

*a close-up*

# Chronic Disease

In Snohomish County



Snohomish Health District

Health Statistics & Assessment

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#### **Mission Statement:**

To improve the health of individuals, families, and communities through disease prevention, health promotion, and protection from environmental threats.

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# Executive Summary

Chronic diseases were responsible for 70% of all deaths in Snohomish County during 2006 and accounted for seven of the top ten causes of death. Mortality from these seven diseases declined by 20% from 1992 through 2006 compared with an overall decline in mortality of 12%.

Cancer and heart disease accounted for nearly half of all deaths. Heart disease was the leading cause of death for many years, but in 2006 the number of deaths from cancer exceeded those from heart disease. Cancer was responsible for 24% of deaths during 2006 compared with 23% from heart disease.

## Cardiovascular Disease

Heart disease and stroke accounted for 23% and 6% of deaths, respectively, in Snohomish County during 2006. Cardiovascular diseases are also a major cause of disability.

- Mortality rates decreased for both heart disease (34%) and stroke (39%) from 1992 through 2006. In 2006 heart disease caused 961 deaths and stroke 233 deaths. Men were more likely than women to die of these cardiovascular diseases.
- Hospitalization rates declined for heart disease and stroke by 31% and 24%, respectively, between 1992 and 2006.

## Cancer

In 2006 cancer was the leading cause of death in Snohomish County, causing 975 deaths. During 2005 Snohomish County's cancer incidence rate was significantly greater than for Washington (567 cases per 100,000 versus 536 per 100,000). Breast cancer was the most common type of new cancer cases, but lung cancer was the leading cause of cancer deaths. From 1992 through 2005, decreases were observed in the incidence rates of lung cancer (17%), colorectal cancer (23%), and prostate cancer (32%) in Snohomish County. Breast cancer incidence increased by 12% during this same period.

- Lung cancer was the third most commonly diagnosed form of cancer, with an incidence rate of 73 new cases per 100,000 residents from 2001 through 2005. However, during this same period lung cancer was the leading cause of cancer deaths, causing 55 deaths per 100,000 residents. More Snohomish County residents died of lung cancer than from the next three most lethal cancers combined.
- Colorectal cancer was the fourth most commonly diagnosed type of cancer in the county from 2001 through 2005 and the third leading cause of cancer deaths. The incidence rate of colorectal cancer decreased by 23% from 1992 through 2005, and mortality decreased by 36% from 1992 through 2006. Men were more likely to be diagnosed with colorectal cancer than women. Native Americans had a much higher incidence rate than other races.
- Hematologic cancers (leukemia, lymphomas, and myeloma) were the fifth most commonly diagnosed type of cancer in Snohomish County (8%) and the second leading cause of cancer death (11%) from 2001 through 2005. Approximately 46 people per 100,000 residents were diagnosed with a hematologic cancer each year from 2001 through 2005. Mortality averaged 21 deaths per 100,000 residents annually from 2001 through 2005. Males were more likely than females to be diagnosed with this form of cancer.
- Breast cancer was the most commonly diagnosed cancer in Snohomish County from 2001 through 2005, with about 556 new cases occurring each year. The incidence rate of breast cancer was 180 cases per 100,000 female residents from 2001 through 2005. It caused an average of 65 deaths per year from 2001 through 2005. A woman's lifetime risk of developing cancer is 13%, or almost one in seven. Incidence of breast cancer increased by 12% from 1992 through 2005, but its mortality rate decreased by 31%.
- Prostate cancer was the second most commonly diagnosed cancer in the county from 2001 through 2005, with about 400 new cases each year, or 168 cases per 100,000 male residents. The incidence of prostate cancer decreased by 32% from 1992 through 2005, while the mortality rate decreased by 40%. Black men were the most likely to be diagnosed with this cancer, and Asian and Pacific Islander men were the least likely to be diagnosed.

**In 2006 cancer was the leading cause of death in Snohomish County, causing 975 deaths.**

## Other Chronic Diseases

Other common chronic diseases include those that are leading causes of death (e.g., chronic lung disease, diabetes, and dementia) and those that impact a person's quality of life (asthma). Dementia (including Alzheimer's disease) was the third leading cause of death during 2006, chronic obstructive pulmonary disease (COPD) was the fifth, and diabetes the seventh. Asthma was not a leading cause of death but is a major cause of disability.

- Dementia death rates more than doubled from 1992 through 2006, from 24 deaths per 100,000 population to 55 per 100,000. Mortality rates from dementia were significantly greater in Snohomish County than for the state. Hospitalizations increased from 1992 through 2003 to 58 per 100,000 residents, but fell back to 35 per 100,000 in 2006. Women were more likely to die of dementia than men.
- COPD caused approximately 209 deaths per year from 1992 through 2006. Mortality rates remained stable, but hospitalizations decreased by 52%. Most of this decline occurred from 2001 through 2004. Men were more likely to die of COPD than women.
- During 2006 the prevalence of self-reported diabetes was 6% in adults and 5% in 10th graders. Diabetes in adults increased by 80% from 1994 through 2006, but the mortality rate remained stable at about 23 deaths per 100,000 population. The rate of hospitalization from diabetes in adults increased by 22%, but in children this rate doubled. Children 10 years and older were the most likely to be hospitalized for diabetes.
- In Snohomish County about 9% of adults and 14% of 10th graders reported having asthma. The prevalence of adult asthma remained fairly stable from 1999 through 2006, but hospitalizations decreased by 56%. Children younger than five were twice as likely to be hospitalized for asthma as children between the ages of five and nine.

## Prevention

Prevention is the key to the control of chronic diseases. For many chronic diseases and cancers screening strategies that detect the disease early are available so that treatment can be implemented to increase survival. However, decreasing risky health behaviors such as tobacco use, lack of physical activity, and poor eating habits that contribute to the onset and progression of chronic diseases is the optimal prevention strategy.

# Introduction

This report discusses the major chronic diseases affecting the people of Snohomish County. Chronic diseases are medical conditions that persist over a long time (at least three months) or that progress slowly. They are the leading causes of death and disability. Some diseases are chronic from their long onset time (e.g., lung cancer), whereas others are conditions that continue throughout a person's life, such as asthma or diabetes. If such conditions are not properly managed and controlled, they can result in residual disabilities that impact quality of life.

Although some chronic diseases are associated with age and genetic factors, most occur as the result of risky health behaviors. These behaviors include smoking, lack of physical activity, and poor diet. Avoiding such behaviors can prevent the onset of chronic diseases or lessen their impact. Prevention of disease is more effective and less expensive than treating a disease after it has developed. This report provides information to help organizations and policy makers identify priority health issues, plan programs, direct interventions, educate, and obtain funding for prevention activities.

The report begins with a discussion of chronic diseases in general, including their place as the leading cause of death in the United States. Each of the subsequent chapters discusses a specific chronic disease and its impact on Snohomish County. The diseases discussed are heart disease, stroke, five types of cancer, asthma, chronic obstructive pulmonary disease (COPD), diabetes, and dementia. Trend analyses show whether there has been a change in the rates of incidence, hospitalizations, or mortality from the disease. Other analyses show whether the incidence or mortality rates differ by sex or race. Screening and prevention strategies are presented, and, where available, data are presented about how many people are engaging in those strategies. Sources of information about each disease are referenced for anyone wishing more information. Please see the Appendix for details on technical methods and definitions.

## Leading Causes of Death

Chronic diseases are by far the most common cause of death in the United States, accounting for nearly 70% of all deaths. At the beginning of the twentieth century, 5 of the 10 leading causes of death were communicable diseases (denoted by ***bold italics***). By 2006 only one of the leading causes of death was a communicable disease. This change is due in large part to the success of public health agencies controlling communicable diseases through initiatives such as widespread vaccination, vector control, and the development of the infrastructure to deliver clean food and water to homes.

Communicable diseases in the early part of the century tended to kill people at fairly young ages, leading to a low life expectancy. Control of these diseases has led to increased life expectancy. However, this change has led to an increase in the incidence of chronic diseases that generally affect people at older ages. In addition, longer life spans and better means of controlling the effects of lifelong chronic diseases (such as type 1 diabetes) means that these diseases last longer with a commensurate increase in the costs of care and human suffering associated with such diseases.

	United States, 1904 <sup>1</sup>	Snohomish County, 2006 <sup>2</sup>
1	<b><i>Pneumonia &amp; influenza</i></b>	Cancer
2	<b><i>Tuberculosis</i></b>	Heart disease
3	Heart disease	Unintentional injuries
4	<b><i>Diarrhea, enteritis, &amp; intestinal ulcers</i></b>	COPD
5	Stroke	Alzheimer's disease
6	<b><i>Nephritis</i></b>	Stroke
7	Accidents	Diabetes
8	Cancer	<b><i>Influenza &amp; pneumonia</i></b>
9	Senility	Suicide
10	<b><i>Bronchitis</i></b>	Chronic liver disease

Data sources: 1. Centers for Disease Control and Prevention: Leading Causes of Death, 1900-1998  
2. Death Certificate Data: Washington State Department of Health, Center for Health Statistics



## Introduction

The leading causes of death in Snohomish County are similar to those in Washington State and the United States. Heart disease and cancer accounted for roughly half of all deaths at all three levels of governance. Although heart disease has been the leading cause of death in Snohomish County for many years, in 2006 the number of cancer deaths exceeded those of heart disease.

Dementia (including Alzheimer's disease) has grown in importance as a cause of death. In 2006 it was the third leading cause of death in Snohomish County and in Washington. It was the fifth leading cause of death in the United States. Both Snohomish County and Washington State had higher mortality rates from dementia than the United States. Recent research suggests that dementia deaths are underreported. This report discusses all forms of dementia as a single disease in order to compensate for diagnostic coding changes that occurred in 1999 (see page 54).

Deaths from unintentional injuries are unusually high in Snohomish County, with a mortality rate almost 1 1/2 times the national average. Washington State also has a high rate of unintentional injury deaths. In both cases, accidental poisonings are the most common form of unintentional injury, followed by motor vehicle collisions and falls.

Stroke and COPD account for between 10% and 12% of all deaths in Snohomish County, Washington, and the United States, and diabetes is responsible for another 3%. Chronic liver disease is a leading cause of death in Snohomish and Washington, but not the United States.

	<b>Snohomish - 2006<sup>1</sup></b>	<b>%</b>	<b>Washington - 2006<sup>1</sup></b>	<b>%</b>	<b>United States - 2005<sup>2</sup></b>	<b>%</b>
1	Cancer	23.6	Cancer	24.0	Heart disease	26.6
2	Heart disease	23.2	Heart disease	23.0	Cancer	22.8
3	Dementia	7.2	Dementia	7.0	Stroke	5.9
4	Unintentional injuries	6.5	Stroke	5.9	COPD	5.3
5	COPD	5.8	COPD	5.8	Dementia	5.2
6	Stroke	5.6	Unintentional injuries	5.8	Unintentional injuries	4.8
7	Diabetes	3.0	Diabetes	3.4	Diabetes	3.1
8	Influenza/pneumonia	1.8	Influenza/pneumonia	1.8	Influenza/pneumonia	2.6
9	Suicide	1.6	Suicide	1.7	Nephritis	1.8
10	Chronic liver disease	1.4	Chronic liver disease	1.3	Septicemia	1.4

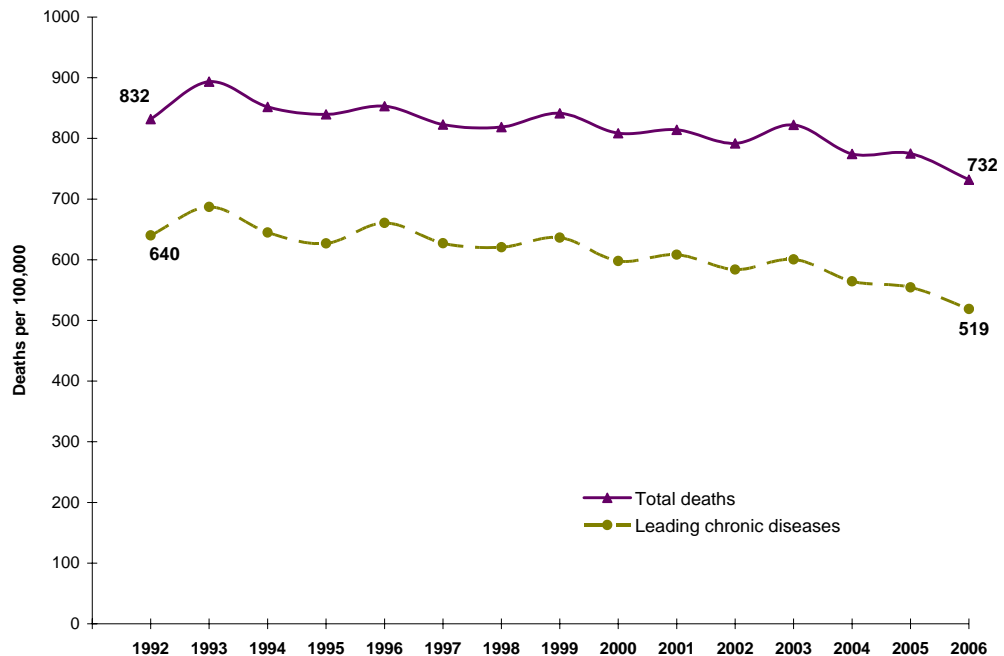
Data sources: 1. Washington State Department of Health, Center for Health Statistics  
 2. Centers for Disease Control and Prevention. Deaths: Final Data for 2005. National Vital Statistics Reports, vol. 56, #10, 2008  
 More current data are not available at this time

### Comparison of Leading Causes of Death Snohomish County, Washington State, & the United States

# Introduction

## Deaths from Leading Chronic Diseases & Total Deaths Snohomish County, 1992 - 2006

Overall mortality rates in Snohomish County declined by 12% from 1992 through 2006, from 832 deaths per 100,000 residents to 732 deaths per 100,000 ( $p = 0.001$ ). Deaths from the leading chronic diseases fell by 19% during this same period, from 640 deaths per 100,000 in 1992 to 519 per 100,000 in 2006. The proportion of deaths from the leading chronic diseases declined from 77% of deaths in 1992 to 71% in 2006. This decline likely is from better prevention and management of these diseases.



Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics  
Rates are age-adjusted

The leading causes of death differed by sex. Whereas cancer and heart disease were the leading causes of death for both sexes, unintentional injury was the third leading cause of death for males but the sixth leading cause for females. Most of these deaths were from motor vehicle accidents (31%) and accidental poisonings (30%), which include drug overdoses. Deaths from unintentional injuries are more common in young people, accounting somewhat for the lower life expectancies of males. The greater longevity of females is reflected in the relatively high percentage of women who died of Alzheimer's disease, which occurs most often in older adults.

## Leading Causes of Death by Sex Snohomish County, 2006

	Males	%	Females	%
1	Cancer	24.2	Cancer	23.0
2	Heart disease	23.7	Heart disease	22.7
3	Unintentional injury	7.5	Dementia	9.3
4	COPD	5.3	Stroke	6.5
5	Dementia	5.1	COPD	6.3
6	Stroke	4.7	Unintentional injury	5.5
7	Diabetes	3.1	Diabetes	2.9
8	Suicide	2.5	Influenza/pneumonia	1.8
9	Influenza/pneumonia	1.7	Septicemia	1.3
10	Chronic liver disease/ cirrhosis	1.5	Chronic liver disease/cirrhosis	1.3

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

## Introduction

*Years of potential life lost* is a measure of productivity lost to the community because of disease. It is defined as the difference between the age at which a person dies and the age of 65, the average age of retirement. This represents the years of working life that a person lost from death. For example, a person who dies at age 50 is considered to have lost 15 years of potentially productive life ( $65 - 50 = 15$ ). If a person is 70 years old at death, then that person lost zero years of potential life because he or she lived past 65.

The table below shows the total years of potential life lost to each of the leading causes of death in Snohomish County during 2006 and the average number of years lost per death. Most deaths from chronic conditions occur after the age of 65, which is shown by the generally low average number of years lost before 65 per death. For example, cancer caused a total loss of 3,778 years of potential life, or an average of 3.9 years for each cancer death. The large total number of years of life lost to heart disease and cancer is from the large number of deaths, not to the number of years lost per death.

In contrast, unintentional injuries cause the greatest total number of years lost, even though heart disease and cancer each account for approximately four times as many deaths. Suicide and unintentional injury deaths disproportionately affect the young, as shown by the large average number of years of life lost to unintentional injury (23.5 and 17.9 per death, respectively). Also of note is the low number of years of life lost to influenza and pneumonia. Most people dying of these communicable diseases are older adults, whereas at the beginning of the twentieth century communicable diseases struck down young as well as older individuals.

### Years of Potential Life Lost by Leading Causes of Death Snohomish County, 2006

		Number of Deaths	Total Years of Life Lost < 65	Average Years Lost per Death
1	Cancer	975	3,778	3.9
2	Heart disease	961	2,007	2.1
3	Dementia	299	20	0.1
4	Unintentional injuries	268	4,792	17.9
5	COPD	240	269	1.1
6	Stroke	233	374	1.6
7	Diabetes	124	288	2.3
8	Influenza/pneumonia	74	257	3.5
9	Suicide	67	1,572	23.5
10	Chronic liver disease	58	554	9.6

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

# Introduction

## Leading Underlying Causes of Death

Although chronic diseases generally affect older adults, age by itself is rarely the cause. Most heart disease and many cancers are the direct result of unhealthy behaviors such as smoking, poor diet, and physical inactivity. The Centers for Disease Control and Prevention (CDC) has estimated how many people die of behavioral and environmental causes. These “real” causes of death in the United States underlie many specific medical conditions. For example, many lung cancer deaths are caused by tobacco use. The table below shows the U.S. estimates for the year 2000.

### Leading Underlying Causes of Death United States, 2000

Cause	Estimated Deaths	Percent of Deaths
Tobacco use	435,000	18.1
Poor diet & physical inactivity	365,000	15.2
Alcohol consumption	85,000	3.5
Microbial agents	75,000	3.1
Toxic agents	55,000	2.3
Motor-vehicle crashes	43,000	1.8
Incidents involving firearms	29,000	1.2
Sexual behaviors	20,000	0.8
Illicit drug use	17,000	0.7

Data source: Mokdad, A, Marks J, Stroup D, et al. Actual Causes of Death in the United States, 2000. JAMA. 2004, 291: 1238-1245

Tobacco use is the leading cause of death, and poor diet and physical inactivity (which lead to obesity) constitute the second. Both of these are risk factors for heart disease and certain cancers, which account for nearly half of all deaths. Both are far ahead of the third cause of death (alcohol use). Indeed, deaths from tobacco use and poor diet and physical inactivity each outnumber the total of the seven remaining causes. Whereas tobacco use has long been identified as a leading cause of illness and death, more recently poor nutrition and lack of exercise have come to the attention of the public and public health officials. Programs to educate the public about the importance of diet and exercise and to promote a healthy lifestyle have been implemented only recently.

## Leading Causes of Hospitalizations (excluding childbirth)

Chronic diseases are most notable as causes of death, but they also consume a large amount of health care resources. They are estimated to be responsible for 75% of health care spending in the United States. The table below shows the leading causes of non-childbirth hospitalizations and the average cost of each type of admission in Snohomish County in 2006.

### Leading Causes of Non-childbirth Hospitalizations Snohomish County, 2006

	Cause	No. of Hospitalizations	Percent of Hospitalizations	Average Stay (days)	Average Cost per Admission
1	Unintentional injuries	7,743	17.8	5.6	\$32,149
2	Digestive system diseases	5,372	12.4	3.9	\$22,182
3	Diseases of the heart	4,928	11.3	3.4	\$39,171
4	Respiratory disease	3,872	8.9	4.9	\$24,063
5	Genitourinary disease	2,730	6.3	3.0	\$16,832
6	Alcohol-related	2,506	5.8	4.2	\$22,899
7	Illicit drug-related	2,411	5.5	5.6	\$19,896
8	All psychoses	2,366	5.4	7.0	\$12,868
9	Infections & parasites	2,295	5.3	5.9	\$33,579
10	All cancer	2,050	4.7	5.6	\$36,107

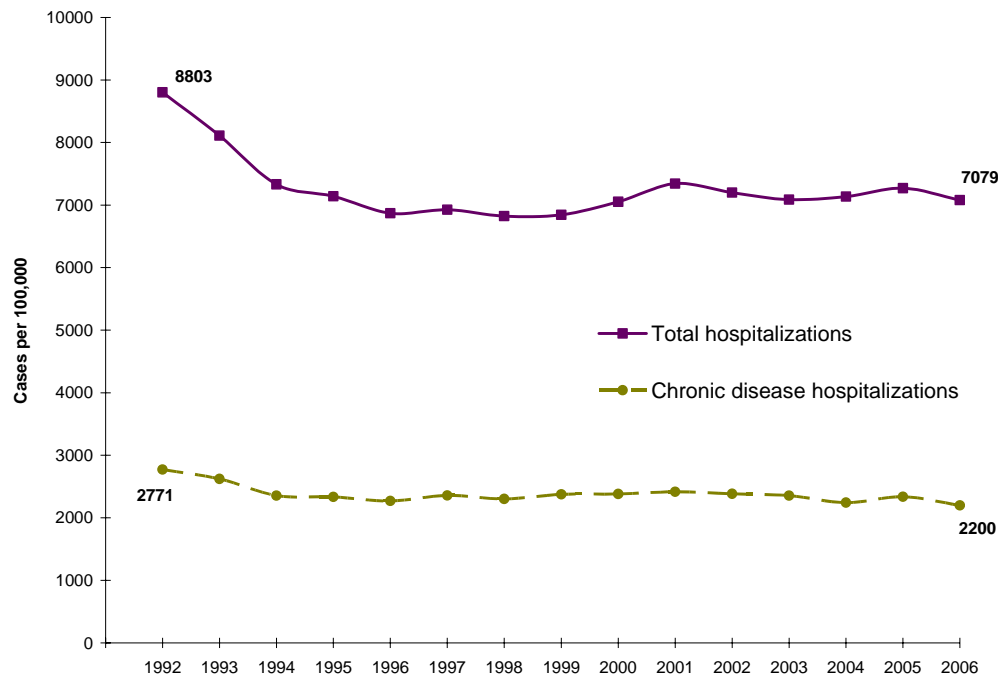
Data source: Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems

## Introduction

Four chronic diseases (heart disease, cancer, psychoses, respiratory disease) accounted for 30% of all hospitalizations in Snohomish County during 2006, but this number only hints at the burden that chronic diseases place on the health care system. Hospitalizations for chronic diseases tend to last longer than the overall average (4.8 days versus 3.6 days  $p < 0.001$ ) and thus consume more resources. In addition, hospitalizations from chronic diseases tend to be more costly than those for nonchronic conditions, even after adjusting for the longer length of stay (\$29,500 versus \$19,000,  $p < 0.001$ ).

The number of hospitalizations presents a skewed picture of the burden of chronic disease on the health care system, as many chronic disease patients are discharged to nursing homes and long-term care facilities for recovery. Patients suffering from dementia are most likely to be cared for in such settings and represent an increasing proportion of the patients in such facilities. Unfortunately, county-specific data for these types of facilities are not available at this time.

Overall hospitalization rates decreased by 20% from 1992 through 2006 from 8,803 admissions per 100,000 residents to 7,079 ( $p = 0.001$ ). Admissions from the leading chronic diseases (heart disease, cancer, respiratory conditions, psychoses) declined by 21% during this period. Hospital admissions from these four chronic conditions accounted for approximately 32% of all non-childbirth-related hospital admissions from 1992 through 2006.



Does not include hospitalizations for pregnancy

Data source: Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems  
Rates are age-adjusted

**Total & Chronic  
Disease  
Hospitalizations  
Snohomish  
County, 1992 - 2006**

## Sources of Information


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# Cardiovascular Disease

# Cardiovascular Disease

## Heart Disease

*Heart disease* refers to a number of conditions affecting the heart and circulatory system. These chronic conditions degrade a person's quality of life and can lead to acute events like heart attack and stroke, which in turn can cause other chronic problems or even death. Heart disease was the leading cause of death in the United States during 2005, accounting for 27% of all deaths. It was the second leading cause of death in Snohomish County, accounting for 24% of all deaths from 2002 through 2006. Heart disease costs Snohomish County approximately 2,000 potential years of life each year. Heart disease is also a major cause of disability. In 2006 the American Heart Association estimated that the nation spent \$258 billion because of heart disease, including health care services, medications, and lost productivity.

The most common form of heart disease is coronary artery (ischemic) heart disease. This condition occurs when the arteries supplying blood to the heart become hardened and narrowed from a buildup of plaque, a condition called *atherosclerosis*. Plaque is a mixture of fat and other substances, including cholesterol and other lipids. The narrowed arteries are unable to deliver sufficient blood to the heart, so the heart muscles are deprived of oxygen, become weaker, and begin to die. Sudden loss of blood flow from an artery becoming completely blocked results in a heart attack (also called a *myocardial infarction*). Damage to the heart increases with the time that passes before blood flow is restored to the heart. With sufficient damage to the heart, death can result.

There are many other types of heart disease. Below are brief descriptions of the most common types.

