<td>5.4</td>
<td>$7,851</td>
</tr>
<tr>
<td>Infections &amp; parasites</td>
<td>2,552</td>
<td>5.7</td>
<td>5.6</td>
<td>$5,723</td>
</tr>
<tr>
<td>Illicit drug-related</td>
<td>2,481</td>
<td>5.5</td>
<td>7.4</td>
<td>$4,836</td>
</tr>
<tr>
<td>All psychoses</td>
<td>2,372</td>
<td>5.3</td>
<td>6.3</td>
<td>$2,229</td>
</tr>
<tr>
<td>All cancer</td>
<td>2,057</td>
<td>4.6</td>
<td>5.5</td>
<td>$9,020</td>
</tr>
</tbody>
</table>


Hospitalizations from injuries tend to be longer than average for non-childbirth hospitalizations, averaging 5.6 days per admission versus 3.7 for all other causes \((P < 0.0001)\). In addition, people with injuries were more likely than others to be discharged from the hospital to a skilled nursing facility \((19.9% \text{ vs } 8.9%, P < 0.0001)\) or to their homes under the care of a health service organization \((10.7\% \text{ versus } 8.3\%, P < 0.0001)\). This means that people who are hospitalized for injury are more likely to need additional medical care after discharge from the hospital and thus will incur more medical charges after being hospitalized.
Most injury hospitalizations (91.8%) were for unintentional injuries. Suicide attempts were the next most common cause, accounting for 3.9% of injury admissions. Injuries of undetermined intent accounted for nearly twice as many hospitalizations (2.8%) as did assaults (1.5%).

Falls constituted nearly half (49.1%) of hospital admissions for injuries. Motor vehicle crashes were the second most common type of injury for which people were hospitalized, accounting for approximately one eighth (13.2%) of injury admissions. Suicide attempts were the third most common type of injury (8.8%), followed by unintentional poisonings (7.0%). No other single cause accounted for more than 3.4% of injury hospitalizations.
OVERVIEW

Figure 1.10 Age-Adjusted* Injury-Related Hospitalization Rates by Demographic Factors
Snohomish County (n = 39,658), 2003-2007

- Snohomish County had a significantly higher rate of hospital admissions for injuries than Washington State ($P < 0.0001$).
- Males were more likely to be admitted to a hospital for injuries than females ($P < 0.0001$).
- The likelihood of being admitted to a hospital because of an injury increased with age ($P < 0.0001$).

*Age-adjustment does not apply to age groups.
Public Health’s Role in Preventing Injuries

The societal effort to reduce injuries involves law enforcement, emergency medical services, engineering, governmental and nongovernmental research and advocacy bodies, and legislative bodies at the national and state levels (4). The role of local public health in preventing injuries is sometimes eclipsed by the efforts of larger, more visible institutions. Nevertheless, local public health departments and districts are in a unique position to provide leadership to community injury prevention efforts.

Many health departments already have some form of injury prevention program, such as child safety seat distribution or bike safety education. Such programs can provide a basis for taking a more central role in preventing injuries. Other programs can be designed to incorporate injury control initiatives into their daily business. For example, staff in Women, Infants, and Children (WIC) programs can determine whether clients are using car seats and refer them to a distribution program if they are not. Local public health agencies can customize safety programs to the unique circumstances found in their communities and provide a more personalized approach than state or national programs can.

Local health departments have established credibility within the community and often have existing relationships with members of underserved populations whose specific needs might not be addressed by a broader-based program. They can use these existing partnerships with community organizations and members to take a leadership role in forming coalitions to prevent injuries. Contacts with other local health departments allow for the building of regional alliances. Health promotion efforts that focus on high-risk health behaviors can be expanded to address those behaviors that result in injuries, such as drinking and driving or not wearing a bike helmet.

Local public health departments and districts are in a unique position to provide leadership to community injury prevention efforts.
OVERVIEW

Public Health’s Role in Preventing Injuries Continued

The public health model is easily adapted to injury control. For example, primary prevention aims to reduce susceptibility to a health threat. In the case of motor vehicle collisions, primary prevention would take the form of preventing collisions from occurring in the first place through means as diverse as driver education or consulting with traffic engineers and planners before new construction begins. Secondary prevention (lessening the severity of injury) can be applied to seat belt and car seat use and the provision of air bags in vehicles. Tertiary prevention (reducing the effects of injury) would aim to reduce the effects of injuries suffered through improved rehabilitation.

Among the core functions of public health is the assessment of problems affecting the community. Health departments have staff experienced in determining which needs are not being met in the community and how they can be addressed. Data are used to determine the extent of the problem and can be used to assess the effectiveness of programs that are put in place. Data can drive injury prevention policies.

For example, the introduction of graduated driver’s licenses resulted from data showing that teenage drivers are much more likely to be involved in car crashes than older drivers.

The current community need and interest in injury prevention support a role for local public health. Injury prevention is a clear objective of the public health mission, and public health agencies are in a unique position to provide leadership in the community on this problem. However, limited resources (e.g., staff time, money) may prevent their participation in such efforts. Local public health agencies must determine the priority of injury prevention within their own communities and decide for themselves where their resources are best allocated.

Sources of Information
2. UNINTENTIONAL INJURIES

Unintentional injuries were the fourth leading cause of death in Snohomish County, accounting for 6.1% of deaths, and the leading cause of non-childbirth hospitalizations (17.4%) in 2007. From 2003 through 2007, they were the leading cause of death for people younger than age 45. During this period there were 2.6 unintentional injury deaths for every intentional (suicide and homicide) injury death. This section discusses the five leading causes of unintentional injury death (poisonings, motor vehicle crashes, falls, drowning, and suffocations), which accounted for 89.2% of all unintentional deaths from 2003 through 2007.

Figure 2.1 Age-Adjusted Unintentional Injury Mortality Rates
Snohomish County & Washington State, 1990-2007

- Snohomish County experienced a decline in unintentional injury mortality between 1990 and 1992, after which the rate increased by 63% ($P = 0.0002$).
- Washington experienced an increase of 13.9% in unintentional injury mortality between 1992 and 2007 ($P = 0.0008$).
- Snohomish County had lower rates of unintentional injury mortality than the state for most of the 1990s, but since 2002 the county’s mortality rate has been similar to that of Washington.
From 2003 through 2007, Snohomish County’s rate of unintentional injury mortality was the same as that of Washington State.

Males were twice as likely as females to die of an unintentional injury ($P = 0.0001$).

Unintentional injury mortality increased with age ($P = 0.0001$). People over the age of 64 were nearly 30 times more likely to die of an unintentional injury than those younger than 15.

American Indians were significantly more likely to die of unintentional injuries than members of other races ($P = 0.003$).

Asian and Pacific Islanders were significantly less likely than members of other races to die of unintentional injuries ($P = 0.0001$).

Hispanics’ unintentional injury mortality rate did not differ significantly from that of non-Hispanics.
Table 2.1 Leading Causes of Unintentional Injury Mortality Snohomish County (n = 1,225), 2003-2007

<table>
<thead>
<tr>
<th>Type of Injury</th>
<th>Number of Deaths</th>
<th>Age-Adjusted Mortality per 100,000</th>
<th>% of Intentional Injury Deaths</th>
<th>Average Years of Potential Life Lost per Death (&lt;65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1,225</td>
<td>39</td>
<td>100</td>
<td>18.4</td>
</tr>
<tr>
<td>Poisonings</td>
<td>420</td>
<td>12</td>
<td>34.3</td>
<td>23.2</td>
</tr>
<tr>
<td>Motor vehicle crashes</td>
<td>308</td>
<td>10</td>
<td>25.1</td>
<td>25.9</td>
</tr>
<tr>
<td>Falls</td>
<td>280</td>
<td>10</td>
<td>22.9</td>
<td>2.8</td>
</tr>
<tr>
<td>Suffocations</td>
<td>42</td>
<td>1</td>
<td>3.4</td>
<td>14.0</td>
</tr>
<tr>
<td>Drownings</td>
<td>41</td>
<td>1</td>
<td>3.3</td>
<td>31.4</td>
</tr>
<tr>
<td>Fire/smoke</td>
<td>19</td>
<td>1</td>
<td>1.6</td>
<td>8.8</td>
</tr>
</tbody>
</table>

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

- Poisonings accounted for more than one third (34.3%) of all deaths from unintentional injury.
- Motor vehicle crashes were the second most common cause of unintentional injury death between 2003 and 2007. One quarter of unintentional injury deaths (25.1%) were the result of a motor vehicle crash.
- Falls accounted for 22.9% of unintentional injury deaths. Because deaths from falls are most common in older adults, only 3 years of potential life were lost per death.
- Drowning accounted for only 3.3% of unintentional injury deaths, but more than 31 years of potential life were lost per death from this cause.
- Fire injuries and smoke inhalation were the sixth leading cause of unintentional injuries. Because there were so few incidents, they are not included in the report.
OVERVIEW

Continued:

Public Health's Role in Preventing Injuries

UNINTENTIONAL INJURIES

- Hospital admissions for unintentional injuries in Snohomish County decreased significantly between 1990 and 1999 ($P = 0.05$). However, since 1999 these rates have increased by 30%, from 1,003 admissions per 100,000 residents to 1,305 ($P < 0.0001$). The admission rate in 2007 was 22% higher than in 1990.
- Hospital admissions for unintentional injuries in Washington State decreased between 1990 and 1995 but increased by 35% thereafter ($P = 0.001$).

Figure 2.3 Age-Adjusted Unintentional Injury Hospitalization Rates Snohomish County & Washington State, 1990-2007

Between 2003 and 2007, Snohomish County residents had nearly 40,000 hospital admissions for injuries. The overall hospitalization rate for unintentional injuries was 1,269 admissions per 100,000 residents.

From 2003 through 2007, Snohomish County had a significantly higher rate of hospital admissions for unintentional injuries than Washington ($P = 0.001$).

Males were more likely to be hospitalized because of an unintentional injury than females ($P = 0.001$).

Hospitalizations for unintentional injuries increased with age. People age 65 and older were 28 times as likely to be hospitalized as people under the age of 15.
UNINTENTIONAL INJURIES

Table 2.2 Injury Hospitalization Lengths of Stay & Cost Snohomish County, 2003-2007

<table>
<thead>
<tr>
<th>Type of Injury</th>
<th>Number of Admissions</th>
<th>% of Unintentional Injury Admissions</th>
<th>Average Length of Stay (Days)</th>
<th>Average Charges per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>39,658</td>
<td>100</td>
<td>5.6</td>
<td>$6,316</td>
</tr>
<tr>
<td>Falls</td>
<td>8,584</td>
<td>21.6</td>
<td>4.7</td>
<td>$6,520</td>
</tr>
<tr>
<td>Motor vehicle collisions</td>
<td>2,308</td>
<td>5.8</td>
<td>5.5</td>
<td>$8,818</td>
</tr>
<tr>
<td>Poisonings</td>
<td>1,225</td>
<td>3.1</td>
<td>3.5</td>
<td>$6,664</td>
</tr>
<tr>
<td>Fire/burns</td>
<td>436</td>
<td>1.1</td>
<td>5.5</td>
<td>$3,410</td>
</tr>
<tr>
<td>Suffocations</td>
<td>158</td>
<td>0.4</td>
<td>7.1</td>
<td>$6,033</td>
</tr>
</tbody>
</table>


- Falls were the most common type of unintentional injury for which people were hospitalized. They accounted for 21.6% of all unintentional injury hospitalizations from 2003 through 2007.
- Motor vehicle crashes were the second most common type of unintentional injury hospitalization, but they constituted only 5.8% of such admissions.
- Among the most common causes of unintentional injury hospital admissions, those from motor vehicle crashes incurred the highest average charges per day, which suggests that such injuries may be more severe than those from other causes.
Unintentional Injury Prevention

Unintentional injuries can be characterized as an interaction between a person and some type of object, such as an automobile or bodies of water (1). Most unintentional injury prevention programs thus have an environmental focus, such as making potentially injurious objects safer to use or physically separating people from such objects. However, changing people’s behaviors can be as much or more effective. Behaviors can be changed by creating policies that modify how people use such objects (e.g., mandatory seatbelt laws) or making people responsible for their misuse of them (e.g., stricter punishments for impaired driving). Because behavior and objects within an environment can influence one another, the most effective approaches to injury prevention incorporate both. Seat belts in automobiles are an example where these two strategies have been combined.

Seat belts represent an environmental change to a potentially injurious object (i.e., motor vehicles) that can lessen injuries, and the recent Washington law that makes failure to wear a seat belt a primary traffic offense is a behavioral intervention.

Sources of Information
3. POISONINGS

The Centers for Disease Control and Prevention (CDC) define a poison as any substance that is harmful to the body when ingested (eaten), inhaled (breathed), injected, or absorbed through the skin (1). “Unintentional poisoning” occurs when substances are ingested without the intent to cause harm (2). Unintentional drug poisoning results from drug misuse, drug abuse, and unforeseen drug interactions. It includes the excessive use of drugs or chemicals for nonrecreational purposes, such as by a toddler, and the use of drugs or chemicals for recreational purposes in excessive amounts (i.e., an “overdose”). Drug poisonings constitute the majority of poisoning cases in the United States (3).

This section describes the increases in mortality and morbidity caused by unintentional poisoning in Snohomish County and also describes the most common poisons. For a more detailed examination of the unintentional poisoning problem in Snohomish County, the reader is referred to the Health District’s report Unintentional Poisonings in Snohomish County, published in August 2009 and available at: www.snohd.org.