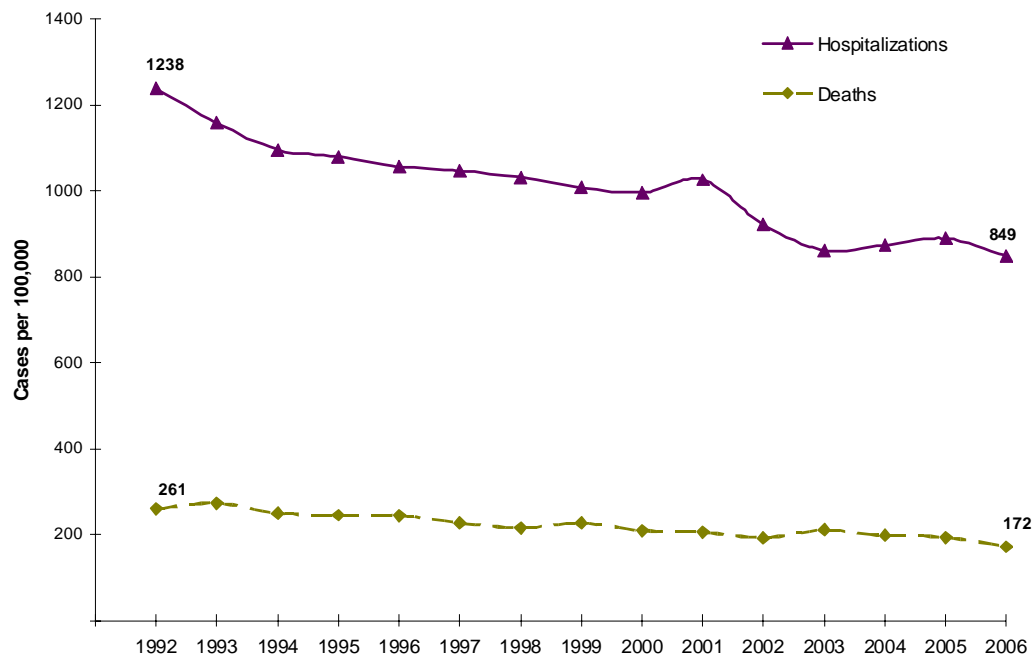
- Angina is caused by insufficient blood getting to the heart and results in chest pain or discomfort. Angina can be either "stable" (occurs during physical exertion or under stress) or "unstable" (occurs randomly, even while a person is at rest). Angina is a symptom of coronary heart disease.
- An aortic aneurysm is a condition where the aorta stretches and can then rupture. A ruptured aorta is an emergency condition.
- Arrhythmia is an irregular, or unusually fast or slow, heartbeat caused by a disruption of the normal electrical impulses that control heartbeats. A severe arrhythmia (ventricular fibrillation) can result in death.
- Cardiomyopathy is a weakening of the heart muscle or a change in the muscle's structure that causes inadequate heart pumping. Cardiomyopathy can result from prior heart attacks, infections, and other causes.
- Congenital heart disease describes malformations of the heart caused by genetic factors or adverse exposures during pregnancy. The most common malformations are holes in the walls that divide the chambers of the heart, which can disrupt the normal flow of blood through the heart. Congenital heart defects are the most common type of major birth defect.
- Heart failure is also called congestive or chronic heart failure. In this condition the heart cannot pump enough blood to meet the needs of other organs. There is no cure for heart failure other than a heart transplant. Once diagnosed with heart failure, a person will be taking medications for the rest of his or her life.
- Peripheral arterial disease is a hardening of the arteries that supplies blood to the legs and arms. It is usually caused by atherosclerosis.
- Rheumatic heart disease describes damage to the heart valves and other structures from inflammation and scarring caused by rheumatic fever, which develops from streptococcal infections.

**Heart disease was the leading cause of death in the United States during 2005, accounting for 27% of all deaths.**



## Cardiovascular Disease

- The rate of death from heart disease declined by 34% between 1992 and 2006, from 261 deaths per 100,000 population to 172 deaths per 100,000. This decrease was statistically significant ( $p = 0.001$ ).
- Heart disease accounted for 12% of all hospitalizations not related to childbirth from 2000 through 2006.
- The rate of hospitalizations from heart disease decreased by 31% from 1992 through 2006. This decrease was statistically significant ( $p = 0.001$ ).

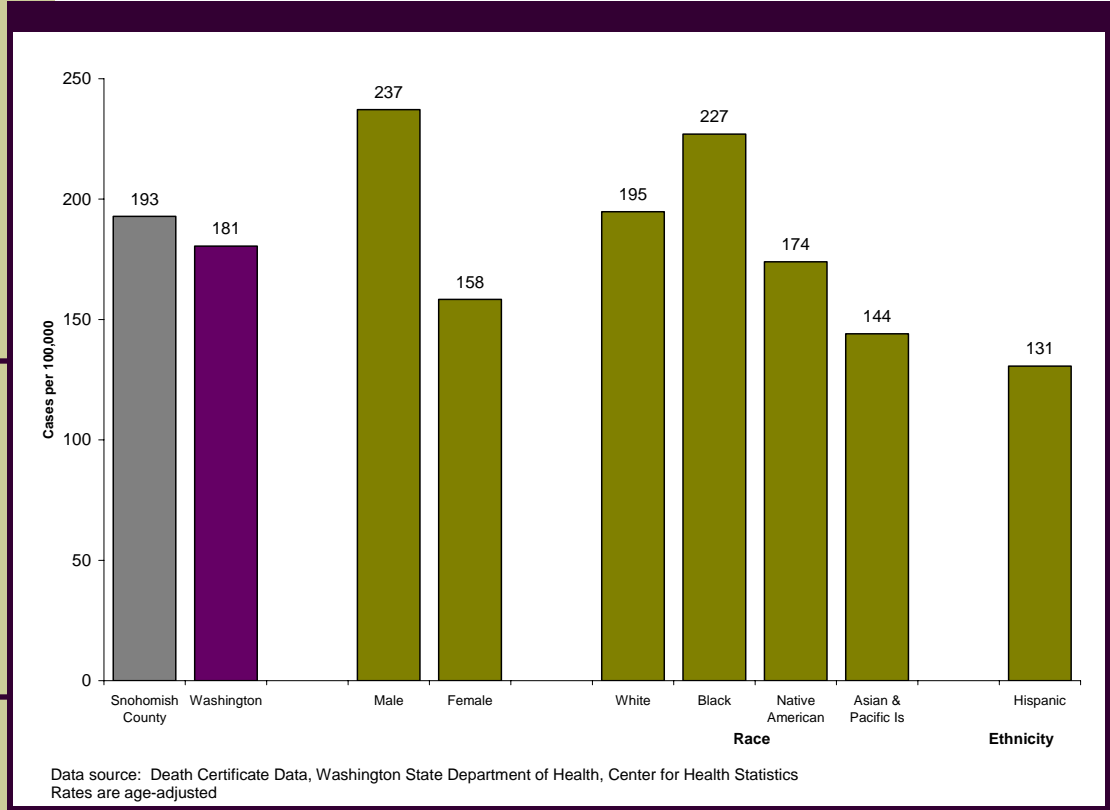


Data sources: Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems. Death Certificate Data: Washington State Department of Health, Center for Health Statistics  
Rates are age-adjusted

Heart Disease  
Hospitalizations  
& Deaths  
Snohomish County,  
1992 - 2006

# Cardiovascular Disease

## Deaths from Heart Disease by Sex, Race, & Ethnicity Snohomish County, 2002 - 2006 (n = 4,977)



- From 2002 through 2006, heart disease caused nearly 5,000 deaths, or about 1,000 each year.
- During this period the rate of mortality from heart disease was 193 deaths per 100,000 Snohomish County residents. This was significantly greater than the Washington State rate ( $p < 0.001$ ).
- Males were significantly more likely to die of heart disease than females ( $p < 0.001$ ). However, increasing numbers of women have been dying of heart disease in recent years.
- Asians were less likely to die of heart disease than the county average ( $p < 0.001$ ). Nationally, heart disease is the leading cause of death for all races, except Asians and Pacific Islanders.
- Blacks in Snohomish County did not have a significantly higher rate of mortality from heart disease than the county average ( $p = 0.10$ ), but nationally Blacks have a heart disease mortality rate that is 30% higher than the national average.

### Risk Factors

The risk factors for developing heart disease are fairly well understood. The major risk factors are high blood cholesterol levels, high blood pressure, and diabetes mellitus. Heredity can increase some people's chances of developing these risk factors, but all are controllable by behavioral and lifestyle changes. On the other hand, poor behavioral and lifestyle choices can increase the chances of developing these risk factors. Smoking has been shown to promote atherosclerosis, increase blood pressure, and reduce the amount of oxygen carried by the blood. Exposure to other people's tobacco smoke can also increase the risk of heart disease, even among nonsmokers. Diets high in fat can raise blood cholesterol levels and promote atherosclerosis. Diets high in salt or sodium can raise blood pressure. Obesity is linked to higher levels of LDL (bad) cholesterol and triglycerides, high blood pressure, and diabetes. Physical inactivity is directly related to the development of heart disease and to the development of obesity. Alcohol use can increase levels of triglycerides, which contribute to atherosclerosis, and increase blood pressure, which increases the risk of heart attack.

Blood cholesterol is a waxy substance produced by the liver or consumed in certain foods. Cholesterol is needed by the body, and the liver produces enough cholesterol for the body's needs. Excess cholesterol is deposited in the arteries, where it causes atherosclerosis. There are two types of cholesterol: high-density and low-density lipoproteins (respectively, HDL and LDL). HDL cholesterol is considered to be "good" cholesterol because it provides some protection against heart disease. LDL cholesterol is considered "bad" because it can lead to heart disease.

High blood pressure is a condition in which the pressure of the blood in the arteries is too high. This risk factor often has no symptoms but can be controlled through behavioral changes, medication, or both.

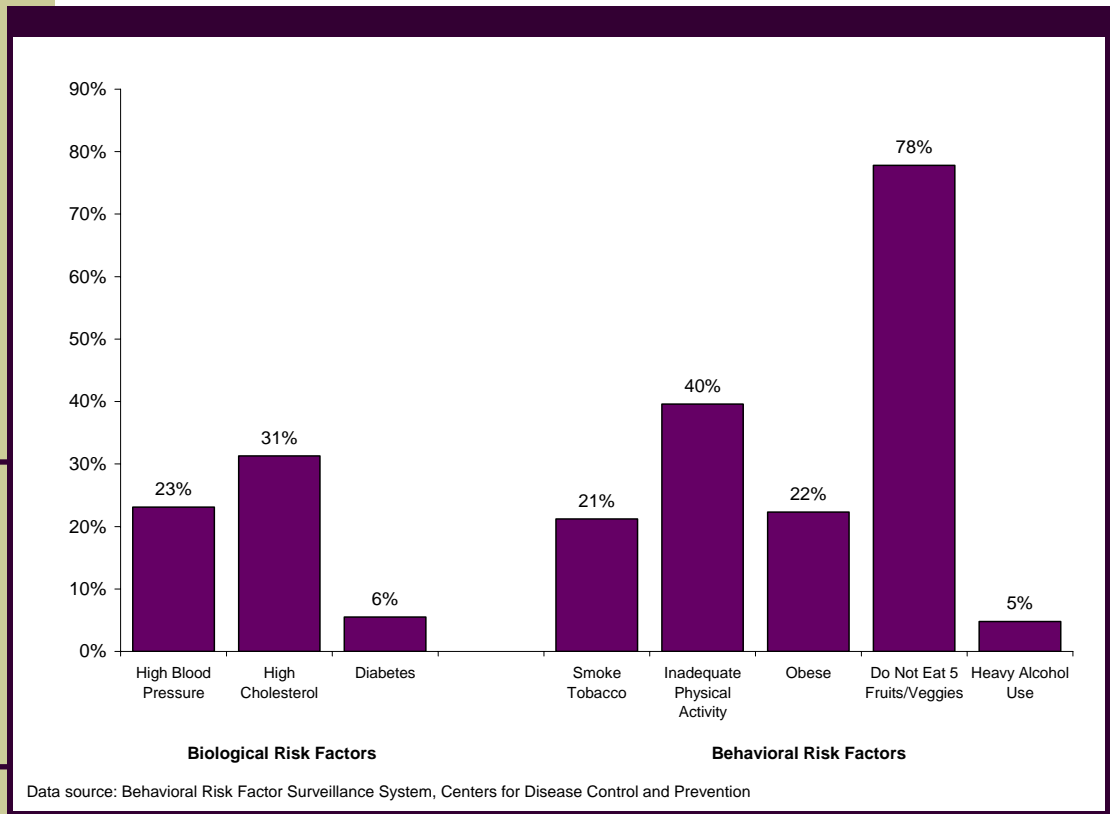
Diabetes mellitus can increase a person's risk for heart disease. Improper regulation of insulin can lead to a build-up of sugars in the blood. Approximately three-quarters of people with diabetes die of diseases of the heart or circulatory system.

# Cardiovascular Disease

Half of Snohomish County adults (50%) reported having at least one biological risk factor (high blood pressure, high cholesterol, or diabetes) for heart disease. Nearly one-quarter (23%) said they had been told by a medical professional that they have high blood pressure, and 31% said they have been told they have high cholesterol.

Nearly seven out of eight Snohomish County adults (86%) of adults indulged in at least one behavior that increased their risk of developing heart disease. About one in five adults smoked tobacco, a similar proportion were obese, and 40% did not participate in adequate physical activity. More than three-quarters of adults did not eat enough fruits and vegetables. Given the prevalence of these behavioral risk factors in the population, it is not surprising that heart disease is the leading cause of death.