Poisonings were the second leading cause of injury deaths overall and the leading cause for people aged 35 to 54.

Mortality

Nationally, unintentional poisoning deaths nearly doubled from 1999 through 2006 (3). They were the second leading cause of injury deaths overall and the leading cause for people aged 35 to 54. In Snohomish County, during 2004 unintentional poisoning surpassed motor vehicle crashes to become the leading cause of unintentional injury death. This increase was due to a combination of increasing mortality rates from poisoning and decreasing mortality rates from motor vehicle collisions. In 2007 unintentional poisoning caused 98 deaths, a rate of 14 deaths for every 100,000 residents; motor vehicle crashes caused 59 deaths, or 9 deaths per 100,000.
The rate of unintentional poisoning mortality increased significantly in both Snohomish County ($P = 0.0001$) and Washington State ($P < 0.0001$) from 1990 through 2007.

The mortality rate for unintentional poisonings in Snohomish County increased by an average of 10% each year since 1991 ($P < 0.0001$).

Snohomish County’s poisoning mortality rate was similar to that of Washington State from 1990 through 2002, but after that Snohomish County’s rate surpassed Washington’s.

In 2006 (the latest year for which national data are available), Snohomish County’s poisoning mortality rate was 13 per 100,000 and Washington State’s was 11; the national average was 9 poisoning deaths per 100,000.
POISONINGS

Figure 3.2 Age-Adjusted* Unintentional Poisoning Mortality Rates by Demographic Factors
Snohomish County (n = 420), 2003-2007

<table>
<thead>
<tr>
<th>Demographic Factors</th>
<th>Washington State</th>
<th>Snohomish County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Females</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>&lt;15</td>
<td>N/A**</td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>25-44</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>45-64</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>65+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>American Indian</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Asian/PI</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>5</td>
<td>12</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Age-adjustment does not apply to age groups.
**Numbers too small to calculate a reliable rate.
Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.

- An average of 84 Snohomish County residents died of unintentional poisoning each year from 2003 through 2007.
- Snohomish County had a significantly higher mortality rate from poisoning than Washington during this period (P = 0.002).
- Males were more likely to die of unintentional poisoning than females (P < 0.0001).
- Individuals aged 45 to 64 were more likely to die of unintentional poisoning than any other age group.
- Older adults (aged 65 years or older) were less likely to die of unintentional poisoning than adults aged 15 to 64 (P < 0.0001).
- Asian and Pacific Islanders in Snohomish County were significantly less likely to die of unintentional poisoning than were other races (P < 0.0001).
- Hispanics had significantly lower rates of poisoning mortality than non-Hispanics (P = 0.006).
Figure 3.3 Poisoning Mortality Rates* by Health Planning Area (HPA) 
Snohomish County, 2003-2007

- The North Everett HPA experienced a significantly higher mortality rate from unintentional poisoning than the county ($P < 0.0001$).
- The Mill Creek-Bothell HPA had a significantly lower rate of mortality from unintentional poisoning than the county average ($P = 0.001$).

*Rates are age-adjusted per 100,000 people.
Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
POISONINGS

Types of Poison
National data show that the increase in poisoning deaths reflects an increased use of potentially lethal prescription drugs during this time (4). Commercial disbursements of commonly abused prescription drugs increased 109% from 2000 through 2004 (5). From 1999 through 2006, the number of poisoning deaths in the United States nearly doubled, largely because of overdose deaths involving prescription opioid painkillers (3).

The increase in opioid poisoning deaths corresponded with a fourfold increase in the use of these drugs (6). Opioids are synthetic versions of opium (2). Opioids kill by decreasing respiratory function to the point where vital organs stop working as a result of oxygen depletion. Using opioids in conjunction with alcohol, benzodiazepines, or antihistamines further depresses the central nervous system and can lead to extreme respiratory depression (3,7). In contrast, cocaine is a central nervous system stimulant that, when combined with opioids, can cause seizures (5). Opioids were involved in almost 40% of poisoning deaths nationally during 2006 (2). These drugs are increasingly used for nonmedical purposes because they cause euphoria and are now widely available illicitly.

In Washington during 2006, the rate of poisoning involving opioid painkillers was 8 per 100,000 residents, which was significantly higher than the national average of 5 deaths per 100,000 (4). These deaths occurred disproportionately among Washington residents who were men between the ages of 45 and 54. The higher rate of opioid poisoning deaths in Washington may be attributable to the fact that the state’s rate of nonmedical use* of these drugs was four times the national average (4). Medicaid enrollees were twice as likely to be prescribed opioid painkillers as were patients with private insurance, and they were almost six times more likely to die of an opioid drug overdose than were people not enrolled in Medicaid.

* Nonmedical use is the taking of medications without a prescription or use only to experience the feeling the drug caused.
A study by the Washington State Department of Health found that drugs, both legal and illicit, were responsible for 97.0% of the unintentional poisoning deaths in Snohomish County from 2005 through 2007 (5). In nearly two thirds of unintentional poisoning deaths, a combination of drugs from multiple drug classifications was the underlying cause of death. The most common unintentional poisoning deaths from a single drug involved the use of opioids (narcotics) and hallucinogens (psychodysleptics). Opioids include both illicit drugs (e.g., heroin) and prescription medications such as hydrocodone and methadone. Hallucinogens are illicit substances such as cocaine and LSD (lysergide).

**Figure 3.4  Underlying Cause of Death in Unintentional Poisoning Deaths Snohomish County (n = 271), 2005-2007**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Drugs</td>
<td>63%</td>
</tr>
<tr>
<td>Opioids &amp; Hallucinogens</td>
<td>27%</td>
</tr>
<tr>
<td>Anti-epileptics, sedative-hypnotic, other psychoactive drugs</td>
<td>7%</td>
</tr>
<tr>
<td>Other Gasses &amp; Vapors</td>
<td>2%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>1%</td>
</tr>
</tbody>
</table>

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

It should be noted that alcohol is rarely listed as the underlying cause of death for two reasons: First, when both drugs and alcohol are present at the time of death, the drug is listed as the underlying cause of death. Second, prior to 2007 special rules dictated that alcohol intoxication be coded as a “mental and behavioral disorder due to alcohol intoxication,” not as an unintentional poisoning. Alcohol was present as a contributory cause of death in half (42.5%) of all unintentional poisoning deaths.
POISONINGS

Like in Washington and the United States, the increase in Snohomish County’s unintentional poisoning deaths is due mainly to the increased use of both prescription and nonprescription opioids. At least one opioid (either prescription or not) was present in approximately 79% of unintentional poisoning deaths from 2005 through 2007. Prescription opioids were present in two thirds of unintentional poisoning deaths during this period and were the definite cause of death in two of every five unintentional poisoning deaths.

Figure 3.5 Opioids in Unintentional Poisoning Mortality Snohomish County, 2005-2007

*For definition and background, see page 34
Only about one in seven (14.0%) unintentional poisonings from prescription opioids was caused by a single drug; methadone was responsible for 19 of these 24 deaths (8). Anywhere from one to seven additional drugs (along with prescription opioids) were identified in the remaining unintentional poisoning deaths.

- A combination of prescription opioids and nonopioid prescription drugs was the most frequently observed combination of drugs at the time of death (52.2%).
- Prescription opioids were mixed with nonprescription substances in approximately one third (31.1%) of these deaths.
- Prescription opioids were the only type of drug used in one sixth (16.8%) of unintentional poisoning deaths from prescription opioids. In most of these deaths, a single prescription opioid was the only drug present (88.9%).
- Illicit drugs were present in 18.0% of unintentional poisoning deaths from prescription opioids. Illicit drugs were often used in combination with prescription opioids and at least one other type of drug (nonopioid prescription drug or over-the-counter drug).
- There was no increase in the rate of poisonings from illicit opioids. The increase in opioid poisonings was due to the increased use of prescription opioids.

*Definition: Death definitely due to prescription opioids*

The Washington State Department of Health recently noticed the steeply increasing rate of unintentional poisoning deaths, specifically with regard to opioids. To further investigate this issue, all death certificates from 1995 through 2007 containing any reference to opioid use were reviewed. Drugs listed on the death certificate were classified based on type, prescription status, schedule, and possibility for abuse. These results were then combined with information from death certificates to identify deaths that were definitely or possibly caused by prescription opioid use. The definition for a death definitely caused by prescription opioids was:

- Terms including “toxic”, “intoxication”, “overdose”, or “ingestion” were reported on the death certificate.
- A prescription opiate was reported on the death certificate (excluding morphine or narcotic unspecified) and/or terms such as “medication” or “prescription” that appeared to describe the opiate were reported on the death certificate.
- No illicit substances were reported and no terms such as “illicit” were used reported on the death certificate, and
- There was no indication of alcohol use on the death certificate.

A death possibly caused by prescription opioids met the first two conditions and additionally had an illicit substance or alcohol also present at the time of death. All analyses of prescription opioid deaths in this report included deaths identified as unintentional poisonings (X40-49) in the underlying cause of death field that were definitely or possibly caused by prescription opioids.
POISONINGS

Hospitalizations
Poisoning was the third most common type of unintentional injury for which Snohomish County residents were admitted to hospital. Most patients seeking treatment for unintentional poisoning are initially seen in emergency departments (EDs), or another urgent care setting (1). National data suggests that about one third of unintentional poisoning cases involving the nonmedical used of pharmaceutical drugs seen in EDs in 2006 were serious enough to require inpatient treatment. More than half (58%) were treated and released, and 12% had another outcome (transferred to another facility, left against medical advice, died, or not documented). Many injuries and other medical conditions can be treated on an outpatient basis and do not require admission to a hospital. The conditions described in this chapter reflect the most serious injuries and medical conditions requiring additional or longer-term care.

Drugs and medications were responsible for 87.5% of all unintentional poisoning hospitalizations in Snohomish County from 2005 through 2007. Opioids, including methadone and heroin, were the most prevalent type of drug reported in both unintentional poisoning deaths (79.0%) and hospitalizations (25.7%).
The unintentional poisoning hospitalization rate increased significantly in both Snohomish County ($P < 0.0001$) and Washington State ($P < 0.0001$) from 1999 through 2007. Before 1999, there was no discernable change in these rates.

There was an average of 117 hospitalizations for unintentional poisoning annually from 1990 through 1999. Since 2000 that number has nearly doubled to 214 hospitalizations for unintentional poisoning each year.

The unintentional poisoning hospitalization rate for Snohomish County residents was significantly greater than the hospitalization rate for Washington State residents in 2005 ($P = 0.003$) and 2006 ($P = 0.002$), but there was no significant difference in 2007.
From 2003 through 2007, about 245 Snohomish County residents were hospitalized annually as a result of unintentional poisoning.

Snohomish County had a significantly higher rate of unintentional poisoning hospitalizations than Washington State ($P = 0.002$).

Males and females were equally likely to be hospitalized for unintentional poisoning ($P = 0.9$).

The hospitalization rate for unintentional poisoning increased as age increased ($P = 0.01$).

Older adults (aged 65 years or older) were the most likely to be hospitalized for unintentional poisoning ($P < 0.0001$).
Figure 3.8 Unintentional Poisoning Hospitalization Rates* by Health Planning Area (HPA) Snohomish County, 2003-2007

*Rates are age-adjusted per 100,000 people. Data source: Washington State Comprehensive Hospital Abstract Reporting System.

- Rates of hospital admission for unintentional poisoning were higher than average in the Marysville-Tulalip, North Everett, and East HPAs ($P < 0.0001$, $P < 0.0001$, and $P = 0.001$, respectively).
- The HPAs in the southwestern part of the county (Edmonds-Mukilteo, Lynnwood-Mountlake Terrace-Brier, Mill Creek-Bothell, and Monroe-Snohomish HPAs) had lower- than-average rates of hospital admission for unintentional poisoning (Edmonds, $P < 0.0001$; Lynnwood, $P = 0.009$; Mill Creek, $P = 0.0004$; and Monroe, $P = 0.015$).
Unintentional Poisoning Prevention

Unintentional poisonings are amenable to prevention, and numerous preventive efforts have already been implemented to reduce the incidence of unintentional poisoning. The earliest stages of prevention (primary prevention) seek to minimize the possibility that a poisoning will occur. Both government agencies and individuals are important in preventing unintentional poisonings.

- Government agencies are responsible for ensuring that medications meet certain safety standards and for providing general education to physicians and patients regarding those medications.
- Physicians and pharmacists are responsible for understanding the uses, side effects, and potential drug interactions of the medications they are prescribing and for informing patients about their medications.
- Patients are responsible for understanding medications they are prescribed, using them as prescribed, informing physicians of all other medications they are currently taking, and safely storing and disposing of all medications.

Washington State has created an unwanted medicine return program to prevent the availability of prescription drugs for abuse. This program allows owners of prescription drugs that they no longer need to dispose of them at designated disposal sites (such as some pharmacies) instead of putting them in with their general trash, where it can potentially be retrieved and subsequently abused. However, these programs do not accept prescribed controlled substances. To fill this gap, the Snohomish Health District is partnering with local law enforcement to provide collection sites for these drugs. There are currently 28 such sites in the county. For more information, please go to www.snoco.org and search for “pharmaceuticals.”
Secondary prevention seeks to minimize adverse outcomes from a disease or risky health behavior. In terms of unintentional poisoning, secondary prevention takes the form of addiction treatment. Successful treatment of addiction reduces both the long-term health effects of inappropriate drug use and the chances that a person will unintentionally poison himself with an overdose.

Tertiary prevention of unintentional poisoning refers to traditional medical care that seeks to ameliorate the effects of poisonings. Medical treatment is available in both outpatient and inpatient settings, depending on the severity of the poisoning. Immediate assistance is available through the Washington State Poison Control Center or by calling 9-1-1. The Washington Poison Center is a nonprofit organization that answers questions from the public and health care professionals about poisonous and toxic substances.

Sources of Information
4. MOTOR VEHICLE COLLISIONS

Injuries sustained in motor vehicle collisions were the leading cause of injury death in the United States during 2006. They are the leading overall cause of death for people aged 1 through 34 years (1). Annually, more than five million people sustain injuries in motor vehicle collisions and require a visit to an emergency department (ED). Economically, motor vehicle collisions were estimated to have cost the nation $230 billion in 2000.

Deaths from injuries sustained in motor vehicle collisions have been declining nationally for more than a decade, but the reasons for this decline are unclear (2,3). Increased seat belt use and the widespread introduction of other safety technology (e.g., air bags, electronic stability control) as standard features in newer cars are likely part of the reason. Similarly, highways have more safety features, such as rumble strips and barriers that prevent vehicles from inadvertently crossing the median into oncoming traffic. Despite the overall decline in motor vehicle collision–related fatalities, a cause for concern is the increasing number of fatalities occurring to motorcyclists (2). Another cause for concern is the fact that driver impairment by alcohol or drugs continues to account for nearly one third of traffic-related deaths.

Motor vehicle collisions and traffic safety are well studied, and the amount of information available is beyond the scope of this report. This section provides an introduction to the topic and local data that support national and state level analyses. It describes traffic collisions in general and the casualties that result from them. This section also discusses major risk factors (impairment, speeding, motorcycles) and strategies for preventing their occurrence. Finally, prevention and use of protective devices such as seat belts will be examined along with ways to increase their use.

Mortality
Injuries sustained in motor vehicle collisions were the second leading cause of unintentional injury deaths in Snohomish County between 2003 and 2007. They were the leading cause of mortality for people aged between 15 and 24, accounting for 24.3% of deaths in this age group between 2003 and 2007. Washington State’s pattern of deaths from motor vehicle collisions was similar to Snohomish County’s. Washington had one of the lowest rates of mortality from motor vehicle collisions in the nation during 2007 (4), with approximately 9 deaths per 100,000 residents, compared with the national average of almost 14 deaths per 100,000.
The mortality rate from injuries sustained in a motor vehicle collision in Snohomish County declined by 55%, from 19 deaths per 100,000 in 1990 to 9 per 100,000 ($P = 0.001$) in 1992. After 1992 the rate of deaths from such injuries did not change significantly.

The Washington State mortality rate from injuries suffered in a motor vehicle collision decreased by 45% from 1990 through 2007 ($P = 0.001$). Most of the decline occurred from 1990 through 1992.

The mortality rate from injuries sustained in a motor vehicle collision in Snohomish County was generally lower than the rate in Washington State.
In Snohomish County, an average of 62 people died of injuries sustained in a motor vehicle collision each year from 2003 to 2007.

Males were nearly three times more likely than females to die as a result of injuries sustained in a motor vehicle collision ($P = 0.001$).

The mortality rate from motor vehicle collisions was highest in people between the ages of 15 and 24 and those 65 and older.

Blacks had mortality rates from motor vehicle collisions that were significantly higher than rates for other races ($P = 0.02$). Most blacks who died in traffic accidents were between the ages of 35 and 55.

American Indians also had mortality rates from motor vehicle collisions that were significantly higher than rates for other races ($P = 0.03$). The high rate for American Indians was due mostly to an unusually high mortality rate among males between the ages of 15 and 24.
Resident of the East County HPA had a rate of motor vehicle collision mortality three times the average for Snohomish County ($P < 0.0001$).

Residents of the Arlington-Stanwood HPA also had higher rates of motor vehicle collision mortality than was average for the county ($P = 0.015$).

The Mill Creek-Bothell HPA had lower motor vehicle collision mortality than average ($P = 0.039$).
Both Snohomish County and Washington State showed declines in the number of fatal collisions per 100,000 vehicle miles travelled (VMT). This pattern is consistent with national data.

- The rate of fatalities per 100,000 VMT decreased by 41.7% in Snohomish County between 1998 and 2007.
- The rate of traffic fatalities per 100,000 VMT in Snohomish County was generally lower than that in Washington State.

During each year from 2003 through 2007, approximately 462 Snohomish County residents were admitted to a hospital because of injuries suffered in a motor vehicle collision.

Snohomish County’s rate of hospital admissions for injuries sustained in a motor vehicle collision was generally similar to that of Washington State.

From 1990 through 1996, the rate of hospitalizations for injuries suffered in motor vehicle collisions decreased by 44% in Snohomish County ($P = 0.001$). After 1996 there was no significant change.

Washington State experienced a decline in hospitalization rates similar to Snohomish County.
Figure 4.6 Age-Adjusted* Motor Vehicle Collision Hospitalization Rates by Demographic Factors
Snohomish County (n = 2,308), 2003-2007

*Age-adjustment does not apply to age groups.

- Snohomish County’s rate of hospitalizations for injuries suffered in a motor vehicle collision was similar to the rate for Washington State.
- Males were significantly more likely than females to be hospitalized for injuries suffered in a motor vehicle collision (P <0.0001).
- The rate of hospitalizations for injuries suffered in a motor vehicle collision was highest for people between 15 and 24 years of age (P = 0.05). People under the age of 15 were the least likely to be hospitalized because of injuries from a motor vehicle collision, probably because they cannot legally drive.
- Males between the ages of 15 and 24 had the highest hospital admission rate for injuries suffered in a motor vehicle collision, with an average of 176 admissions per 100,000 residents between 2003 and 2007 (not shown). Females in this age group were admitted to hospital at a rate of only 93 per 100,000.
- People aged 65 and older were more likely than average to be hospitalized because of injuries sustained in a motor vehicle collision (P = 0.05).
In Snohomish County, the incidence of serious injuries sustained in a motor vehicle collision was stable at approximately 4.6 serious injuries per 100,000 VMT from 2001 through 2007.

The incidence of serious injuries from motor vehicle collisions in Washington State declined by 28% from 2001 through 2007 ($P = 0.02$).

Washington State began this period with an incidence rate of serious injuries that was much higher than that of Snohomish County. However, the decrease observed in Washington’s rate makes the state’s rate similar to that of Snohomish County.

*Serious injuries are those that require medical attention beyond the scene of the collision, such as admission to a hospital emergency department.

**Motor Vehicle Collisions**

**Collisions**

Collisions are ranked into four types based on the most severe injury sustained by any of the people involved. The most severe collisions result in at least one fatality. Serious injury collisions result in at least one participant going to the hospital ED, whereas minor injury collisions result in only bruises and other minor wounds that can be taken care of by emergency medical personnel at the site of the collision. In the least severe type of collision, no one is injured and only property damage occurs.

Common injuries sustained in collisions are fractures, open wounds, and brain trauma (5).

During 2007 a total of 14,196 traffic collisions occurred in Snohomish County (6). In two thirds of these collisions, no one was injured. Less than 2% involved major injuries or deaths. Thirty-nine fatal collisions occurred in Snohomish County during 2007, each of which took a single life. Serious injuries occurred to 249 people in 210 separate collisions. A total of 6,029 people suffered minor injuries in 4,315 traffic collisions.
Half of the collisions in Snohomish County during 2007 (49.8%) occurred on state or federal highways.

Only 15.5% of collisions occurred on county roads, but they accounted for one third of major injury collisions (34.3%) and one third of fatalities (33.3%).

One third of collisions (34.3%) occurred on city streets, but such collisions only accounted for one quarter of fatal (23.1%) and serious injury (25.2%) collisions.

Table 4.1 Motor Vehicle Collisions by Type of Road
Snohomish County, 2007

<table>
<thead>
<tr>
<th>Type of Road</th>
<th>Total</th>
<th>Fatal</th>
<th>Serious Injury</th>
<th>Minor Injury</th>
<th>No Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S./state highway</td>
<td>7,065</td>
<td>16</td>
<td>83</td>
<td>2,371</td>
<td>4,595</td>
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<tr>
<td>Column %</td>
<td>49.8</td>
<td>41.0</td>
<td>39.5</td>
<td>54.9</td>
<td>47.7</td>
</tr>
<tr>
<td>County road</td>
<td>2,196</td>
<td>13</td>
<td>72</td>
<td>665</td>
<td>1,446</td>
</tr>
<tr>
<td>Column %</td>
<td>15.5</td>
<td>33.3</td>
<td>34.3</td>
<td>15.4</td>
<td>15.0</td>
</tr>
<tr>
<td>City street</td>
<td>4,872</td>
<td>9</td>
<td>53</td>
<td>1,264</td>
<td>3,546</td>
</tr>
<tr>
<td>Column %</td>
<td>34.3</td>
<td>23.1</td>
<td>25.2</td>
<td>29.3</td>
<td>36.8</td>
</tr>
<tr>
<td>Other*</td>
<td>63</td>
<td>1</td>
<td>2</td>
<td>15</td>
<td>45</td>
</tr>
<tr>
<td>Column %</td>
<td>0.4</td>
<td>2.6</td>
<td>1.0</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Total</td>
<td>14,196</td>
<td>39</td>
<td>210</td>
<td>4,315</td>
<td>9,632</td>
</tr>
</tbody>
</table>

*Parking lots, driveways, alleys, highway on/off ramps, etc.

The most common type of collision in Washington State during 2007 was one vehicle running into the back of another that was not moving. Colliding with a fixed object was the second most common type of collision in Washington, but it was the leading type of fatal collision. One third of fatal collisions were with fixed objects. The most common objects struck were roadside ditches, trees and stumps, fences, utility poles, and concrete barriers. Collisions where the vehicle overturned were a major cause of fatalities. More than 10% of fatal collisions were of this type, compared with an average of 3.2% of all collisions. Head-on collisions were fairly uncommon, accounting for 0.6% of all collisions. However, they represented 10.8% of fatal collisions. The fifth most common type of fatal collision involved vehicles going straight that hit a pedestrian. These accounted for 9.3% of fatal collisions but only 0.7% of all collisions.

**Figure 4.8 Leading Types of Collisions Washington State (n = 128,888), 2007**

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same Direction, One Stopped - Rear End</td>
<td>19%</td>
</tr>
<tr>
<td>Collided with Fixed Object</td>
<td>17%</td>
</tr>
<tr>
<td>Entering at Angle (Merging)</td>
<td>13%</td>
</tr>
<tr>
<td>Same Direction, Both Moving - Rear End</td>
<td>8%</td>
</tr>
<tr>
<td>One Parked, One Moving</td>
<td>7%</td>
</tr>
</tbody>
</table>


**Figure 4.9 Leading Types of Fatal Collisions Washington State (n = 529), 2007**

<table>
<thead>
<tr>
<th>Type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collided with Fixed Object</td>
<td>33%</td>
</tr>
<tr>
<td>Vehicle Overturned</td>
<td>12%</td>
</tr>
<tr>
<td>Opposite Direction, Both Moving - Head-on</td>
<td>11%</td>
</tr>
<tr>
<td>Vehicle Going Straight Hit Pedestrian</td>
<td>9%</td>
</tr>
<tr>
<td>Entering at Angle (Merging)</td>
<td>8%</td>
</tr>
</tbody>
</table>

Figure 4.10 Leading Factors in Collisions Washington State (n = 128,888), 2007

- Speeding was cited as a causal factor in more than one fifth of collisions (23.0%) in Washington State during 2007.
- Speeding was cited as a contributing factor in 39.3% of fatal collisions.
- Being under the influence of alcohol was cited as a factor in 5.7% of collisions, but it was cited in 35.2% of fatal collisions.
- Drivers impaired by alcohol or drugs were involved in 6.4% of all collisions, but they were involved in 41.8% of fatal collisions.
- Following too closely behind the car in front was cited in 13.6% of collisions. This is related to the finding that rear-end collisions were the most common type (see previous page).

Figure 4.11 Leading Factors in Fatal Collisions Washington State (n = 529), 2007

- Speeding was cited as a causal factor in more than one fifth of collisions (23.0%) in Washington State during 2007.
- Speeding was cited as a contributing factor in 39.3% of fatal collisions.
- Being under the influence of alcohol was cited as a factor in 5.7% of collisions, but it was cited in 35.2% of fatal collisions.
- Drivers impaired by alcohol or drugs were involved in 6.4% of all collisions, but they were involved in 41.8% of fatal collisions.
- Following too closely behind the car in front was cited in 13.6% of collisions. This is related to the finding that rear-end collisions were the most common type (see previous page).
Nearly half of all collisions in Snohomish County (47.4%) occurred during the afternoon. The occurrence of collisions peaked between 3:00 and 6:00 PM (not shown).

Almost one third of fatal collisions (30.8%) occurred during the afternoon, but nearly half (48.7%) occurred after 6:00 PM.

Collisions involving a driver impaired by alcohol or drugs occurred most commonly between 6:00 PM and 6:00 AM. Nearly four out of five impaired-driver collisions occurred during these hours.
Risk Factors

Motorcycles

Although deaths from motor vehicle collisions have been declining in the last decade (7), deaths of motorcyclists in collisions have increased. Motorcyclists are about 35 times more likely than passenger car occupants to die in a motor vehicle collision and 8 times more likely to be injured on the basis of vehicle miles traveled. The increase in motorcyclist deaths is due mainly to an increase in the number of motorcycles on the roads and because the development and deployment of safety features for motorcycles has lagged behind that for automobiles (8).