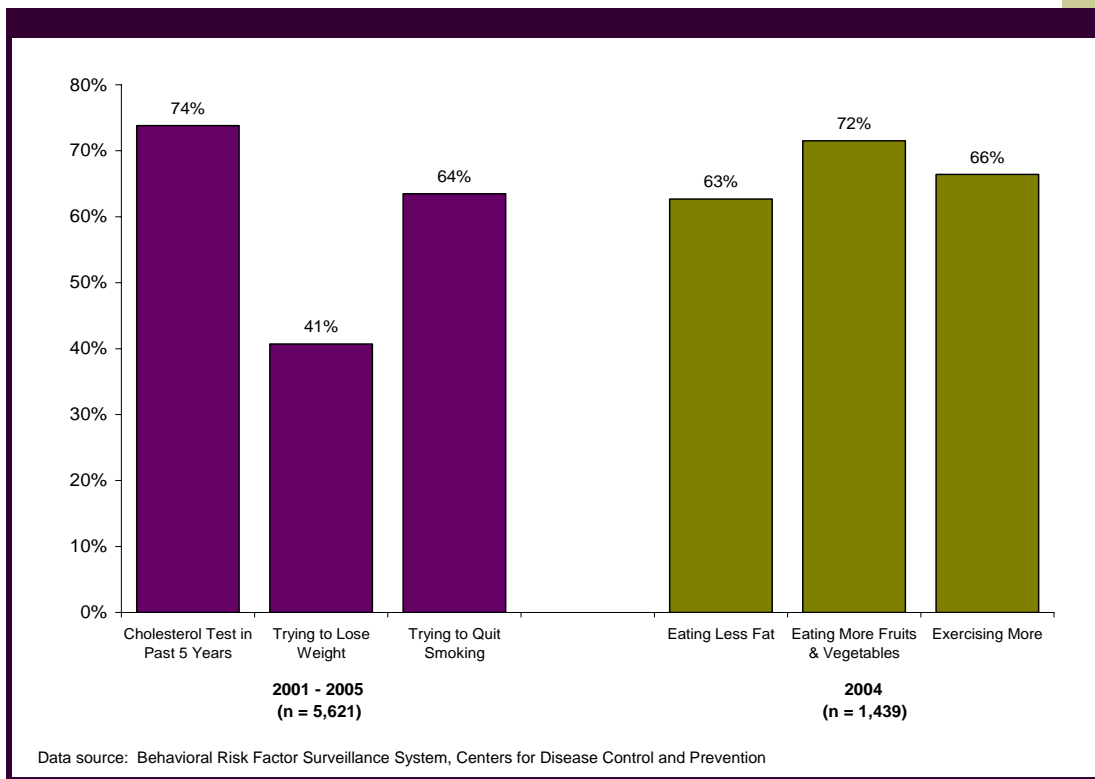
**Heart Disease Risk Factors Snohomish County, 2001 - 2005 (n = 2,372)**



## Screening and Prevention

Prevention of heart disease can be accomplished by monitoring and addressing risk factors like smoking, high blood pressure, and cholesterol. Healthy People 2010 recommends that adults have their blood pressure checked at least every two years and their cholesterol checked at least once every five years. Avoiding tobacco and excessive amounts of alcohol can help to prevent heart disease leading to a heart attack. Preventing and controlling obesity and diabetes also are useful steps for avoiding a heart attack.

- No data currently exist about how recently adults have had their blood pressure checked, but it is encouraging that nearly all survey participants knew whether or not they had been diagnosed with high blood pressure.
- From 2001 through 2005, almost three-quarters of adults had a cholesterol test in the five years prior to being surveyed.
- Two out of five adults said they were trying to lose weight.
- Among smokers, two-thirds said they had tried to quit smoking in the previous year.
- In 2004 the majority of adults reported they were trying to eat less fat and more fruits and vegetables in their diets to avoid the risk of a heart attack. Two-thirds said they were trying to exercise more.



Heart Disease  
Prevention  
Activities  
Snohomish County,  
2001- 2005

## Sources of Information

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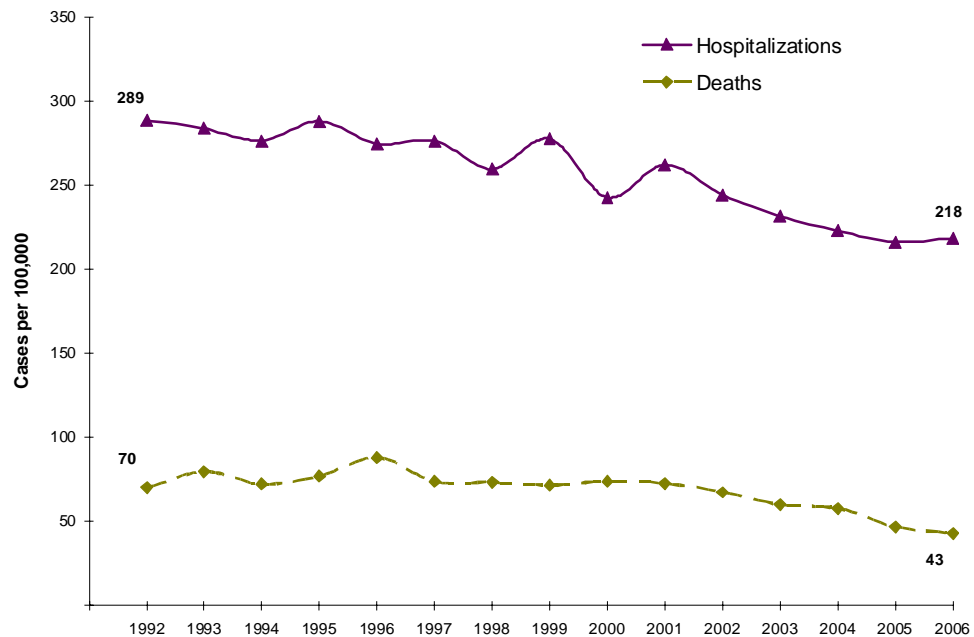
# Cardiovascular Disease

## Stroke

A stroke is very much like a heart attack, except it occurs in the brain. For various reasons (see below) the supply of blood to the brain is interrupted. When this occurs, brain cells are deprived of oxygen and begin to die. The longer this situation lasts, the greater the damage to the brain. This can cause significant disability among those who survive, including paralysis as well as speech and emotional problems. Like a heart attack, strokes are caused by a problem in the circulatory system. Strokes were the third leading cause of death in the United States and the fourth in Washington, but they were the sixth leading cause in Snohomish County, causing more than 200 deaths a year between 2002 and 2006. The county loses almost 400 potential years of life each year from stroke. It is estimated that strokes cost the nation almost \$57 billion in direct and indirect costs during 2005.

There are three main types of stroke: ischemic strokes, hemorrhagic strokes, and transient ischemic attacks (TIAs). *Ischemic strokes* are the most common. They occur when an artery supplying blood to the brain becomes blocked. Blood clots are the most common form of blockage. Atherosclerosis (the buildup of plaques in the arteries) can also lead to blockage and decreased blood flow. *Hemorrhagic strokes* occur when an artery in the brain bursts. This can occur because of an aneurysm, where a weak or thin spot in an artery wall expands until it ruptures. Another possible cause is the breakage of arteries that have become brittle and thin from atherosclerosis. High blood pressure increases the risk of hemorrhagic stroke. *Transient ischemic attacks* (TIAs) are also called "mini-strokes." They begin like major strokes but clear up within 24 hours. TIAs are a warning sign that the patient is at risk for a major stroke.

### Stroke Hospitalizations & Deaths Snohomish County, 1992 - 2006

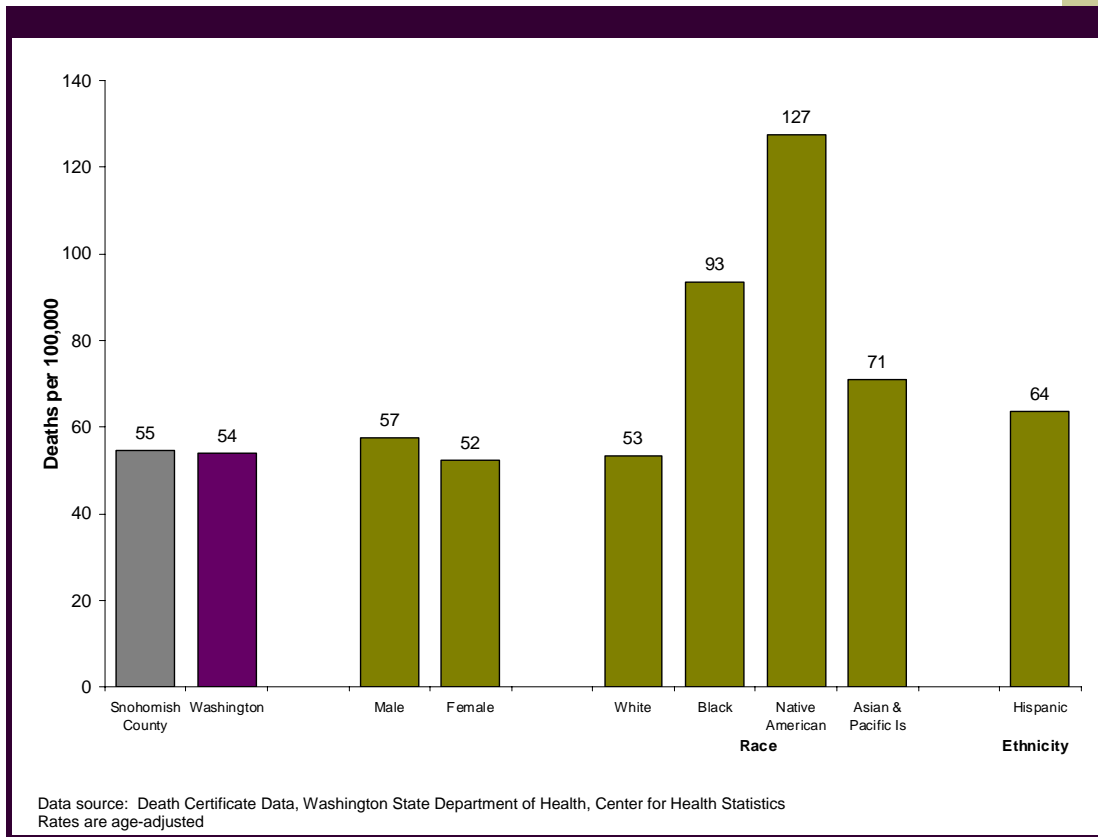


Data sources: Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems. Death Certificate Data, Washington State Department of Health, Center for Health Statistics. Rates are age-adjusted.

- The rate of deaths from stroke declined by 39% from 1992 through 2006 from 70 deaths per 100,000 to 43 per 100,000. This change was statistically significant ( $p = 0.001$ ).
- Nearly 1,200 people were hospitalized from stroke each year from 1992 through 2006.
- Rates of hospitalizations declined 24% during this period from 289 per 100,000 in 1992 to 218 per 100,000 in 2006. This decrease was statistically significant ( $p = 0.001$ ).
- There were approximately five stroke hospital admissions for every death from stroke in 2006.

## Cardiovascular Disease

- From 2002 through 2006, the average rate of deaths from stroke in Snohomish County was 55 per 100,000 residents, very nearly the same as the rate for Washington State.
- Men were more likely to die of stroke than women ( $p = 0.013$ ).
- Non-Whites had higher rates of mortality from stroke than Whites. Native Americans had the highest mortality rates from stroke, which was significantly greater than the county average ( $p < 0.001$ ). Blacks ( $p = 0.01$ ) and Asians ( $p = 0.012$ ) also had significantly higher rates than average. Hispanics also had a higher mortality rate than the county average, but this difference was not statistically significant.



Deaths from Stroke  
by Sex, Race &  
Ethnicity  
Snohomish County,  
2002 - 2006  
(n = 1,396)

### Risk Factors

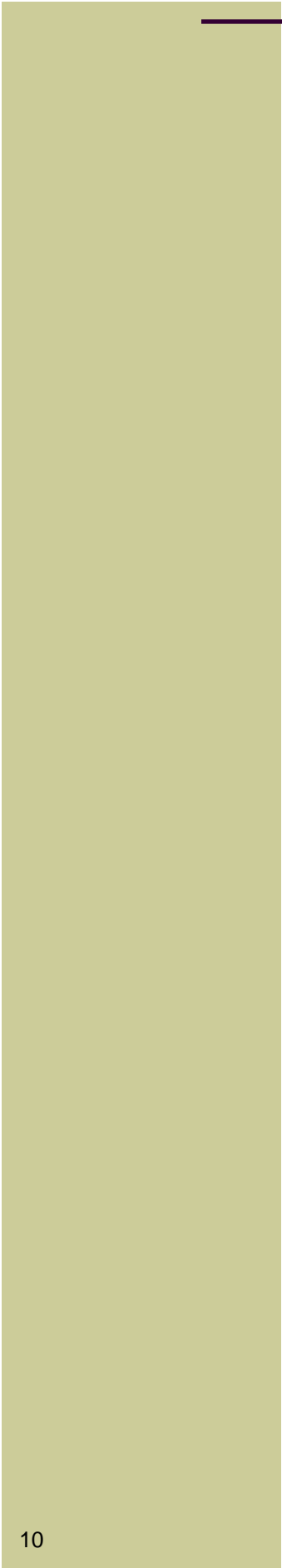
Because strokes are caused by problems with the circulatory system, the risk factors for stroke are the same as those for heart disease (high blood pressure, high cholesterol, diabetes, tobacco and alcohol use, obesity, and genetics - see graph on page 6). In addition, already having heart disease also increases a person's risk of having a stroke.