Figure 4.13 Age Adjusted Motorcycle Collision Mortality Rates
Snohomish County & Washington State, 1990-2007

- In Snohomish County, mortality from injuries sustained by motorcyclists in collisions declined between 1990 and 1998 ($P = 0.002$). However, after 1998, the rate more than tripled ($P = 0.001$).
- Washington State experienced a slight but non-significant decline in motorcycle collision mortality until 1996. From 1997 until 2007, the rate increased by 130% ($P = 0.0005$).
- The pattern of motorcyclist mortality rates in Snohomish County was generally similar to Washington State.
In Snohomish County from 1998 through 2007, the number of registered motorcycles increased by 120%, whereas the overall number of vehicles registered in the county increased by only 48% (not shown).

Between 1998 and 2002, motorcyclists represented 6.2% of all traffic fatalities in Snohomish County, but between 2003 and 2007, 18.8% of people killed in motor vehicle collisions were motorcyclists.

Nationally, passenger cars and light trucks showed declines in the number of fatalities per 100,000 VMT between 1996 and 2006 (-26% and -12.7%, respectively), but the fatality rate for motorcycles increased by 79.1%.
In the United States, between 1997 and 2006, 90% of the motorcyclists killed in traffic collisions were males (8). During 1997 people under the age of 30 were the most common age group of motorcyclist fatalities (40.6%), but by 2007 nearly half of the motorcyclists killed (49.2%) were 40 and older (7). Nearly one-quarter of fatally injured motorcyclists were operating their vehicle with an invalid driver’s license.

Half of fatal motorcycle collisions in the United States involve collision with another vehicle (8). Among these, 78% were head-on collisions. Nationally during 2007, 36% of motorcyclists in fatal collisions were speeding, compared with 24% of passenger cars and 19% of light trucks (7). Motorcyclists involved in a fatal collision were more likely than other drivers to have a blood alcohol concentration (BAC) of 0.08% (27% vs. 23% for automobile and light truck drivers). In Washington State during 2007, 35% of motorcyclists killed in traffic collisions were legally impaired by alcohol or illegal drugs.
Motorcycle helmets are the primary safety device for motorcycle riders. However, helmets are estimated to be only 37% effective; that is, 37 of every 100 motorcyclists killed while not wearing a helmet would have lived had they been wearing one (7). Nationally, 41% of motorcyclists who were killed in a motor vehicle collision during 2007 were not wearing a helmet (7). In Washington State only 15% of motorcycle fatalities were not wearing a helmet in 2007; it is estimated that motorcycle helmets saved 35 lives in that year. Washington is one of only 20 states that require helmet use by all motorcyclists (both drivers and riders). Other states require only some motorcyclists (such as those younger than 18) to wear a helmet or have no helmet requirement at all. Rates of helmet use are lower in states that do not require all riders to use helmets. In 2006, 68% of motorcyclists in states requiring helmets wore helmets that were compliant with U.S. Department of Transportation rules, compared with 37% in states that do not require riders to use helmets (8).
The U.S. Department of Transportation has developed an action plan to reduce motorcycle fatalities (8). Key elements of this plan include the following:

- Conducting a comprehensive study of the factors involved in motorcycle collisions
- Developing national standards for novice motorcycle rider training programs
- Amending the Federal Safety Standard for motorcycle helmets to make it more difficult to falsify helmet certifications
- Distributing a brochure of official guidance on the design, construction, and maintenance of roadways to increase motorcycle safety to road planners, designers, and engineers
- Creating a training program to educate police on motorcycle safety and specific enforcement efforts that can reduce motorcycle collisions
- Marketing a “Share the Road” campaign kit for use by states, local communities, and motorcycle organizations.

Other initiatives seek to modify motorcyclists’ behavior that leads to collisions and to study and improve vehicle safety features such as advanced braking systems and making motorcycles more visible to other drivers.
MOTOR VEHICLE COLLISIONS

Impairment

Impairment of a driver by alcohol or psychoactive drugs was the most commonly cited factor contributing to fatal motor vehicle collisions in Washington during 2007 (9). The probability of involvement in a fatal motor vehicle collision increases significantly when the driver has a blood alcohol concentration (BAC) of 0.05% and increases even more when their BAC reaches 0.08% (10). Drivers with a very high BAC (0.15% or more) are at most risk of dying or being severely injured. Currently all states define legal impairment as driving with a BAC of 0.08% or greater. Driving under the influence of drugs is also considered impairment, but in these cases impairment is less well defined, as the effects of these drugs on driving ability are not understood as well as those of alcohol. Drugs such as marijuana and cocaine were involved in 18% of traffic fatalities nationally (11).

Nationally, the proportion of fatal motor vehicle collisions involving drivers who were impaired declined by 33% between 1982 and 1996 (12). There was little change in the following decade, but small declines in alcohol-related traffic fatalities occurred after 2006 (13). In the United States during 2007, about one third of fatally injured passenger vehicle drivers had a BAC of 0.08% or greater. Similarly, more than one third of the pedestrians killed by a motor vehicle (37%) had a BAC of 0.08% or greater. It is estimated that alcohol-related collisions cost more than $51 billion nationally (11). During 2007 alcohol was a factor in 40% of fatal collisions in Washington State and legally impaired drivers were involved in 34% of all traffic fatalities in the state (5). Nearly one quarter of Washington traffic fatalities (23%) during 2007 involved drivers with a BAC of 0.15% or greater (14).
In Snohomish County in 2007, 55.0% of all traffic fatalities occurred in collisions in which at least one driver was impaired by alcohol or drugs.

There was no discernable pattern in the proportion of traffic fatalities that involved an impaired driver in Snohomish County from 1998 through 2007.

In Washington State, the proportion of traffic fatalities that involved an impaired driver increased by 28.2% from 1998 through 2007 ($P = 0.001$). This increase was due to a decrease of 6.7% in the total number of traffic fatalities and an increase of 3.5% in the number of traffic fatalities involving an impaired driver.
MOTOR VEHICLE COLLISIONS

Impaired drivers were most often young males (15). In Washington State between 2004 and 2008, 83.7% of impaired drivers involved in a fatal collision were male and 42.6% were males between the ages of 16 and 30. Young drivers are more likely to be involved in fatal motor vehicle collisions when impaired because alcohol has greater cognitive effects in younger people than in older ones and because younger drivers lack experience that could somewhat mitigate their impairment (10,12).

In Washington State, half of the impaired drivers involved in fatal collisions were also speeding at the time, and almost one quarter of these drivers were distracted or inattentive at the time of the collision (15). Two thirds of impaired drivers killed in a motor vehicle collision were the sole occupant of their vehicle. Nearly two thirds of impairment-related fatalities (62.7%) occurred in rural areas. Impairment-related fatalities occurred most often on county roads (38.6%) and U.S. or state highways (33.7%).

Two thirds of impairment-related deaths (65.9%) occurred between 6:00 PM and 6:00 AM. More than half occurred during the weekend, between 6:00 PM Friday and 6:00 AM Monday. Nationally, 15% of drivers in fatal collisions during the week were alcohol impaired, compared with 31% on weekends. Alcohol-impaired fatalities occur most often during the summer months, with two of five impairment-related deaths occurring during the summer months of June, July, and August.

Drivers who are under the influence of drugs other than alcohol can also be considered impaired, but the criteria for determining impairment are vague and usually based on the judgment of the reporting officer. Impairing drugs include both legal and illegal products, including stimulants, sedatives, antidepressants, marijuana, and narcotic analgesics. Although the relationship between blood alcohol levels and impairment has been established, no such relationship has been defined for other psychoactive drugs (11). Predicting the effects of psychoactive drugs is difficult because of the large number of different drugs that need to be researched, the poor correlation between measured blood levels and impairment (many drugs persist in the bloodstream after their psychoactive effects wear off), and individual differences in the effects of drugs.
These factors are exacerbated by the possibility of drug interactions: many people who test positive for one drug also test positive for others (most commonly alcohol). A national survey of drivers in 2007 found that one in six nighttime drivers (16.3%) tested positive for some sort of illegal drug (16). The most commonly detected drugs were marijuana (8.6%), cocaine (3.9%), and methamphetamine (1.3).

Prevention

Preventing alcohol-impaired driving is already a high-priority concern for law enforcement, transportation, and public health officials. As previously noted on page 59, nationally there has been no significant change in alcohol-impaired fatality rates since 1996. Suggested ways of combating impaired driving include enhanced law-enforcement activity, legislation that addresses driving while impaired, public education, and technology.

Enhanced law-enforcement activities to deter impaired driving include increased traffic patrols specifically targeting impaired drivers and sobriety checkpoints. Sobriety checkpoints have been shown to reduce impaired-driver collisions by approximately 20% (11).

Legislation that defines impairment as 0.08% BAC, minimum legal drinking age laws, revoking the licenses of persons convicted of driving under the influence, and “zero tolerance” policies for drivers under the age of 21 have all been found to be effective deterrents to impaired driving. A systematic review of BAC laws found that lowering the definition of impaired from 0.1% BAC to 0.08% BAC resulted in a 7% reduction in the number of fatal collisions involving alcohol (11). A bill signed into law during 2000 mandated that states define 0.08% BAC as legal impairment or risk losing federal highway construction funds. By October 1, 2003, the District of Columbia and 45 states had complied.

Effective public education efforts include school-based programs aimed at teaching students not to ride with someone who has been drinking and intervention training programs for alcohol servers. Technological solutions include improving law enforcement’s ability to determine impairment at the scene of a collision (instead of having to take the suspect to a hospital or police station for testing) and preventing repeat driving under the influence (DUI) offenses. The oldest and best known example of the latter is the ignition interlock device, which essentially installs a breath-testing device in the DUI offender’s car. If the machine detects alcohol, it will not allow the vehicle to be started. Other systems are in development (17).
MOTOR VEHICLE COLLISIONS

Speeding
Speeding is one of the most commonly cited contributing factors in motor vehicle collisions (18). A collision is considered to be speeding related if the driver was charged with a speeding-related offense or if an officer indicated that racing, driving too fast for conditions, or exceeding the posted speed limit was a contributing factor. During 2007 speeding was a factor in 31% of collisions in the United States, and 13,040 people died in speeding-related collisions. In 2000 the cost of speeding-related collisions was estimated at $40.4 billion.

In Snohomish County during 2007, speeding was cited as a cause in 22.3% of all traffic collisions (6). Speeding was associated with more severe injuries in collisions: it was a factor in 47.5% of fatal collisions and in 35.7% of serious injury collisions. In Washington State during 2007, speeding was a factor in 39.8% of fatal collisions and in 26.1% of serious injury collisions. (Note: the Washington State data are different than the data on page 52 because of variations in the original data source.)
In Snohomish County during 2007, speeding was cited as a cause in nearly half of all traffic fatalities.

In Snohomish County from 1998 through 2007, there was no discernable pattern in the percent of motor vehicle collision mortality involving speeding.

In Washington State, the proportion of deaths involving speeding did not change significantly from 1998 to 2007.

**Prevention**

The National Highway Traffic Safety Administration (NHTSA) recommends that states develop and implement comprehensive highway safety programs. Such programs should include a comprehensive speed management program that encourages people to comply with speed limits voluntarily. To be effective, such programs should coordinate engineering, enforcement, and education efforts at the local level (19).
MOTOR VEHICLE COLLISIONS

Distraction

It is estimated that nearly 6,000 people die nationally each year in collisions involving a distracted or inattentive driver, and more than half a million are injured. Inattention of the driver to the task of driving was the fourth most commonly cited factor in motor vehicle collisions in Washington State during 2007, being cited 7.2% of the time (6). Distraction of the driver by various agents (e.g., other passengers, electronic devices, smoking) was a factor in 7.0% of collisions. Distraction has gained the public’s attention because of the increasing number of drivers who are attempting to use electronic devices while driving and several high-profile cases where distraction led to loss of life. Cell phones being used for talking or texting are the most frequent electronic distractions to drivers, although driver use of video games, iPods, Blackberries, and GPS (global positioning system) devices are equally distracting. Although the public’s focus has been on electronic distractions lately, these represent a relatively small proportion of the general problem of distraction. Driver inattention comes in many forms (from other people in the car, roadside distractions, eating, and so forth) that are equally dangerous (20).

Nationally, distraction has increased as a factor in motor vehicle collisions. During 2004 it was cited as a factor in 11% of collisions, but by 2007 it was a factor in 14% of collisions. It also increased from 12% to 15% as a proportion of fatal collisions (21). An additional consideration is that distraction is generally accepted as being underreported in motor vehicle collisions because it is often impossible to re-create exactly what happened at the time of the collision (22).

In an observational study by the NHTSA during 2007, approximately 6% of drivers were seen to be using a hand-held cell phone (23). An additional 1.3% of drivers were wearing a visible cell phone headset or were manipulating handheld devices. Drivers between the ages of 16 and 24 were the most likely to be observed using a hand-held cell phone (9%); drivers aged 70 and older were the least likely (1%). Drivers with no passengers, or whose passengers were younger than age 8, were more likely to be observed using a cell phone than drivers who had a passenger age 8 or older. Similar results were obtained for the use of cell phone headsets and other electronic devices.
Distracted Driving Prevention

Developing effective countermeasures for distracted driving is hampered by difficulties in defining, observing, and measuring driver distraction. Many of these difficulties arise from the nearly infinite variety of ways in which drivers can become distracted and because distracted driving is often a societal issue, resulting in part from lifestyle patterns and choices. For example, if it is socially acceptable to use a cell phone while driving, then it may be difficult to influence this behavior.

Behavioral strategies to reduce distracted driving include attempting to remove underlying causes and promoting awareness of the risks. Graduated driver’s license programs may have an impact on driver distraction by limiting the number of passengers and prohibiting cell phone use by drivers with learner’s permits, provisional licenses, or drivers under age 18. Forbidding such potential distractions from the vehicles of younger drivers allows them to develop their driving skills so that later they will be better able to handle emergencies that develop because of distraction (21).

Since 2008 Washington has been one of the few states in the nation that bans the use of handheld cell phones while driving and was the first to ban texting (23). These laws put Washington ahead of other states in preventing collisions because of distraction. However, these laws have not been in effect long enough to determine their efficacy. A similar law was implemented in New York State, but it only reduced driver cell phone use for 18 months, after which time use returned to its former level (21).

Other than cell phone laws, no other laws explicitly address driver distraction. However, reckless driving laws implicitly prohibit driving while significantly distracted (21). No studies have evaluated whether such laws affect distracted driving. It is expected that such laws will have little or no effect unless they are vigorously publicized and enforced.

Continued
MOTOR VEHICLE COLLISIONS

Distracted Driving Prevention Continued

Technological strategies for reducing collisions caused by driver distraction include making roadways safer by installing center-line and shoulder rumble strips (which make the driver aware that they are drifting out of their lane) and improving interfaces for in-vehicle systems that are potential distractions (e.g., radio, heater). One problem identified with making human-machine interface systems more “user friendly” and less distracting is that drivers then tend to use these systems more, thus increasing their exposure to risk. Other technological solutions to distraction include technologies that monitor driver performance or control their use of distracting devices like cell phones. For example, Volvo has introduced a system that delays incoming calls if the driver is busy, and Toyota will equip at least one model with a camera that detects whether the driver is looking ahead when the radar detects a potential collision; if not, it warns the driver (21).

Seat Belt, Safety Devices and Child Seat Use

Seat belts are the most commonly installed personal safety device in vehicles. The NHTSA estimates that in the United States seat belts saved more than 15,000 lives in 2007 and that failure to use an available seat belt resulted in approximately 5,000 deaths that year (24). Seat belts reduce the risk of death for an occupant of the front seat by about 45% (25). The NHTSA estimates that in Washington State during 2007, 264 lives were saved by seat belts and an additional 24 lives could have been saved if available seat belts had been used (25).

Seat belt use is measured by the National Occupant Protection Use Survey, which observes the use of seat belts by actual drivers on the road (26). In 2007, seat belt use was estimated at 82% nationally, but in Washington State use was 96.4% and in Snohomish County it was 97.3% (26,27). This is due mainly to Washington’s primary enforcement seat belt law, which gives law enforcement the right to pull over and cite a driver if anyone in the vehicle is observed not to be wearing a seat belt. During 2007 seat belt use in states with a primary enforcement law averaged 87%, compared with 73% use in states with only secondary enforcement laws (26).
Observed seat belt use increased by almost 40% in Snohomish County, from 69.6% in 1991 to 97.3% in 2007.

Seat belt use in Snohomish County was generally higher than the statewide average from 1991 through 2001, but after that year the rates for county and state were similar.

The increasing use of seatbelts from 1991 through 2001 was mainly the result of public education efforts. The sharp increase in 2002 was due to the passage of Washington’s primary enforcement law for seat belts during that year.

A survey of Snohomish County adults in 2006 found that 97.8% of Snohomish County adults said that they always or nearly always used seatbelts (28).

During 2007, 47.6% of motor vehicle collision fatalities in Snohomish County were people not using an available seat belt. Although this was lower than the 55% observed in 1998, it is not a significant change over time.

In Washington State, the proportion of traffic fatalities who were not wearing seat belts decreased from 59.8% in 1998 to 41.8% in 2007. This decreasing trend was statistically significant ($P = 0.0001$).
A study by the Washington Traffic Safety Commission in 2005 attempted to identify characteristics of the 5% of drivers who do not use seat belts (29). This study compared data on drivers cited for failure to wear a seat belt with data on drivers cited for all other reasons. It found that drivers who did not wear their seat belt tended to be male, were older than those cited for other reasons, and had a poor driving history. They were 2.5 times more likely to have a prior citation for not wearing a seatbelt than others and were also more likely to have prior citations for DUI and insurance or registration infractions. They were more likely to be driving a pickup truck, and their vehicles were more likely to be older models (made before 1990).

Data on the use of child seats are available only for the United States as a whole. In 2007 an observational survey by the NHTSA found that 89% of children under the age of 8 were in a safety seat, in a booster seat, or using a seatbelt (29). This was significantly higher than the 2006 result of 84%. Child restraint use was greatest in the western states, where 94% of children were observed to be in a restraint device (30). Use of child restraints was highly correlated with seat belt use by the driver. In cars where the driver was using a seat belt, 92% of children were in a child seat compared with only 61% in cars where the driver was not using a seat belt.

There is evidence that car seats are not as effective as they should be because many parents install them improperly. An NHTSA study in 2002 found that 72.6% of child restraint systems were misused or improperly installed (31). The most common problems were loose straps securing the child to the seat and loose safety belt attachment around the child seat. Misuse of car seats results from frequent upgrades and design changes to both car seats and vehicles and a perpetual supply of new parents who have no previous experience using car seats. Periodic monitoring of car seat installation is recommended, as are education programs for new users and enforcement of laws requiring the use of child restraint systems.
**Sources of Information**


**Motorcycles**


**Impairment**


**Speeding**


**Distraction**

Sources of Information

Restraints

Unintentional falls were the fourth leading cause of death from injury in Snohomish County from 2003 through 2007, accounting for one in six injury deaths. During this period falls were the leading cause of injury-related hospitalizations, with four times as many admissions as for the next most common injury-related cause, motor vehicle crashes. These data reflect those at the national level and in Washington State (1).

Falls can result in bruises, head trauma, and fractures. Fractures were the most common and the most costly type of nonfatal, fall-related injury. Nationally, only one third of fall-related injuries were fractures, but they accounted for 61% of all fall-related medical costs. Nonfatal fall injuries in older adults are associated with decreased functioning and loss of independence, leading to significant use of health services (2). It is estimated that fall-related medical expenditures in the United States exceeded $19 billion in 2000. These costs are expected to rise to $55 billion by 2020 (3).

Falls are particularly troublesome for older adults because their bones are more brittle, and they have less muscle mass than younger adults. Among older adults, falls are the leading cause of injury-related death in the United States. One in three adults 65 or older falls each year. The risk of incurring serious injury from a fall increases with age. In 2001 the rate of fall injuries for adults 85 and older was four times that of adults 65 to 74. The most common and costly fall injuries are traumatic brain injury (TBI) and injuries to the hips, legs, and feet. In 2001 these types of injuries accounted for 78% of all fall fatalities and 79% of all costs. Injuries to internal organs (including TBI) caused 28% of fall fatalities and 29% of costs. People 75 and older who fall are four to five times more likely than others to be admitted to a long-term care facility for a year or longer (4).
The fall mortality rate in both Snohomish County and Washington State more than doubled from 1990 through 2007, from 5 deaths per 100,000 to 11 per 100,000. This increase was statistically significant ($P = 0.001$).

The fall mortality trend in Snohomish County was similar to that of Washington State.
FALLS

Figure 5.2 Age-Adjusted* Fall Mortality Rates by Demographic Factors Snohomish County (n = 280), 2003-2007

- Falls killed an average of 56 people in Snohomish County each year from 2003 to 2007.
- The fall mortality rate in Snohomish County was similar to the rate for Washington State.
- Males were more likely than females to die of a fall ($P = 0.001$). However, females were more likely than males to be hospitalized for a fall (see Figure 5.6).
- The fall mortality rate increased with age, with a large increase in mortality beginning at the age of 65 ($P = 0.001$). Four fifths (83%) of fall deaths occurred in people aged 65 and older. Nearly half (45%) occurred to people 85 and older.
- No analysis was possible by race or ethnicity because there were not enough deaths to calculate reliable rates.
- Fall mortality rates did not differ by HPA (not shown).

*Age-adjustment does not apply to age groups.
**Numbers too small to calculate a reliable rate.
Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
There were significant differences in the locations where fatal falls occurred for victims younger than age 65 and those 65 and older.

- Nearly half (45%) of fatal falls to people younger than age 65 occurred in the home. Among older adults, three of five fatal falls (61%) occurred in the home.
- The second most common places for a fatal fall to occur were public places for victims younger than age 65 and nursing homes for those 65 and older.

Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
In Snohomish County, falls caused approximately 1,700 people to be hospitalized each year from 2003 through 2007. The hospitalization trend for falls in Snohomish County was generally similar to that in Washington State.

Fall-related hospitalization rates decreased from 355 admissions per 100,000 people in 1990 to 285 per 100,000 during 1997 ($P = 0.0002$). After 1997, hospitalization rates increased to 319 admissions per 100,000 in 2007, but this increase was not statistically significant. The decrease between 1990 and 1997 occurred in people under the age of 65 (not shown). There was no corresponding decrease among adults 65 and older.
The rate of fall hospitalizations in Snohomish County was similar to the rate for Washington State.

Females were significantly more likely than males to be hospitalized for a fall ($P < 0.0001$), mainly because of their longer lifespan. Most people hospitalized for a fall were older adults, and most older adults were women.

Rates of hospitalizations from falls increased significantly with age. People age 65 and older were 30 times more likely to be hospitalized because of a fall than were those under age 25. People over the age of 85 were seven times more likely to be hospitalized because of a fall than those between 65 and 74.

In Snohomish County from 2003 through 2007, the average length of stay of a hospitalization for a fall was 3.7 days with an average charge of $23,236$ (not shown).
FALLS

Figure 5.7 Fall Hospitalization Rates* by Health Planning Area (HPA)
Snohomish County (n = 8,381), 2003-2007

*Rates are age-adjusted per 100,000 people.
Data source: Washington State Comprehensive Hospital Abstract Reporting System.

- The South Everett HPA had a higher rate of hospital admissions for falls than the county average ($P = 0.002$).
- The Lake Stevens HPA experienced a lower rate of hospital admissions for falls than the county average ($P = 0.0001$).
- None of the other HPAs had fall mortality rates that were significantly different from the county average.
Older adults can take steps to reduce their risk of falling (1). These include the following:

- Exercise regularly to improve strength and balance.
- Ask their doctor to review their medications to reduce side effects and interactions that can lead to dizziness or disorientation.
- Have their eyes checked annually.
- Improve the lighting in their home.
- Reduce hazards in the home (like clutter and rugs) that can lead to falls.

Sources of Information

6. SUFFOCATIONS

Suffocation is the process of being asphyxiated (1). Asphyxiation is a condition of severely deficient oxygen supply to the body that arises from being unable to breathe normally. An example of asphyxia is choking. Asphyxia causes generalized hypoxia (a state of receiving insufficient oxygen), which primarily affects the tissues and organs. Like drowning, suffocation can cause permanent brain damage to those who survive the experience.

Suffocation is the fourth leading cause of unintentional injury death in the United States (2), causing approximately 4,700 deaths each year (3). It is the leading cause of unintentional injury death for infants (4). In Snohomish County, suffocation is the fourth leading cause of unintentional injury death, causing approximately eight deaths per year in the county. It causes an additional 74 people to be hospitalized each year, and it caused three quarters of unintentional injury deaths among Snohomish County infants from 1998 through 2007.

Infants are particularly susceptible to suffocation because of their tendency to experience new objects by putting them in their mouths (4). They can also suffocate in pillows and soft bedding. Recent research suggests that 30% of deaths defined as sudden infant death Syndrome (SIDS) are actually attributable to suffocation by soft bedding. Older adults are also at increased risk of choking to death because of their high use of sedative drugs, diseases that affect coordination or mental function, and difficulties chewing (5).
Although Snohomish County’s mortality rate from suffocation declined by 33% between 1990-1991 and 2006-2007, this change was not statistically significant.

Washington State showed no significant change in the suffocation mortality rate between 1990 and 2007.

Snohomish County’s suffocation mortality trend was generally similar to Washington between 1990 and 2007.
SUFFOCATIONS

Figure 6.2 Age-Adjusted* Suffocation Mortality Rates by Demographic Factors
Snohomish County (n = 42), 2003-2007

- The suffocation mortality rate in Snohomish County was similar to Washington State from 2003 through 2007.
- There was no significant difference between the suffocation mortality rates of males and females.
- Suffocation mortality rates were generally low in younger age groups. The incidence of suffocation increased greatly among people age 65 and older. People 65 and older were 10 times more likely to suffocate than children younger than 15.

*Age-adjustment does not apply to age groups.
**Numbers too small to calculate a reliable rate.
Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
Suffocation is not a leading cause of injury hospitalizations. Most choking victims who reach a hospital are handled by the Emergency Department and do not require admission (6). However, for every choking-related death, there is an average of nearly 20 nonfatal choking and suffocation injuries that require medical care and/or result in missing days of work or school (3).