### Screening and Prevention

Screening for the possibility of a stroke is not possible, but it is possible to screen for risk factors like high blood pressure and cholesterol. Prevention takes the form of controlling those two factors, mainly by changing behaviors that lead to them. A person's chances of having a stroke can be reduced by changing diet (less fat and more fruits and vegetables), weight control, exercise, and by not using tobacco or alcohol.

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Centers for Disease Control and Prevention. Stroke. Available at: [www.cdc.gov/stroke](http://www.cdc.gov/stroke). Accessed April 23, 2008.







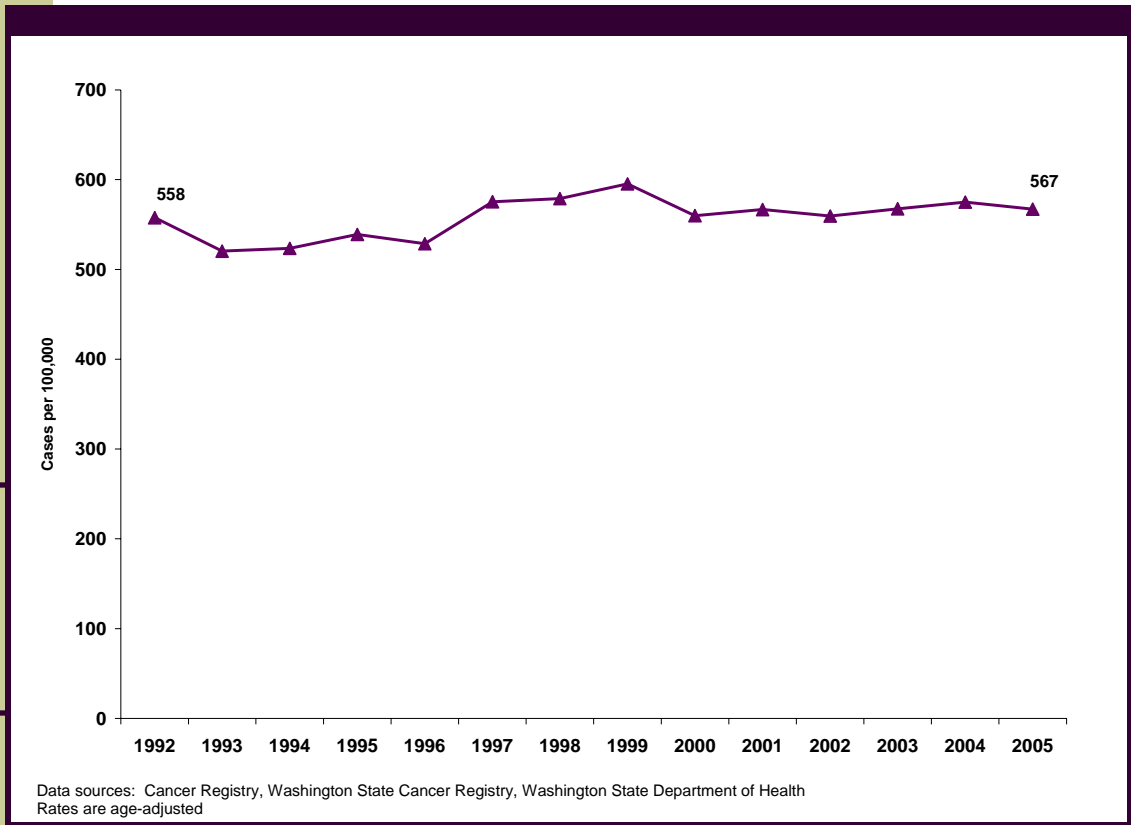
# Cancer

## Cancer Incidence

Cancers are a family of diseases in which a group of cells undergoes mutation and uncontrolled growth. Cancer cells invade and destroy adjacent tissues and sometimes spread to other areas of the body (called *metastasis*). Most cancers form a localized tumor. Tumors that do not exhibit uncontrolled growth, invasion of neighboring tissue, or spread elsewhere in the body are called *benign tumors*. These are not generally life-threatening. Cancer can affect people at all ages, but the risk of developing the more common types of cancer tends to increase with age.

Nearly all cancers are caused by abnormalities in the genetic material of the affected cells. These abnormalities can be caused by cancer-causing agents (called *carcinogens*) like tobacco smoke, radiation, inhaled particulate matter, or infections. Other possible causes include randomly occurring errors in DNA replication or genetics. The presence of carcinogens can interact with underlying genetic susceptibility to produce a cancer.

### Total Cancer Incidence Snohomish County, 1992 - 2005



The overall incidence of cancer in Snohomish County averaged 560 cases per 100,000 residents from 1992 through 2005, which was higher than the average of 540 cases per 100,000 statewide ( $p = 0.05$ ). From 1992 through 2005, the overall cancer incidence rate in Snohomish County increased slightly, but this was significant ( $p < 0.001$ ). Whereas the incidence rates of several of the major types of cancer (lung, colorectal, and prostate) declined during this period, the incidence of other cancers (most notably melanomas and breast cancer) increased, leading to a generally stable overall cancer incidence rate.

## Cancer

Cancer was the leading cause of death in Snohomish County during 2006, replacing heart disease as the number one cause of death. The table below shows which cancers occurred most often and which were most likely to result in death from 2001 through 2005. The main sex-specific cancers (breast and prostate) accounted for 31% of all cancers but only 12% of cancer deaths. Lung cancer accounted for only 12% of diagnosed cancers, but was the leading cause of cancer death (28%). It accounted for more deaths than the next three types of cancer combined.

This section describes the most common forms of lethal cancers: lung, colorectal, hematologic, female breast, and male prostate. Skin cancers, although common, are rarely fatal and are not included. Conversely, pancreatic cancer has not been included because it is rare, although it is usually fatal because it tends to be diagnosed in its later stages.

Incidence Type	Percent of Cancers	Mortality Type	Percent of Cancer Deaths
Breast (F)	17.8	Lung & bronchus	28.4
Prostate (M)	12.7	Hematologic	10.8
Lung & bronchus	12.0	Colorectal	9.6
Colorectal	8.8	Breast (F)	6.6
Hematologic	8.2	Pancreatic	5.6
Skin melanoma	7.9	Prostate (M)	4.9
Bladder	4.3	Brain/central nervous system	3.4
Endometrium (F)	2.6	Liver	2.9
Kidney	2.5	Ovarian (F)	2.8
Oral cavity	2.2	Esophageal	2.7

**Leading Types of  
Cancer by Incidence  
& Mortality  
Snohomish County,  
2001 - 2005**

(M) Males (F) Females  
Data source: Death Certificate Data, Washington State Department of Health, Center for Health Statistics  
Cancer Registry, Washington State Cancer Registry, Washington State Department of Health

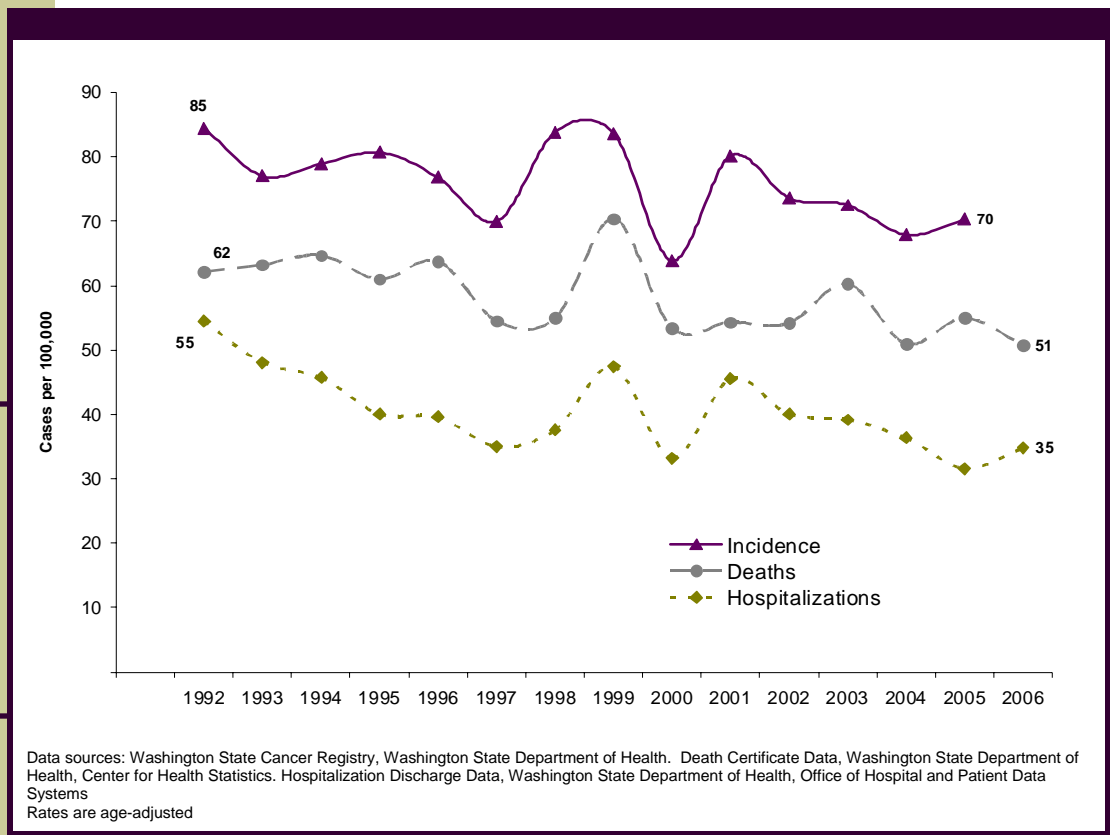
# Cancer

## Lung Cancer

From 2001 through 2005, lung cancer was the third most commonly diagnosed cancer in Snohomish County, but it was the leading cause of cancer deaths. During this period more Snohomish County residents died of lung cancer than of the next three types of cancer combined. Each year in Snohomish County, lung and other respiratory cancers kill approximately 250 people and cause 3,600 years of potential life lost among county residents.

Lung cancer has a long latency period, with clinical symptoms typically manifesting themselves 20 to 40 years after initial exposure. Once diagnosed, approximately 60% of patients die within a year of diagnosis and between 70% and 80% die within two years. The expected five-year survival rate for patients diagnosed with lung cancer is only 15.5%.

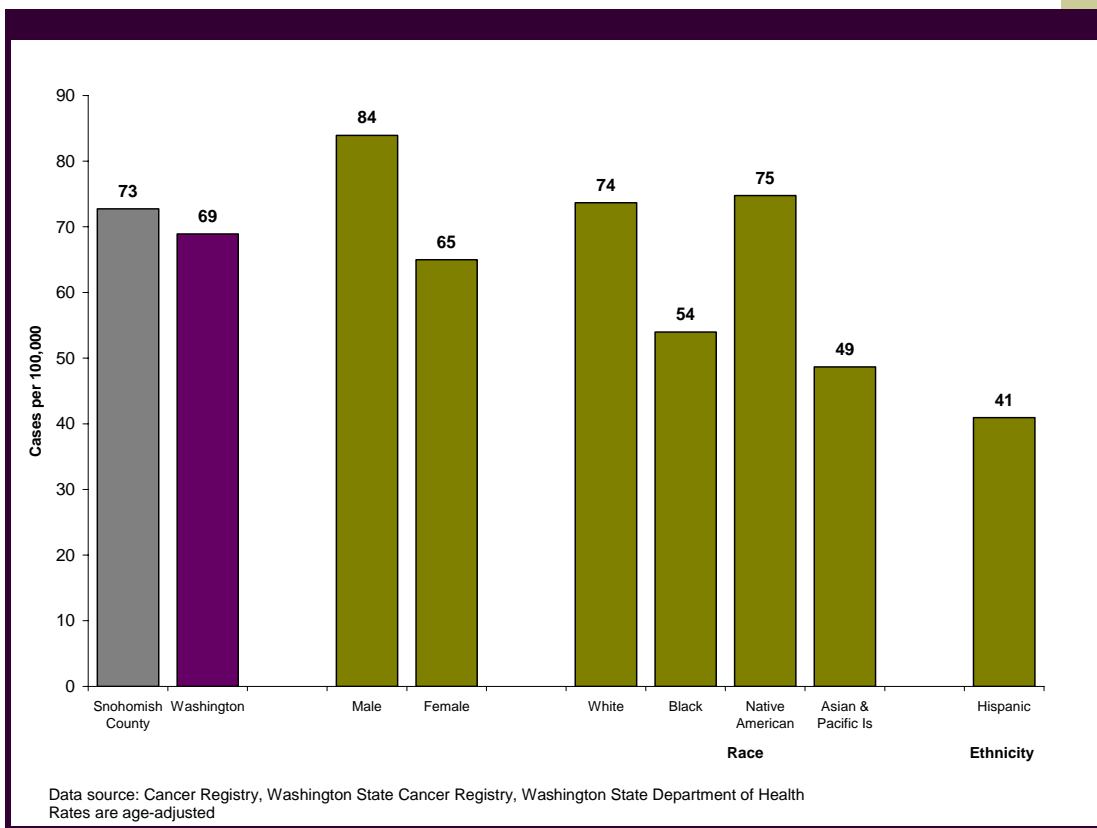
### Lung Cancer Incidence, Hospitalizations, & Deaths Snohomish County, 1992 - 2006



- From 1992 through 2005, 4,800 Snohomish County residents developed lung cancer.
- The incidence rate of lung cancer decreased significantly from 85 cases per 100,000 people in 1992 to 70 cases per 100,000 in 2005 ( $p = 0.001$ ).
- The rate of death from lung cancer also decreased significantly from 1992 through 2006, from 62 deaths per 100,000 to 51 ( $p = 0.001$ ).
- The high mortality rate of this disease can be seen by how closely the rate of deaths follows that of incidence. The mortality rate was approximately 75% of the incidence rate from 1992 through 2005, which is not unexpected given the low survival rate for this disease (see above).
- The pattern of hospitalizations for lung cancer was very similar to the incidence. The hospitalization rate was equal to roughly 54% of the incidence rate.