**Figure 6.3 Age-Adjusted Suffocation Hospitalization Rates**

Snohomish County & Washington State, 1990-2007

- There was no significant change in the rate of suffocation-related hospital admissions in Snohomish County from 1990 through 2007.
- Washington State experienced a 35% increase in the rate of hospital admissions for suffocation-related injuries between 1990 and 2002 \((P < 0.001)\). After that there was no significant change in the rate.

Suffocations

Figure 6.4 Age-Adjusted* Suffocation Hospitalization Rate by Demographic Factors Snohomish County (n = 158), 2003-2007

- Snohomish County’s rate of suffocation-related hospitalizations was similar to Washington State.
- Males had a higher suffocation hospitalization rate than females, but this difference was not statistically significant.
- Hospitalizations for suffocation-related injuries varied by age, with people 65 and older being the most likely to be admitted.

*Age-adjustment does not apply to age groups.
**Numbers too small to calculate a reliable rate.
Suffocation Risk Factors & Prevention

As already described, the main risk factor for death by suffocation is choking on food or some other foreign object that is blocking the airway. Infants and the elderly are the most at risk for this happening. Therefore, preventive resources should be targeted toward these high-risk groups.

Choking in children can be prevented by mandating that children’s products conform to safety standards set down by the U.S. Consumer Product Safety Commission (7). In addition, public awareness and education campaigns can be targeted toward parents and caregivers. These campaigns should stress avoiding soft material or bedding in the infant’s sleeping environment, placing infants on their backs for sleeping, avoiding overheating or bundling infants, not sharing a bed with an infant, and keeping small objects out of the reach of young children.

Older adults can avoid choking by not eating just after waking or when compromised by alcohol, selecting and preparing food with appropriate texture and size, using appropriate utensils, maintaining proper posture while eating, ensuring good denture fit, reducing environmental distractions, and maintaining strength and flexibility in the muscle groups associated with eating (5,7). In addition, caregivers are encouraged to know the Heimlich maneuver for dislodging pieces of food that have become stuck.

Sources of Information
7. DROWNINGS

Drowning is defined by the World Health Organization as “the process of experiencing respiratory impairment from submersion or immersion in liquid” (1). Drowning begins when a person panics or struggles, followed by submersion with breath-holding. Loss of consciousness can begin within three minutes of being underwater. Brain damage may occur if the brain is deprived of oxygen for more than six minutes. Oxygen deprivation may also cause the heart to go into an irregular rhythm that interrupts blood flow throughout the body. People who are drowning are often unable to call for help because they are expending all their energy to breathe or to keep their head above water or because their airway goes into a spasm as water enters the respiratory system, making it difficult to cry out.

Nationally, more than one in four drowning deaths is a child younger than 15 (2). Drowning accounts for one quarter of all unintentional injury deaths in this age group. Most drowning deaths of children in the first year of life occur in bathtubs, buckets, or toilets because these children are not coordinated enough to get out of these places by themselves (1). Between the ages of 1 and 4, most deaths occur in residential swimming pools. Children between 5 and 14 are most likely to drown in lakes, ponds, rivers, and oceans. People older than 15 usually drown because their swimming ability is impaired by alcohol or drug use.

Nonfatal drowning incidents can produce severe brain damage that causes long-term memory problems, learning disabilities, or permanent loss of basic functioning (i.e., a permanent vegetative state) (3). The lifetime cost of long-term care for the victim of a submersion incident who has suffered brain damage can be more than $4.5 million. Individuals who survive a near drowning should be evaluated by a health care practitioner because manifestation of complications may be delayed and might not be noticed until several hours after the drowning episode (1).

Drowning kills about eight Snohomish County residents every year. Drowning was the fifth most common type of unintentional injury death in Snohomish County from 2003 through 2007.
Snohomish County’s drowning mortality rate declined from 3 deaths per 100,000 in 1990-1991 to 1 death per 100,000 in 2006-2007, but the overall trend was not significant. This was probably due to the small number of cases.

The rate of drowning mortality in Washington State declined significantly from 1990 to 2007, from 1.8 deaths per 100,000 to 1.4 per 100,000 ($P = 0.01$).

Snohomish County’s drowning mortality trend was similar to that of Washington State between 1990 and 2007.

Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
Snohomish County’s drowning mortality rate was similar to Washington State. Males were four times more likely to drown than females ($P < 0.001$). Drowning deaths were most common in people between the ages of 15 and 24 and those over the age of 64. However, neither of these groups was significantly different from the overall average for Snohomish County. No analysis by race was possible because of the small number of cases involved.
Hospital admissions for injuries suffered in a drowning incident are relatively rare. Most drowning incidents result in death or a visit to a hospital ED. In Snohomish County between 2003 and 2007, there were 43 deaths from drowning, but only 21 admissions to hospital.

**Figure 7.3 Age-Adjusted Drowning-Related Hospitalization Rates Snohomish County & Washington State, 1990-2007**

- The drowning-related hospital admission rate in Snohomish County decreased by 77% between 1990-1991 and 2006-2007 ($P < 0.001$).
- Admissions for drowning-related injuries declined in Washington State from 2 admissions per 100,000 in 1990-1991 to 1 admission per 100,000 in 2006-2007 ($P < 0.001$).
- Snohomish County’s hospital admission trend for drowning-related injuries was similar to that of Washington State between 1990 and 2007.
The rate of drowning-related hospital admissions in Snohomish County was similar to Washington State.

Although males had a higher rate of hospitalizations for drowning-related injuries than females, this difference was not statistically significant.

Hospitalization rates for drowning-related injuries in people younger than 25 were four times higher than for people between 25 and 64 ($P < 0.0001$).
Drowning Risk Factors

Drowning deaths result from a number of risk factors, including the water itself, the environment, supervision, provision of safety equipment, and education. Most drowning deaths occur within a short distance of safety and could be prevented (1).

For children younger than age 5 and people with seizure disorders, the greatest risk factor is lack of adult supervision (3). Infants and people prone to seizures are most likely to drown in the bathtub, whereas children aged between 1 and 4 are most likely to die in a residential pool. Young children who drowned in pools were most often at home under the care of one or both parents and had been out of sight for less than 5 minutes (2). A major risk factor for young children is lack of barriers around all four sides of a home pool, making it easy for them to access the pool and drown in it (3). Although lifeguards provide effective supervision at public pools and beaches, they cannot replace the supervision of a parent because they are usually responsible for several dozen people at a time in a public swimming area.

Failure to use personal floatation devices (PFDs) is a risk factor for people in small boats. In the United States during 2004, 90% of boating-related fatalities involved victims who were not wearing a PFD (2). In the 2006 Washington State Healthy Youth Survey, only 41% of Snohomish County students who had ridden in a small boat said that they always wore a PFD (3).

Alcohol use while engaged in water recreation activities is a major risk factor for drowning (1,2). Alcohol use is involved in between 30% and 70% of adolescent and adult deaths associated with water recreation (3). Alcohol influences balance, coordination, and judgment, and its effects are heightened by sun exposure and heat. One study found that 50% of the decline in unintentional drowning deaths in King County between 1975 and 1995 was due to less use of alcohol around water (4). Environmental factors like cold or dark water, riptides, and fast-moving currents are all risk factors for drowning. These difficult water conditions become even more dangerous when combined with adverse weather conditions.
DROWNINGS

Drowning Prevention

To date, only pool barriers (i.e., isolation fencing) has been shown to be an effective method of preventing drowning (3). Fencing around all four sides of a pool has been shown to be more effective than three-sided fencing with the house on the fourth side because this latter arrangement still allows access to the pool through the house. Isolation fencing is required by Appendix G of the International Residential Building Codes for Washington State, but this was adopted in 2003, so only pools built since that date can be expected to be compliant.

Public policy and regulations can promote water safety through boating laws; pool, water park, and bathing beach regulations; and enforcement of the building codes described. In addition, safety at public bathing beaches would be improved by the development of Washington Administrative Code rules pertaining to such beaches. A further water safety measure would be the adoption of a risk management program recommended by Washington State Parks that includes drowning prevention training for rangers, restoration of the lifeguard program at selected bathing beaches, and giving Washington State Parks the authority to close dangerous waters that are under its jurisdiction.
Drowning Prevention Continued

Other preventive measures include promoting the close supervision of children in and around bodies of water, by both adults and lifeguards, and promoting the use of life jackets. Alcohol use in and around the water can be discouraged through education and enforcement of current “boating under the influence” regulations.

Public education about drowning risk factors can dispel inaccurate beliefs, such as the belief that air-filled toys are safety devices and that swimming lessons are sufficient to prevent drowning deaths in small children (5). Such education should be tailored to different cultural, racial, and age groups. Finally, the establishment of standardized drowning investigation procedures would improve data collection efforts, which in turn would lead to a better understanding of the risk factors involved in drowning deaths.

Sources of Information

8. INTENTIONAL INJURIES

Intentional injuries are those that are purposefully inflicted by a person on either themselves (suicide) or another person (assault and murder). Another term for intentional injury is violence. Violence caused 51,873 deaths in the United States during 2006, or 2.1% of all deaths (1). It was the ninth leading cause of death in that year. It is estimated that violent deaths cost the country more than $52 billion in medical care and lost productivity every year (2). Victims of violence can experience not only physical injury but adverse mental health consequences like depression and anxiety. Indirect physical consequences may include cardiovascular disease, substance abuse, and suicide attempts (3).

Within the past 15 years, violence and intentional injuries have increasingly been recognized to be public health issues (3). Unfortunately, applying public health interventions to the problem of violence has been hampered by incomplete data on the circumstances surrounding violent deaths (5). The data on these deaths tend to be fragmented and difficult to reconcile. For example, a death certificate may provide information on the victim of a homicide, but information about the perpetrator would more likely be found in a police report of the incident.

In 2002 the Centers for Disease Control and Prevention (CDC) established the National Violent Death Reporting System (NVDRS) to address the lack of a coordinated data system about violent deaths (2). Its ultimate goal is to provide communities with a clearer understanding of violent deaths so they can be prevented. Data about the victim, mechanism of injury or death, circumstances, and suspects can be used to understand the potential and limitations of violence prevention efforts (6). As of 2008 the NVDRS was active in 17 states. Unfortunately, Washington was not among those states.
Between 2003 and 2007, 465 Snohomish County residents died of intentionally-inflicted injuries, or 93 each year. This represented more than one quarter of Snohomish County’s fatal injuries (26.8%) for which intent could be determined. Most intentional injury deaths (82.4%) were suicides.

**Figure 8.1 Age-Adjusted Intentional Injury Mortality Rates**
Snohomish County & Washington State, 1990-2007

- Snohomish County’s violent injury mortality rate declined by 23.7%, a significant decrease ($P < 0.001$).
- Washington State experienced a significant decline of 16.5% in violent injury mortality ($P = 0.005$).
- Snohomish County had a violence mortality trend that was similar to Washington State’s from 1990 through 2007.
Snohomish County’s intentional injury mortality rate was significantly lower than Washington’s ($P = 0.0025$).

Males were more than three times as likely as females to die of intentional injuries ($P < 0.001$).

Intentional injury mortality rates generally increased with age ($P < 0.001$).

There were no significant differences between the rates of intentional mortality by race. Although blacks had the highest rate of intentional injury mortality, they were not significantly different than other races.

Hispanics had a rate of intentional injury mortality that was similar to non-Hispanics.
In both Snohomish County and Washington State from 2003 through 2007, approximately one fifth of injury deaths resulted from violence.

The proportion of homicides to suicides was highest in people between the ages of 15 and 24 ($P < 0.0001$).

Violence accounted for a smaller proportion of injury deaths among people age 65 and older than among younger age groups ($P < 0.001$).

Blacks had a higher ratio of homicides to suicides than other races ($P = 0.006$).

Asians and Pacific Islanders also had a higher proportion of injury deaths resulting from violence than other races ($P = 0.002$).

Hispanics had a higher ratio of homicides to suicides than non-Hispanics ($P < 0.001$).
Snohomish County’s rate of violence-related hospitalizations fell by 50% from 1990 through 1998, from 87 admissions per 100,000 to 47 admissions per 100,000 ($P < 0.001$). From 1998 to 2007, the rate increased by 35.3%, from 47 admissions per 100,000 residents to 59 admissions per 100,000 ($P = 0.001$).

Washington State’s rate of violence-related hospitalizations declined by 19.4% from 1990 through 1998 ($P < 0.001$). The rate of violence-related hospital admissions in Washington State increased by 4% from 1998 through 2007 ($P = 0.001$).

Snohomish County had lower rates of violence-related hospitalizations than did Washington State from 1990 through 2007.

Snohomish County had a significantly lower rate of intentional injury hospitalizations than did Washington State ($P < 0.001$).

Males had a higher rate of hospital admissions for intentional injuries than females, but this difference was not statistically significant.

Age was significantly associated with intentional injury hospital admissions ($P < 0.001$). Rates were lowest for residents younger than 15 and highest for those between 15 and 24. Admissions for intentional injuries declined after the age of 24.
Figure 8.6 Age-Adjusted* Intentional Injury Hospitalizations as a Proportion of Total Injury Hospitalizations by Demographic Factors
Snohomish County (n = 2,132), 2003-2007

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<tr>
<td>Females</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

*Age-adjustment does not apply to age groups.


- Snohomish County had a lower proportion of intentionally inflicted injury hospitalizations than did Washington State ($P < 0.001$).
- Males had a higher proportion of intentional injury hospitalizations than did females ($P < 0.001$).
- Males had a much higher proportion of intentional injury hospitalizations that were assaults than did females ($P < 0.001$).
- Intentional injuries decreased as a proportion of injury hospitalizations after age 24 ($P < 0.001$).
- People between the ages of 15 and 24 had the highest proportion of intentional injury hospitalizations ($P < 0.001$) and the highest proportion of intentional injuries that were assaults ($P < 0.001$).
Intentional Injury Prevention

As noted, each episode of violence tends to be unique in many ways. The individuality of each act of violence suggests that such incidents are not amenable to public health interventions (2). The lack of specific data about such incidents (see page 95) makes planning such programs difficult. However, there are opportunities for violence prevention at the population level.

Evidence shows that childhood experiences of violence predispose individuals to intimate partner and other types of violence (7,8). Programs to prevent such childhood experiences can prevent future violence. This option is preferable to attempting to re-educate violent offenders who are in prison because it prevents youths from growing up with a tendency toward violence. Cognitive-behavioral therapy with violent offenders in prison has been shown to prevent recidivism, but such programs are limited in effectiveness, largely because of individual differences among violent offenders (9).

Suicide prevention requires a different approach. Because suicide is usually an attempt to solve unique personal difficulties, population-based interventions to prevent it suffer from the same problems as preventing interpersonal violence. Suicide prevention of individuals is most effectively performed by those close to the person at risk, who can judge their situation, mood, and signs of suicidal ideation. Although some population-based interventions have been developed, their effectiveness has not yet been proven (5).

Sources of Information
9. SUICIDES

Worldwide, more people die of suicide than die from all wars and homicides combined (1). However, more people attempt suicide than succeed, and they are often seriously injured and require medical care (2). Suicide also leaves a large emotional, and sometimes financial, burden on the surviving families and friends of the victim. A failed suicide attempt can leave the victims with disabilities that they will carry for the rest of their lives.

Although suicide is a complex behavior with no single determining cause, it is most often the end result of untreated major depression. Depression is the most prevalent mental health disorder. It is estimated that 9.5% of Americans suffer from a depressive illness in any given year. Treatment of depression is effective 60% to 80% of the time (4), but only about half of Americans diagnosed with major depression in a given year receive treatment for it, and only about one fifth receive treatment consistent with current practice guidelines (5). Untreated depression often leads to co-morbid conditions such as alcohol and substance abuse (4).

The risk of suicide in people with major depression is about 20 times that for the general population (4). Seven percent of men and 1% of who are diagnosed with depression will commit suicide. People who experience multiple episodes of depression, or who are substance dependent in addition to being depressed, are at even greater risk of committing suicide.

The risk of a suicide attempt varies by sex and age (6). Among adults age 65 and older, there are four attempts for every completed suicide. However, suicide attempts occur most often between the ages of 15 and 24, when there are approximately 100 to 200 attempts for every completed suicide. Nationally, suicide was the third leading cause of death in this age group during 2006 (7). The 2006 Washington Healthy Youth Survey found that 16.9% of Snohomish County 10th graders had seriously considered attempting suicide in the previous year, and 4.6% had actually attempted to kill themselves.
Males take their own lives at approximately four times the rate of females, but three times as many females as males attempt suicide (6). This is because males usually use more effective methods. Nationally, more than half of male suicides used a firearm, whereas females were more likely to use poison, which takes longer to work and allows for the possibility of intervention. Men are most likely to commit suicide after the age of 75, whereas women are most likely to commit suicide between the ages of 45 and 64.

Nationally, suicide was the 11th leading cause of death during 2006 (6). More than 33,000 suicides occurred nationally that year. From 2003 through 2007, suicide was the ninth leading cause of death in both Snohomish County and Washington State. It was the second leading cause of fatal injuries in the county. Approximately 77 people took their own lives each year, and more than 300 were hospitalized for injuries sustained in an attempt to commit suicide.
S U I C I D E S

Figure 9.1 Age-Adjusted Suicide Mortality Rates
Snohomish County & Washington State, 1990-2007

- Snohomish County’s suicide rate declined by 31% from 1990 through 2007 ($P = 0.008$).
- The suicide rate in Washington State decreased by 9% from 1990 through 2007 ($P = 0.003$). Suicide rates in Washington were generally higher than the national average (10.9 deaths per 100,000 residents in 2006, $P < 0.0001$).
- The suicide trend in Snohomish County was generally similar to that of Washington State.

Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
Figure 9.2  Age-Adjusted* Suicide Mortality Rates by Demographic Factors Snohomish County (n = 383), 2003-2007

- The rate of mortality from suicide in Snohomish County was similar to that of Washington State from 2003 through 2007.
- Males were three times more likely to commit suicide than were females ($P < 0.001$).
- Suicide rates generally increased with age. The incidence of suicide was highest among people aged between 45 and 64 because female suicides peak in that age group.
- Men 65 years and older had the highest suicide rate of all at 32 deaths per 100,000 (not shown).
- No race had a suicide rate that differed significantly from the average for Snohomish County.
- The suicide rate of Hispanics was not significantly different from that of non-Hispanics.

*Age-adjustment does not apply to age groups.
**Numbers too small to calculate a reliable rate.
Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
The East County HPA had a higher suicide rate than the county average ($P = 0.007$).

No other HPA had a suicide rate that differed significantly from the county average.
Three methods (suffocation, poisoning, and use of a firearm) accounted for 91% of suicides in Snohomish County from 2003 through 2007.

Firearms were used by slightly more than half of men who committed suicide. Less than one third of women who committed suicide used a gun. During 2004 firearms were kept in 32.6% of Snohomish County households.

Roughly one quarter of suicides died of asphyxiation. Men and women were equally likely to use this method of self-destruction.

Females were twice as likely as men to use poison to commit suicide.

The most commonly occurring types of suicide included in the “Other” category were cutting or piercing (n = 7) and jumping or falling (n = 6).

Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
**SUICIDES**

Figure 9.5 Age-Adjusted Suicide-Related Injury Hospitalization Rates
Snohomish County & Washington State, 1990-2007

- Hospital admissions for suicide-related injuries in Snohomish County declined by 54% from 1990 through 1998 ($P < 0.001$). From 1999 through 2005, admissions increased by 79% ($P = 0.003$). The rate began falling again in 2006, but it is too early to tell whether this signifies a substantial change or is just random fluctuation.

- Washington State experienced a similar trend, with declining admission rates from 1990 through 1999 ($P = 0.001$), followed by an increase after that year ($P = 0.006$).

- Snohomish County generally had lower rates of hospital admissions for suicide-related injuries than Washington from 1995 through 2007.

Snohomish County had a significantly lower rate of hospital admissions for suicide-related injuries than did Washington ($P < 0.001$).

- Females had a higher rate of hospital admissions for suicide-related injuries than did males ($P < 0.001$).
- Hospital admissions for suicide-related injuries were rare in people younger than 15 but were most common in people aged between 15 and 24.
- Females between age 15 and 24 had the highest rate of hospitalizations for suicide-related injuries, with 98 admissions per 100,000 (not shown).
The North Everett HPA had a suicide hospitalization rate that was significantly higher than the county average ($P < 0.0001$).

The Lake Stevens, Monroe-Snohomish, and Mill Creek-Bothell HPAs had suicide hospitalization rates that were significantly lower than the county average ($P = 0.001$, $P = 0.025$, and $P < 0.0001$, respectively).
Suicide Risk Factors

Risk factors for suicide can be divided into two kinds: chronic factors that predispose the individual toward suicide over the lifespan and acute factors that increase risk in the near-term (8). Suicides usually occur when acute factors combine with chronic ones to push the victim “over the edge.” Environmental factors, such as the availability of a firearm or poisonous materials, can contribute to a suicide by making the act easier to accomplish (9).

Some chronic factors are permanent and not modifiable, whereas others are potentially modifiable (8). Chronic factors that cannot be changed include demographics, family history, and personal history. Demographic factors that increase the risk of suicide include being white or American Indian, male, older, or widowed at an early age. Family-related factors include a history of suicidal behavior in the family and a history of parental violence, substance abuse, divorce, or psychiatric hospitalization. A personal history that includes a previous suicide attempt or self-harming behavior, trauma or abuse, frequent mobility, and violent or impulsive behavior predispose a person toward suicide. Although these factors cannot be changed, they can help to identify persons at risk, thus enabling targeted interventions.

Chronic factors that are potentially modifiable include psychiatric disorders, medical conditions, and personal characteristics. The presence of a major Axis I psychiatric disorder, such as mood or anxiety disorders, schizophrenia, and substance abuse problems, is a major risk factor for suicide, as is the presence of an Axis II personality disorder. Medical conditions that impose a functional impairment or chronic pain also increase the risk. Victims of Traumatic Brain Injury (TBI) seem to be especially vulnerable to suicide. Combinations of the conditions listed above are particularly dangerous. Potentially modifiable personal characteristics that predispose a person toward suicide include low self-esteem, a tolerant attitude toward suicide, smoking, perfectionism (particularly when combined with depression), and a lack of acceptance of their sexual orientation by themselves or significant others. Continued
Suicide Risk Factors Continued

Acute risk factors increase the risk of suicide in the near term. A precipitating stimulus that causes shame, guilt, humiliation, or feelings of abandonment or rejection is generally the immediate cause of a suicide but is not sufficient by itself to cause suicide. However, such a stimulus applied to an already depressed person, especially one who lacks social support, can cause a person to attempt suicide as a way out of a seemingly irresolvable situation. Exposure to another person’s suicide can also trigger a suicide attempt, as suicide seems to provide resolution to an unsolvable situation.

Suicide Prevention

Population-based programs to prevent suicide are in place in many areas, but evaluation of their effectiveness is limited (10). Prevention strategies fall into three categories (11). Universal interventions apply to everyone, regardless of their susceptibility to suicide. Selected interventions are applied to groups of people at increased risk; an example would be a support group for people who are depressed. Finally, indicated interventions target individuals with a known risk factor. Prescribing antidepressants to someone known to be depressed would be an example of an indicated intervention. The limitation of selected and indicated strategies is that they can affect only people who have been identified as being at increased risk while missing people whose increased risk has not been identified. Thus, those who have not been identified as potentially suicidal may receive no intervention at all.
Suicide Prevention Continued

Factors that are preventive against suicide include providing strong social support to the individual, cultural or religious beliefs that disapprove of suicide, and restricting access to highly lethal means of committing suicide (10).

For individuals who are already at risk for suicide, or have already attempted it, secondary prevention factors include access to effective clinical care for mental, physical, and substance abuse disorders (8). An example of an effective therapy is cognitive-behavioral therapy, which has been shown to reduce repeat suicide attempts by up to 50% by giving people problem-solving and conflict resolution skills (7). Educational programs that teach health care providers and individuals to recognize the warning signs of suicidal ideation have also been shown to be effective. People in high-risk groups (e.g., elderly white men) should be screened for signs of depression or suicidal thoughts by their health care providers. People who have survived a suicide attempt should be monitored for further ideation, as most people who commit suicide have a history of prior attempts (10,12).

Sources of Information


Additional Sources

10. HOMICIDES

Assaults are injuries purposefully inflicted on one person by another person with the intent to cause injury (1). Homicide is the most extreme outcome of such violence (2). Nationally, 91 nonfatal assault-related injuries are seen in the ED for every homicide. The nation’s homicide rate was stable throughout the first decade of the twenty-first century, but the rate of homicides involving firearms in men between the ages of 25 and 44 increased during this period (3). Washington State has generally had lower homicide rates than the United States, and Snohomish County’s rates have been lower than Washington’s rates. Homicides accounted for 5% of all injury mortality in Snohomish County from 2003 through 2007.

National crime statistics from 2007 reveal that some form of argument was the most common circumstance (41.0%) resulting in a murder or non-negligent manslaughter (4). One quarter of killings (24.1%) occur during the commission of another felony, most commonly robbery (9.9%) or a narcotics offence (6.2%). Juvenile gang killings accounted for 7.2% of all killings. Brawls occurring under the influence of alcohol or other drugs accounted for another 1.9%. It should be noted, however, that the circumstances were known for only 63.1% of killings.

The relationship between the offender and the victim was known in 53.8% of murders and non-negligent manslaughters. In only about one quarter of killings (24.1%) was the victim a stranger to the perpetrator. The most common relationship between victim and perpetrator was “acquaintance” (i.e., not family, friend, neighbor, or co-worker), which accounted for 38.3% of killings. Males are by far the most likely perpetrators and victims of killings. They committed 88.5% and were the victims in 71.3% of homicides during 2007. Approximately two thirds of homicides (64.8%) consisted of a male killing another male, and one quarter (25.4%) were a male killing a female. A female killed another female in only 2.5% of cases.

Homicide occurs most often to young people. In the United States during 2007, one quarter of the victims of murder or non-negligent manslaughter (25.8%) were under the age of 22. One in five (20.6%) were males under the age of 22. More than half of all homicide victims (52.0%) were younger than age 30.
Data from the Uniform Crime Reporting System indicate that approximately 233 of every 100,000 Snohomish County residents were the victim of a violent crime each year between 2003 and 2007. More than half of the violent crimes in the county were aggravated assault (53.6%). Robberies constituted 28.4% of violent offences, and rapes constituted another 17.1%. Only 1% of the violent crimes reported to Snohomish County law enforcement agencies between 2003 and 2007 were murders. Firearms were used in more than half (52%) of the murders in the county during this period.