# Cancer

- In Snohomish County from 2001 through 2005, approximately 375 people developed lung cancer each year, or 73 per 100,000 residents. This was higher than the statewide average of 69 per 100,000 ( $p = 0.04$ ).
- Males were significantly more likely to be diagnosed with this cancer, which may reflect greater smoking rates in males during the past ( $p < 0.001$ ).
- The incidence of lung cancer in Asians and Pacific Islanders was lower than the county average ( $p < 0.001$ ).
- The incidence rate of lung cancer among Hispanics was not significantly different from the county average ( $p = 0.09$ ).



**Lung Cancer  
Incidence by  
Sex, Race, &  
Ethnicity  
Snohomish County,  
2001 - 2005  
(n=1,871)**

## Risk Factors

By far the greatest risk factor for lung cancer is smoking. It is estimated that between 80% and 90% of lung cancer deaths in the United States are from smoking. In Snohomish County an estimated 1,105 people died of smoking-induced lung cancer from 2001 through 2005. Secondhand smoking is thought to be responsible for approximately 3,000 lung cancer deaths annually in the United States.

Other causes of lung cancer are environmental: radon gas, work-borne carcinogens such as asbestos and particulate matter pollution. When environmental exposures are combined with smoking, the risk of developing lung cancer increases greatly over exposure to only one of these risk factors. In addition, certain people may have a genetic vulnerability to developing lung cancer when exposed to one of the causes listed above.

Radon is the second largest cause of lung cancer, responsible for an estimated 21,000 deaths per year nationally. It is a chemically inert, odorless, colorless, and tasteless naturally occurring radioactive element found in soils and rocks that make up the earth's crust. Radon is usually encountered in the home, as gas released from the soil under the house that penetrates into the building. Radon occurs in all of the United States, and the only way to detect it is through testing the air in a residence. Radon levels are measured in pico-Curies per liter (pCi/L). A measure of 4.0 pCi/L or greater is considered dangerous. In Snohomish County 3% of homes have been found to have dangerous radon levels. More information about radon can be found at [www.doh.wa.gov/ehp/rp/environmental/radon.htm](http://www.doh.wa.gov/ehp/rp/environmental/radon.htm).

## Screening and Prevention

There are no simple, inexpensive, and effective methods of screening for lung cancer. A growing number of doctors are using helical low-dose computed tomography (CT) scans that can show smaller tumors in the lungs than regular x-rays can find. It is important to detect tumors when they are small enough to be cured or excised.

The most effective means of prevention is avoiding exposure to carcinogens, particularly cigarette smoke. Cigarettes contain more than 4,000 chemical compounds, many of which are proven carcinogens. The more one smokes, the greater the chance of developing lung cancer. The risk of developing lung cancer decreases when a person stops smoking. After 10 years of not smoking, a former smoker will have only one-third to one-half the risk of developing lung cancer as a person who continued to smoke. During 2006, 19% of Snohomish County adults reported smoking cigarettes within 30 days of being surveyed. Of these, 57% reported that they were trying to quit. The Snohomish Health District provides more information about smoking and cessation programs at [www.snohd.org/snoTobacco/index.htm](http://www.snohd.org/snoTobacco/index.htm).

## Sources of Information

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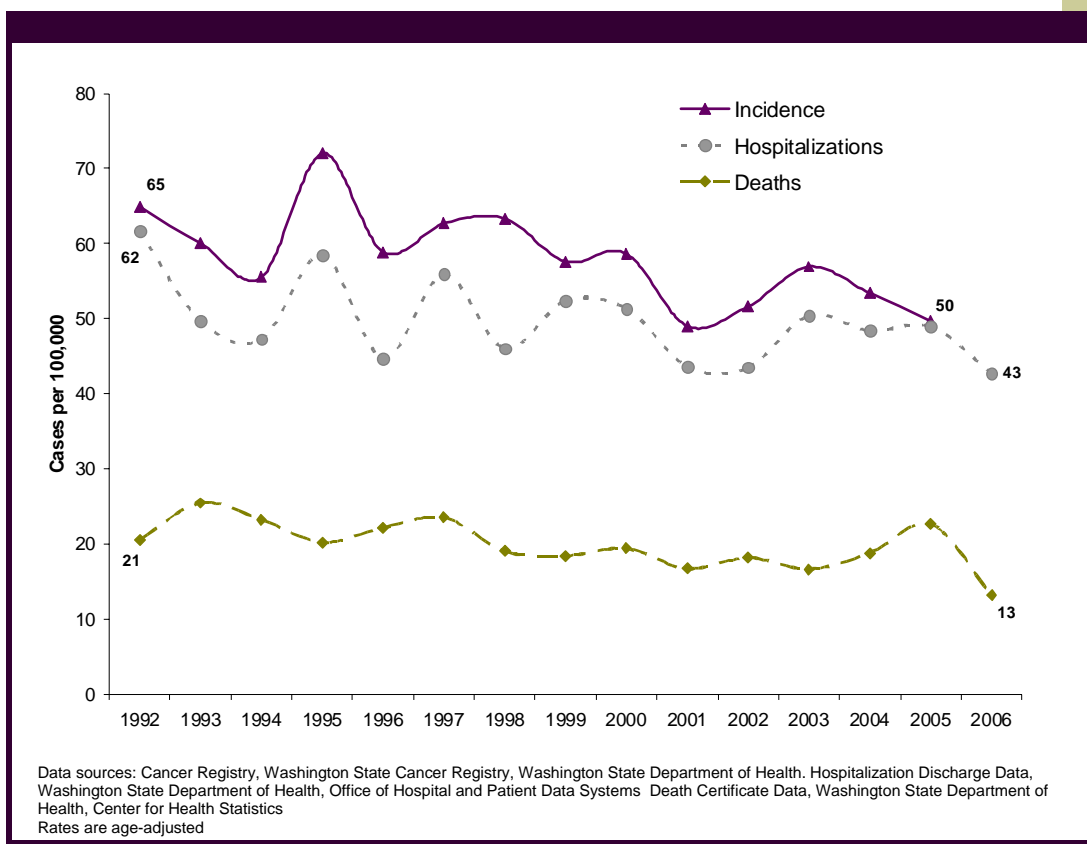
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## Colorectal Cancer

Colorectal cancer was the fourth most commonly diagnosed cancer in Snohomish County from 2001 through 2005, and the third leading cause of cancer deaths. During this period, about 276 county residents were diagnosed with colorectal cancer each year and 95 died of the disease. Each year approximately 260 potential years of life are lost to Snohomish County residents from colorectal cancers.

Colorectal cancer has a latency period of 10 to 20 years. However, the disease is treatable with surgery, and 65% of those diagnosed with colorectal cancer are still alive five years after diagnosis. Survival depends on when treatment occurs. Patients treated while the cancer is still limited to the colon wall have an 80% chance of long-term survival. However, those whose cancer has metastasized to other organs have only a 10% chance of long-term survival.



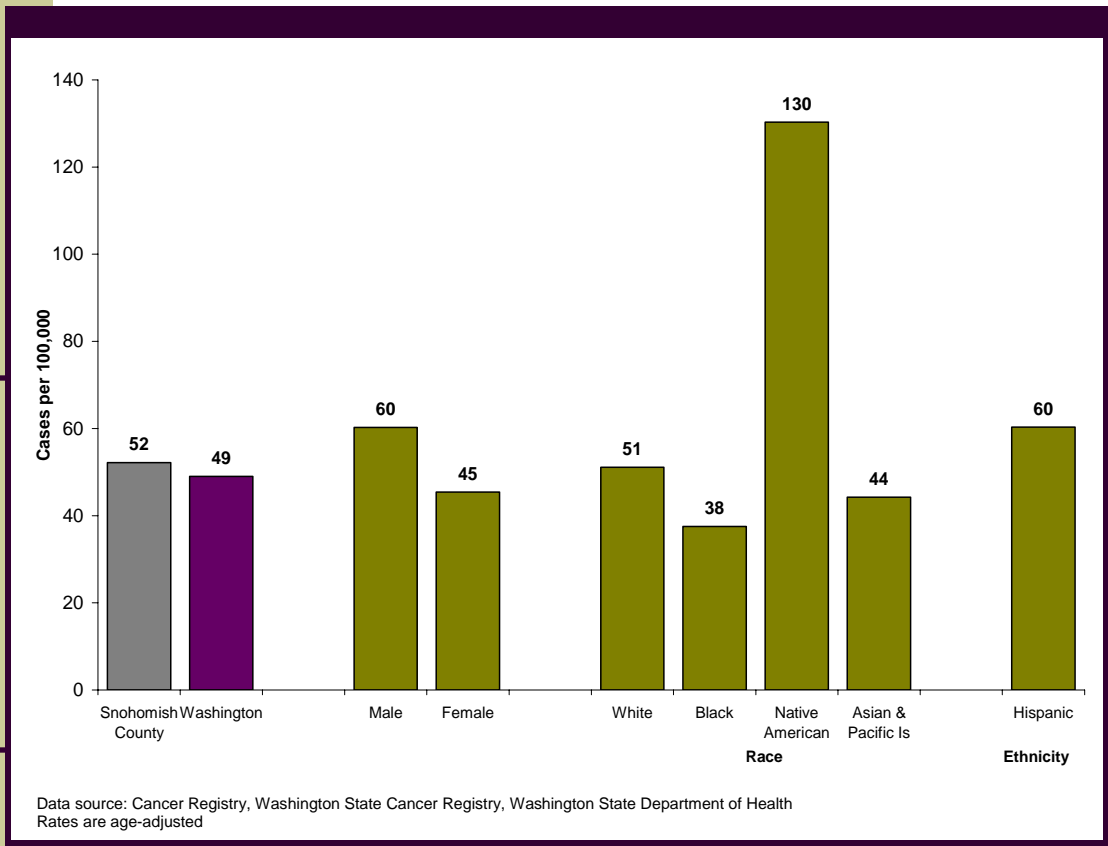
### Colorectal Cancer Incidence, Hospitalizations, & Deaths Snohomish County, 1992 - 2006

- From 1992 through 2005, nearly 3,700 Snohomish County residents developed colorectal cancer.
- The incidence of colorectal cancer decreased by 23% during this period, from 65 cases per 100,000 people in 1992 to 50 cases per 100,000 in 2005 ( $p = 0.001$ ).
- Hospitalizations from colorectal cancers decreased by 31% from 1992 through 2006 ( $p = 0.001$ ). The rate of hospitalizations followed the incidence rate closely because the main treatment for colorectal cancer is surgical removal.
- The mortality rate of colorectal cancer decreased by 36% from 1992 through 2006 ( $p = 0.001$ ). Because the mortality rates prior to 2006 were very stable or similar, it is uncertain whether the decline observed in 2006 reflects a real change or was a one-time anomaly.
- The mortality rate was much lower than the incidence rate, reflecting the high survivability of this disease.

# Cancer

- From 2001 through 2005, nearly 1,400 cases of colorectal cancer were reported in Snohomish County. There were 52 cases of colorectal cancer per 100,000 residents each year. This was significantly higher than the rate statewide ( $p = 0.02$ ).
- Males were significantly more likely than women to be diagnosed with colorectal cancer ( $p < 0.001$ ).
- Native Americans living in Snohomish County had much higher rates of colorectal cancer than other races ( $p < 0.001$ ). The rate of colorectal cancer among Snohomish County Native Americans was more than twice the state average (130 cases per 100,000 compared with 58 per 100,000). Native Americans in Washington also had higher incidence rates of colorectal cancer than the statewide average (58 per 100,000 versus 49 per 100,000,  $p = 0.02$ ).

**Colorectal Cancer  
Incidence by  
Sex, Race,  
& Ethnicity  
Snohomish County,  
2001 - 2005  
(n = 1,383)**





## Risk Factors

The risk factors for developing colorectal cancer are age, lifestyle, and genetic factors. Approximately 90% of people diagnosed with colorectal cancer are older than 50 years. A lack of physical activity increases one's chances of developing colon cancer, as does a diet high in fat. People who are obese are at greater risk of developing colon cancer and are at greater risk of dying of the disease than people considered to be of normal weight. In addition, use of alcohol or tobacco increases one's chances of developing colorectal cancer.

Genetic syndromes that increase a person's risk of developing colon cancer include *familial adenomatous polyposis* and *hereditary nonpolyposis colorectal cancer* (also called *Lynch's syndrome*). In addition, a family history of colorectal cancer means that a person has an elevated chance of developing colorectal cancer. About 20% of colorectal cancers are associated with a family history of colon cancer.

## Screening and Prevention

The most effective method for preventing colon cancer includes early detection and removal of pre-cancerous polyps. Several screening methods are available:

- Stool Blood Test – This test checks a sample of stool for the presence of blood. Samples are collected at home. Cancers found by this method tend to be early stage and have a good long-term prognosis. The 2006 Behavioral Risk Factor Surveillance System survey (BRFSS) showed that 56% of Snohomish County adults aged 40 and older had undergone a stool blood test, a significant increase since 1997, when only 40% had such a test ( $p = 0.001$ ).
- Sigmoidoscopy/Colonoscopy – These tests use a viewing tube to examine the inside of the colon for polyps. It is recommended that people aged 50 and older have such a screening test every 10 years. According to findings from the BRFSS, two-thirds (66%) of Snohomish County adults aged 50 and older met this recommendation in 2006, a significant increase over the 47% who met it in 1995 ( $p = 0.001$ ).
- Barium Enema – This test allows the doctor to evaluate the entire large intestine with an x-ray. The barium coats the lining of the bowel, creating a silhouette of the rectum and colon. If any irregularities are found, the enema is usually followed up with a sigmoidoscopy or colonoscopy.
- Virtual Colonoscopy – Not yet in widespread use, this method uses computed tomography (CT) scans to take images of the inside of the colon.

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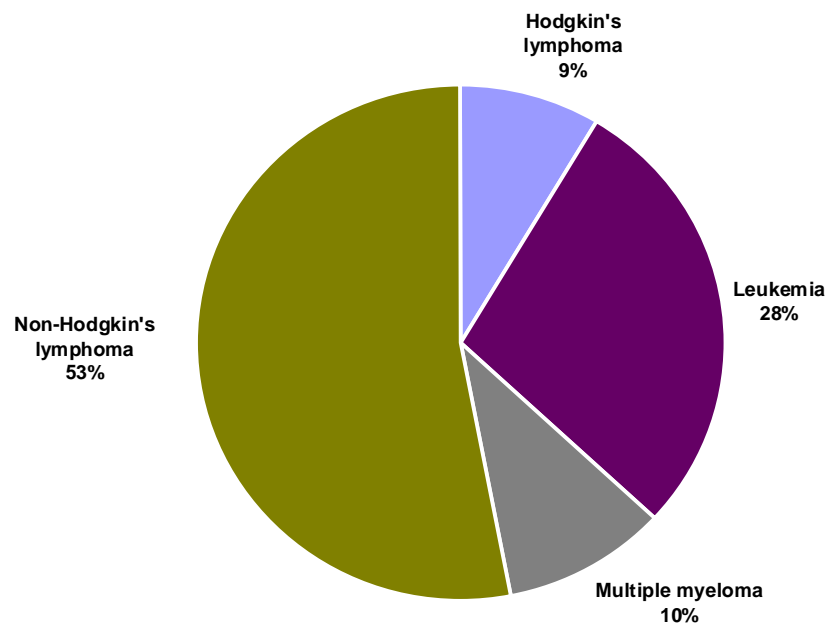
## Hematologic Cancers

Hematologic cancers include leukemias, lymphomas, and myeloma, all of which involve the uncontrolled growth of cells composing various components of the lymphatic and circulatory systems. Lymphoma affects a type of white blood cell called a *lymphocyte* that eventually creates a tumor in a lymph node. Lymphomas are classified as either Hodgkin's or non-Hodgkin's, depending on whether they proceed from one group of lymph nodes to another in an orderly manner (Hodgkin's) or in a nonorderly manner (non-Hodgkin's). *Leukemia* is a term for four related cancers of the bone marrow and blood. Myeloma is cancer of the marrow that affects plasma cells.

The latency periods of the various hematologic cancers are not known because their causes are largely unknown. The latency period for one known cause of leukemia, benzene exposure, is between 5 and 15 years. However, few cases of the disease have such a clear causal agent. Once diagnosed, approximately 60% of patients die within a year and between 70% and 80% die within two years. The five-year survival rate for leukemia is roughly 50%. For lymphomas the five-year survival rate is 67%.

This class of cancers was the fifth most commonly diagnosed cancer in Snohomish County but the second leading cause of cancer deaths from 2001 through 2005. It accounted for 8.2% of all cancers diagnosed but 10.8% of cancer deaths (535 cases). These proportions were similar to those at the state and national levels. Each year in Snohomish County, hematologic cancers cause the loss of more than 450 potential years of life to the population of the county.

**Types of  
Hematologic Cancers  
Snohomish County,  
2001 - 2005  
(n = 1,280)**

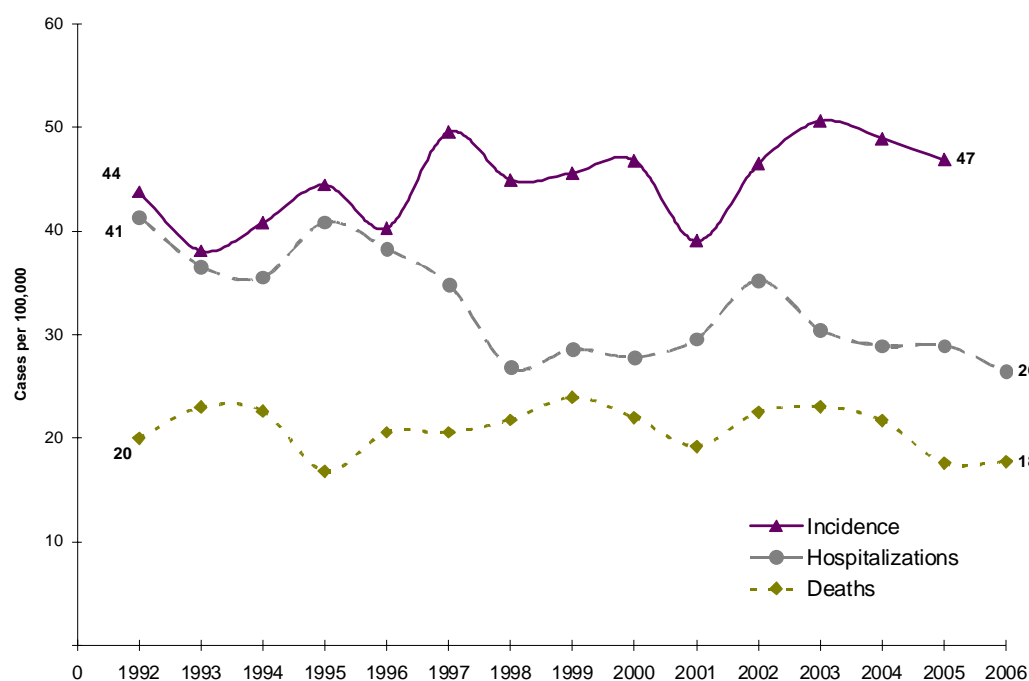


Data source: Cancer Registry, Washington State Cancer Registry, Washington State Department of Health

- Non-Hodgkin's lymphomas were the most common form of hematologic cancers diagnosed from 2001 through 2005, accounting for 53% of all cases.
- Leukemia was the second most common form of hematologic cancer, accounting for about one-quarter of cases.

# Cancer

- From 1992 through 2005, more than 3,000 Snohomish County residents developed a hematologic cancer, an average of 218 new cases per year.
- There is some evidence that the incidence of these cancers increased from 1992 through 2005; however, the trend was not statistically significant. The incidence rate in 2005 was 47 per 100,000 people, which was higher than the rate of 44 per 100,000 in 1992. However, between these years the incidence rate fluctuated from a low of 38 per 100,000 in 1993 to a high of 51 per 100,000 in 2003.
- The rate of deaths from hematologic cancers was fairly stable during this period, averaging 21 deaths per 100,000 residents.
- Hospitalizations from hematologic cancers declined from 41 hospitalizations per 100,000 residents in 1992 to 26 per 100,000 in 2005 ( $p = 0.001$ ).



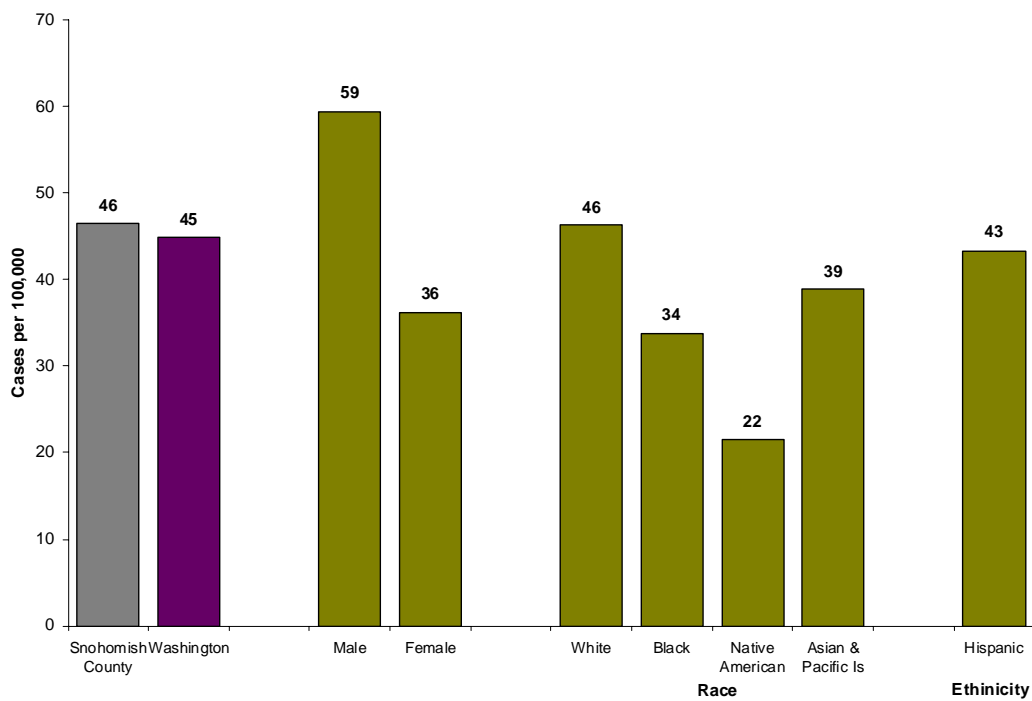
Data sources: Cancer Registry, Washington State Cancer Registry, Washington State Department of Health. Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems. Death Certificate Data: Washington State Department of Health, Center for Health Statistics  
Rates are age-adjusted

## Hematologic Cancer Incidence, Hospitalizations, & Deaths Snohomish County, 1992 - 2006

# Cancer

- In Snohomish County from 2001 through 2005, an average of 46 people per 100,000 developed some form of hemotologic cancer each year. This rate was similar to that of the state.
- Males were significantly more likely to be diagnosed with this type of cancer ( $p < 0.001$ ).
- Native Americans had a rate of mortality from hemotologic cancers that was half the county average ( $p = 0.027$ ). Blacks also had a lower mortality rate from this disease than the average ( $p = 0.04$ ).

## Hematologic Cancers by Sex, Race, & Ethnicity Snohomish County, 2001 - 2005 (n = 1,280)



Data source: Cancer Registry, Washington State Cancer Registry, Washington State Department of Health  
Rates are age-adjusted

## Risk Factors

The causes of hematologic cancers are not well understood, but some associations have been found. Known risk factors for developing leukemia include smoking, a family history of leukemia, and race. Certain cases can be attributed to chronic exposure to benzene or large doses of radiation. Risk factors for developing Hodgkin's lymphoma include being in young or late adulthood, being male, and being infected with the Epstein-Barr virus. Having a first-degree relative with Hodgkin's lymphoma also increases a person's risk.

Non-Hodgkin's lymphoma occurs most often in males, older people, and Whites. Having an immune system disorder from an inherited condition, having HIV/AIDS, or taking immunosuppressant drugs also increases the risk of developing this cancer. Exposure to certain pesticides is an additional risk factor, as is a diet high in meats and fat. Prior treatment for Hodgkin's lymphoma also increases one's chances of developing non-Hodgkin's lymphoma.

The most significant risk factor for developing myeloma is age. Few people younger than age 45 develop the disease, and most cases occur in people 67 or older. Men are more likely to develop the disease than women, and it is about twice as common among African Americans than among Whites. Exposure to radiation is a risk factor in some rare cases. Having a sibling with multiple myeloma also increases a person's risk of developing this disease.

## Screening and Prevention

No quick and inexpensive screening tests for hematologic cancers are available. Those methods that exist tend to be expensive and invasive (e.g., bone marrow biopsy). Several screening tests are currently undergoing clinical trials, but no definite conclusions about their effectiveness can be drawn as yet.