**Figure 10.1 Age-Adjusted Homicide Rates**
Snohomish County & Washington State, 1990-2007

- Snohomish County’s homicide rate showed no discernable pattern of increase or decrease from 1990 through 2007.
- The homicide rate in Washington State decreased by 38% from 1990 through 2007 ($P < 0.001$).
- The homicide rate in Snohomish County was generally lower than Washington State, although the trends were generally similar.
HOMICIDES

From 2003 through 2007, about 16 people were murdered each year in Snohomish County.

Snohomish County’s homicide rate (2.5 per 100,000) was significantly lower than Washington State’s rate (3.4 per 100,000) from 2003 through 2007 ($P = 0.002$).

Males were three times more likely than females to be the victim of homicide ($P < 0.001$).

The homicide rate was greatest between the ages of 15 and 24.

Blacks had the highest homicide rate of any race in Snohomish County ($P = 0.005$).

Hispanics had a significantly higher homicide rate than non-Hispanics ($P = 0.006$).

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**Figure 10.2 Age-Adjusted* Homicide Rates by Demographic Factors Snohomish County (n = 82), 1990-2007**

<table>
<thead>
<tr>
<th>Demographic Factor</th>
<th>Age-Adjusted Mortality Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Snohomish County</td>
<td>3</td>
</tr>
<tr>
<td>Washington State</td>
<td>3</td>
</tr>
<tr>
<td>Males</td>
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<tr>
<td>Females</td>
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<tr>
<td>&lt;15</td>
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<td>15-24</td>
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<td>25-44</td>
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<td>65+</td>
<td>2</td>
</tr>
<tr>
<td>White</td>
<td>2</td>
</tr>
<tr>
<td>Black</td>
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</tr>
<tr>
<td>American Indian</td>
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</tr>
<tr>
<td>Asian/PI</td>
<td>3</td>
</tr>
<tr>
<td>Hispanics</td>
<td>4</td>
</tr>
<tr>
<td>Non-Hispanics</td>
<td>2</td>
</tr>
</tbody>
</table>

*Age-adjustment does not apply to age groups.
**Numbers too small to calculate a reliable rate.
Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics.
Hospital admissions for assault-related injuries in Snohomish County declined by 49% from 1990 through 2000 ($P < 0.001$). From 2000 through 2007, admissions increased by 28% ($P = 0.03$).

Washington State experienced an overall decline of 32% in assault-related admission rates from 1990 through 2007 ($P < 0.001$).

Snohomish County generally had lower rates of hospital admissions for assault-related injuries than did Washington State from 1990 through 2007.
HOMICIDES

Figure 10.4  Age-Adjusted* Assault-Related Injury Hospitalization Rates by Demographic Factors
Snohomish County (n = 593), 2003-2007

- Snohomish County had a significantly lower rate of hospital admissions for assault-related injuries than did Washington State (P < 0.001).
- Males in Snohomish County were three times more likely than females to be admitted to a hospital because of injuries suffered from an assault (P < 0.001).
- Hospital admissions for assault-related injuries were rare in people younger than 15 but common in people between 15 and 24. After the age of 24, assault-related hospital admission rates declined.

*Age-adjustment does not apply to age groups.
Homicide Risk Factors

Homicide is a fairly rare event, and the circumstances that contribute to it tend to be unique for each occurrence. Nevertheless, there are identifiable risk factors that increase an individual's tendency to commit violence (2). These risk factors are characteristics of the individual, family background, and the community in which they live. In general, these characteristics combine to create individuals who are impulsive and believe that violence is a legitimate way of getting what they want.

Factors that predispose a person toward committing violence and homicide, or being the victim of violence, include a belief in male physical prowess and toughness, underdeveloped verbal and conflict-resolution skills, a tendency toward thrill seeking, child abuse, neurological and psychological disorders, and a history of intimate partner violence. Individuals who engage in violence at an early age often behave violently as adults. Those with a prior felony conviction are also more likely to commit murder (5).

Families contribute to a child’s tendency toward violence by engaging in conflict and abuse, practicing severe or inconsistent punishment, failing to set clear expectations about behavior, or failing to monitor their children's behavior. Friends of the child who engage in violent behaviors can create the impression that violence is normal (2).

Poor communities that are characterized by a lack of resources and jobs, with a weak tax base and deteriorating infrastructure, contribute to creating an individual prone to violence. Such neighborhoods often experience an increase in drug dealing and gang activity, which lead to a greater incidence of violence and homicide. Communities with high rates of mobility also have higher crime rates. Income inequality is strongly linked with homicide, as are poor economic conditions in general. When the gross domestic product increases, homicide rates tend to drop (2).

Continued
Homicide Risk Factors Continued

Drug and alcohol consumption are proximate risk factors, as about half of all victims and perpetrators of homicide have consumed alcohol before the event (6). Alcohol and drugs can reduce inhibitions against aggression and encourage high-risk behaviors. Access to firearms may be a risk factor for homicide, as a firearm makes committing violence very easy and very lethal (2). More than half of Snohomish County’s murders from 2003 through 2007 were committed with a firearm. However, there is considerable controversy in the scientific literature about whether limiting the availability of firearms reduces homicides (7-9), and this strategy remains the subject of intense political debate. Safe storage of firearms has been shown to reduce accidental deaths and suicides, particularly among youth, but no evidence has been found that safe storage affects homicide rates (2).

Intervention Strategies

In general, policies and programs that curb violence also curb homicide (2). Strategies to reduce homicide specifically include targeted interventions to prevent violence among children, intimate partners and youth. Home visits by nurses have been shown to be effective at reducing the incidence of child abuse. Advocacy and shelters for battered women, as well as school-based programs to reduce dating violence, show promise for reducing intimate partner violence. Adoption of more aggressive arrest policies is related to fewer deaths among unmarried intimate partners.

Youth violence prevention strategies include programs to increase social competency and conflict resolution skills, behavior modification interventions with at-risk youth, and training parents in family management. Some of the most effective programs to prevent youth violence are collaborations between local law enforcement and community agencies. These programs are effective because they assess the characteristics of local homicides, which aids in the identification of those most at risk of being involved in violence and targeting interventions at them.
Sources of Information

APPENDIX

Data Sources
This report used a number of different data systems to describe the impact of injuries in Snohomish County. The main sources were population-based data systems that track causes of death and hospitalizations. These data systems are maintained by the Washington State Department of Health. Data from these systems are very complete and reliable.

In general, data from the years 1990 through 2007 have been used. These data have been presented as rates per 100,000 residents. In most cases, the rates have been age-adjusted to the U.S. 2000 standard population (see page 128 for definitions of rates and age adjustment). Rates for individual age groups were not age-adjusted.

For this report most analyses of population-based data systems were performed using the VISTA system, which was developed by the Seattle-King County Health Department. However during the development of the report, the VISTA system was replaced by the CHAT system, which was developed by the Washington State Department of Health. The CHAT system incorporates several changes and corrections to the data, particularly the population data. This change means the results generated by the CHAT system are not directly comparable to those included in this report.

Much of the data in the motor vehicle crash chapter regarding traffic use patterns and collisions are from the Washington Traffic Safety Commission (WTSC). These data are not directly comparable to the data reported about deaths and hospitalizations. The death and hospitalization data are reported by the residence of the driver and not where the collision actually took place, whereas the WTSC data are reported according to where the collision occurred. For example, the death certificate data show that 59 Snohomish County residents were the victim of traffic fatalities in 2007, but the WTSC data report that 40 people were fatally injured in accidents that occurred within Snohomish County. In addition, the WTSC calculates motor vehicle collision rates based on their estimates of the annual vehicle miles traveled in each county rather than on the population of the county.
Some data were drawn from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a telephone survey of adults sponsored by the Centers for Disease Control and Prevention. It is performed every year and surveys enough adults to generate reliable statistics for Snohomish County. The BRFSS data included in this report were collected between 2003 and 2007. Other data were taken from the Washington Healthy Youth Survey, which is a survey of students in the 6th, 8th, 10th and 12th grades. It is administered in school classes and measures health-related behaviors.

### International Classification of Disease (ICD) Codes Used to Define Injuries

<table>
<thead>
<tr>
<th>Injury Type</th>
<th>Deaths ICD-10 (Primary Cause of Death)</th>
<th>Hospitalizations ICD-9CM (Any Diagnostic Code)</th>
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</thead>
<tbody>
<tr>
<td>Motor vehicle collisions</td>
<td>V02-V04, V09.0, V09.2, V12-V14, V19.0-V19.2, V19.4-V19.6, V20-V29, V80.3-V80.5, V81.0-V81.1, V82.0-V82.1, V83-V86, V87.0-V87.8, V88.0-V88.8, V89.0-V89.2</td>
<td>E810-E819</td>
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<td>Poisonings</td>
<td>X40-X49</td>
<td>E850-E869</td>
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<td>Falls</td>
<td>W00-W19</td>
<td>E880-E886, E888</td>
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<td>Drownings</td>
<td>W65-W74</td>
<td>E830, E832, E910</td>
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<td>Suffocations</td>
<td>W75-W84</td>
<td>E911-E913</td>
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<td>Suicides</td>
<td>X60-X84, Y87.0</td>
<td>E950-E959</td>
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<tr>
<td>Homicides</td>
<td>X85-Y09, Y87.1</td>
<td>E960-E969</td>
</tr>
</tbody>
</table>
Definitions

Statistical Tests

Statistical tests of significance are used to determine whether differences exist between groups or over time. Such tests determine the probability that a difference, say between men and women, is likely due to chance. Generally, when a difference has a chance of occurring randomly of 5% or less (expressed as $P = 0.05$), it is said to be statistically significant. In this report, all results of less than 0.0001 (0.01%) are presented as less than 0.0001 ($P < 0.0001$), because results for probabilities lower than this are not generally reported by the software program used to analyze data for this report (Stata).

Tests of significance were used to determine whether changes in rates over time (trends) were meaningful. Trends over time were tested using both the chi-square test for trends and the JoinPoint program available from National Cancer Institute. The chi-square test determines whether there is an overall increase or decrease in a rate over time. If this proved significant, JoinPoint was used to obtain a more detailed analysis of when changes in trends occurred.

Demographic comparisons are presented as averages for the 5-year period 2003 through 2007 to ensure that there were enough instances of rare events (such as death by drowning) to calculate stable rates. Differences between groups (male vs. female, races) were tested using the Poisson test. Tests of significance for age were conducted by comparing each age group to the combination of all others. To test for differences between races and ethnicities, each race was compared with the combination of all other races using the Poisson test.
Race and Ethnicity

This report uses racial categories defined by the Federal Office of Management and Budget. Racial data are captured in the mortality (death certificate) data, but not in the hospital admission data. It was therefore impossible to analyze hospital admissions by race. Despite evidence that the health outcomes of Pacific Islanders differ significantly from those of Asians, these two groups have been combined in this report because the distinction was not captured in the mortality data until 2007.

This report treats Hispanics as an ethnicity rather than as a race. Many data collection systems allow the respondent to choose a race (usually white, black, American Indian, Asian, or Pacific Islander), with Hispanic ethnicity being a separate question. Hence, people who identify themselves as Hispanic can be members of whatever race they decide is appropriate. For purposes of the analyses in this report, people who were identified as Hispanic are included in one of the major race categories for purposes of examining differences between races. A separate analyses compares those people identified as Hispanic with all those who were not identified as Hispanic.
APPENDIX

Health Planning Areas

The 10 Health Planning Areas (HPAs) are used to understand better the diverse populations that make up Snohomish County. They allow planners to make more detailed analyses of the health status of the county and more effectively target intervention programs. Each HPA consists of a number of zip codes that are geographically contiguous and similar socioeconomically. The primary socioeconomic indicator was the proportion of the population earning less than 200% of the federal poverty level (FPL). North Everett, South Everett, Lynnwood-Mountlake Terrace-Brier, and the East County HPAs had the highest proportion of individuals living below 200% of the FPL, and Mill-Creek Bothell, Lake Stevens, and Edmonds-Mukilteo had the lowest proportion of individuals living below 200% of the FPL. For further demographic differences in HPAs see the document, Snohomish County Health Planning Areas at www.snohd.org.

Zip Code Definitions of Health Planning Areas

<table>
<thead>
<tr>
<th>Health Planning Area</th>
<th>Zip Codes</th>
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<td>Arlington-Stanwood</td>
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<td>Mill Creek-Bothell</td>
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<td>North Everett</td>
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</tr>
<tr>
<td>South Everett</td>
<td>98204, 98208</td>
</tr>
</tbody>
</table>
Other Definitions

Age-Adjusted Rates: A procedure that weights the data to a standardized population. This eliminates the differences caused by differing age structures in the populations being compared.

Bias: Error introduced into the data by a factor that systematically affects the observed values for a set of data. For example, if one collected data on people’s heights using a ruler where the inches were shorter than standard, the use of that ruler would introduce bias into the data by making all the observations larger than they really are. Bias is hardly ever directly measurable.

Confidence Intervals: An estimated range of values that is likely to include an unknown population parameter with a known degree of confidence. This report used 95% confidence intervals, meaning we are 95% certain that the true value of the rate being calculated lies within the range of the confidence interval.

Rates: A ratio of the number of cases occurring or existing in a population divided by the size of the population. Rates are generally multiplied by 100,000 to yield the number of cases per 100,000 people in the population. For example, if 47 men of a population of 336,432 died in motor vehicle collisions in 2006, then divide 47 by 336,432 = 0.00014. Multiplying by 100 to obtain a percentage would yield 0.014%; but it is more understandable to express it as 14 deaths per 100,000 residents.