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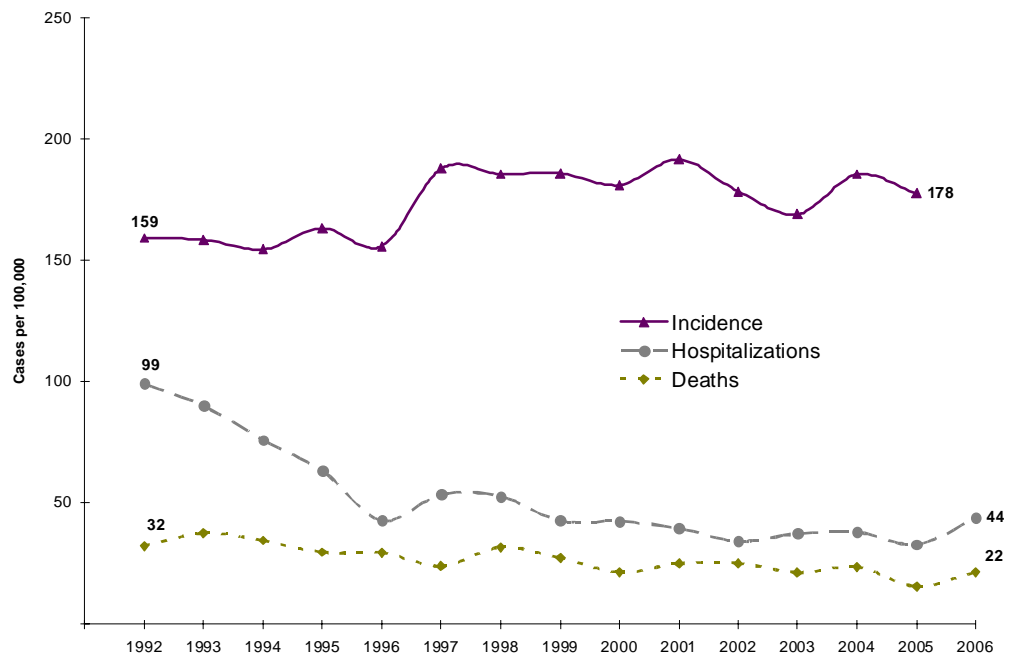
# Cancer

## Breast Cancer

Breast cancer was the most commonly diagnosed cancer in Snohomish County from 2001 through 2005, with approximately 556 new cases occurring each year. During this same period it was the fourth leading cause of cancer deaths in Snohomish County, causing an average of 65 deaths per year. Each year in Snohomish County, breast cancer causes 1,600 years of potential life lost in the population. A woman's lifetime risk of developing breast cancer is 13%, or almost one in seven women. Males can also develop breast cancer, although this is much rarer, with only 0.6% of breast cancer cases occurring in men.

The latency period of breast cancer is unknown but seems to vary by cause and type of tumor that develops. However, latency periods of 20 to 40 years are not uncommon. The expected five-year survival rate for patients diagnosed with breast cancer is 86%. After 10 years, 78% of patients are still alive.

### Breast Cancer Incidence, Hospitalizations, & Deaths Snohomish County, 1992 - 2006

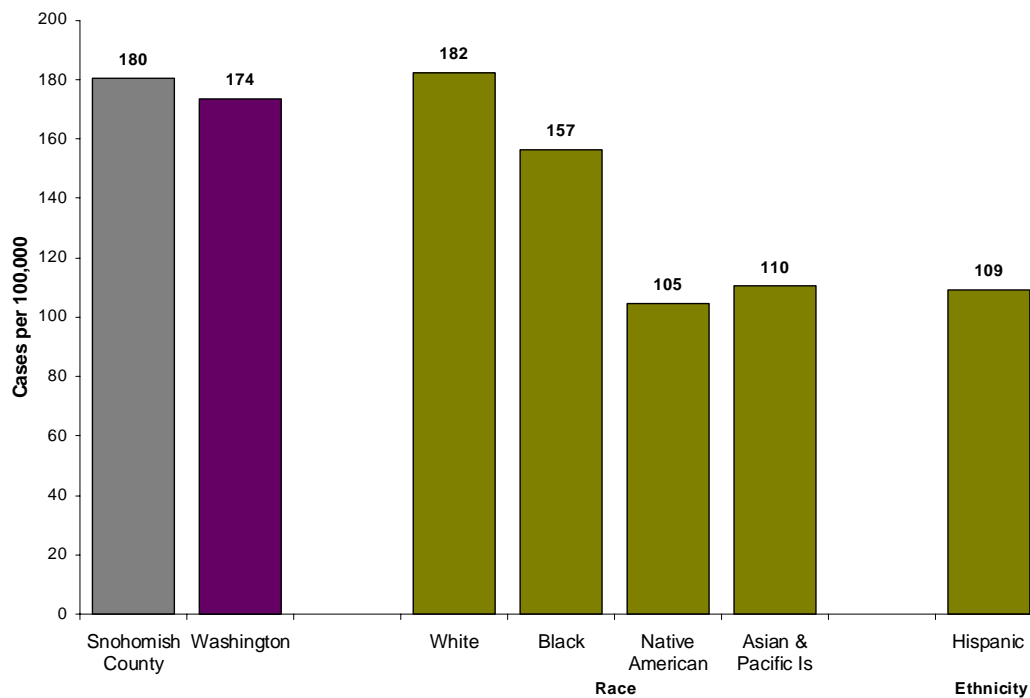


Data sources: Cancer Registry, Washington State Cancer Registry, Washington State Department of Health. Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems, Death Certificate Data, Washington State Department of Health, Center for Health Statistics  
Rates are age-adjusted

- From 1992 through 2005, more than 6,500 Snohomish County women developed breast cancer.
- The incidence rate of breast cancer increased from 159 cases per 100,000 women in 1992 to 178 cases per 100,000 in 2005 ( $p = 0.001$ ).
- More than 960 women died of breast cancer during this period, but the rate of mortality from breast cancer decreased from 32 deaths per 100,000 women in 1992 to 22 deaths per 100,000 in 2006 ( $p = 0.001$ ).
- The combination of decreasing death rates with rising incidence rates has resulted mainly from improved screening. Better screening means that cancers are caught at an earlier, more treatable stage of development.
- Hospitalization rates from breast cancer dropped from 99 per 100,000 women each year in 1993 to 44 per 100,000 in 2006 ( $p = 0.001$ ). This drop is probably from earlier diagnoses of cases through increased screening.

# Cancer

- In Snohomish County from 2001 through 2005, approximately 550 women developed breast cancer each year, or about 180 cases per 100,000 women.
- The incidence rate of breast cancer was greater in Snohomish County than it was for the state ( $p = 0.036$ ).
- Asians and Pacific Islander women had lower rates of breast cancer than the county average ( $p < 0.001$ ). Hispanic women also had lower rates of breast cancer than the county average ( $p < 0.001$ ).
- In Snohomish County, Native American women had low rates of breast cancer compared with other races, but this was not statistically significant ( $p = 0.18$ ), probably because of the small number of cases involved. Nationally, Native American women have the lowest incidence rate of breast cancer of all races.



Data source: Cancer Registry, Washington State Cancer Registry, Washington State Department of Health  
Rates are age-adjusted

**Female Breast  
Cancer Incidence  
by Race,  
& Ethnicity  
Snohomish County,  
2001 - 2005  
(n = 2,778)**

## Risk Factors

The causes of breast cancer are not fully understood at this point. Many exposures and personal characteristics have been associated with breast cancer, but many of these associations are questioned by experts in the field. Risk factors include genetic predispositions, carcinogen exposure (e.g., toxic chemicals, radiation), diet, obesity, and childbearing history. Genetic risk factors account for between 5% and 10% of breast cancers. Women whose close relatives have developed breast cancer are at increased risk of developing it themselves.

Women older than age 50 are more than six times as likely to develop breast cancer compared with women younger than 50. Women who experience early puberty (12 or younger), have delayed menopause, or have their first child after age 30 are all at increased risk of developing breast cancer.

Certain environmental toxins are thought to be associated with the development of breast cancer, but only the association with ionizing radiation seems to be well-documented. Dietary risk factors include eating large amounts of red meat and possibly fat consumption. Obesity is associated with an increased risk of breast cancer after menopause. Smoking and alcohol consumption are also thought to increase a woman's chances of developing breast cancer, but the effect of alcohol is better documented than that of tobacco.

## Protective Factors

Protective factors against breast cancer are also not well understood. Consumption of whole grains and vegetables, particularly dark green and yellow ones, has been shown to reduce a woman's risk of breast cancer, as has regular exercise. A woman who has a full-term pregnancy before the age of 20 has a lower risk of developing breast cancer than other women. Obesity is associated with a slightly decreased risk of developing breast cancer before menopause but is associated with increased risk after menopause.

## Screening and Prevention

Regular screening for breast cancer greatly improves the chances that a woman with the disease will be diagnosed at an early stage, thus improving her prognosis. Women can (and should) do regular self-exams in addition to having regular mammograms and clinical breast exams.

It is recommended that women 40 and older have a mammogram every two years. However, this test leads to many false positives in women under the age of 50. The Behavioral Risk Factor Surveillance System (BRFSS) found that among Snohomish County women 50 and older, 81% had a mammogram within the prior two years between 2000 and 2004.

Women are encouraged to have a clinical breast exam on an annual basis. BRFSS results show that between 2000 and 2004, 64% of Snohomish County women said that they had a clinical breast exam in the previous year.

## Sources of Information

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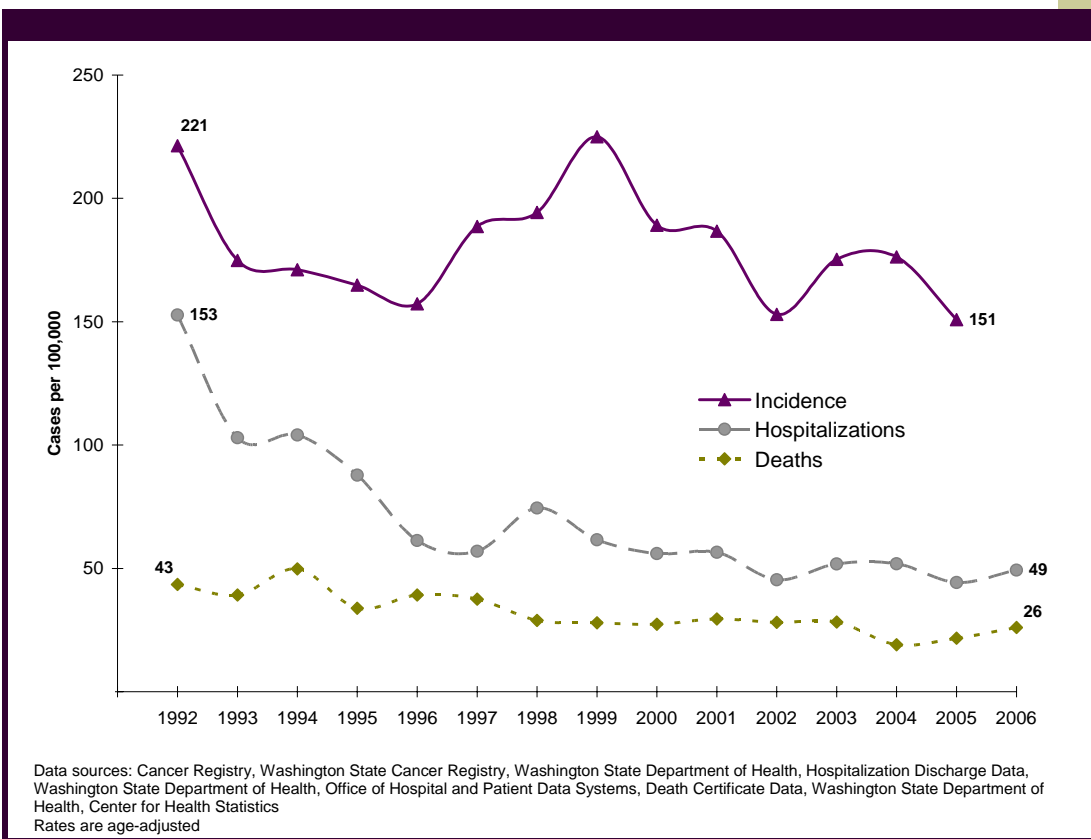
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## Prostate Cancer

Prostate cancer was the second most commonly diagnosed cancer in Snohomish County from 2001 through 2005 and the most commonly diagnosed cancer in men. About one in six men can expect to develop prostate cancer in their lifetime. However, prostate cancer has one of the highest survival rates of all cancers. The expected five-year survival rate for patients diagnosed with prostate cancer is 98.8%. After 10 years 95.2% of patients are still alive. However, only 32% of men will survive for five years if the cancer has metastasized.

Approximately 400 new cases of prostate cancer occur each year in Snohomish County. Fifty men die in the county each year of prostate cancer. Because the disease strikes mostly older men, it causes only 209 years of potential life lost before the age of 65 each year.



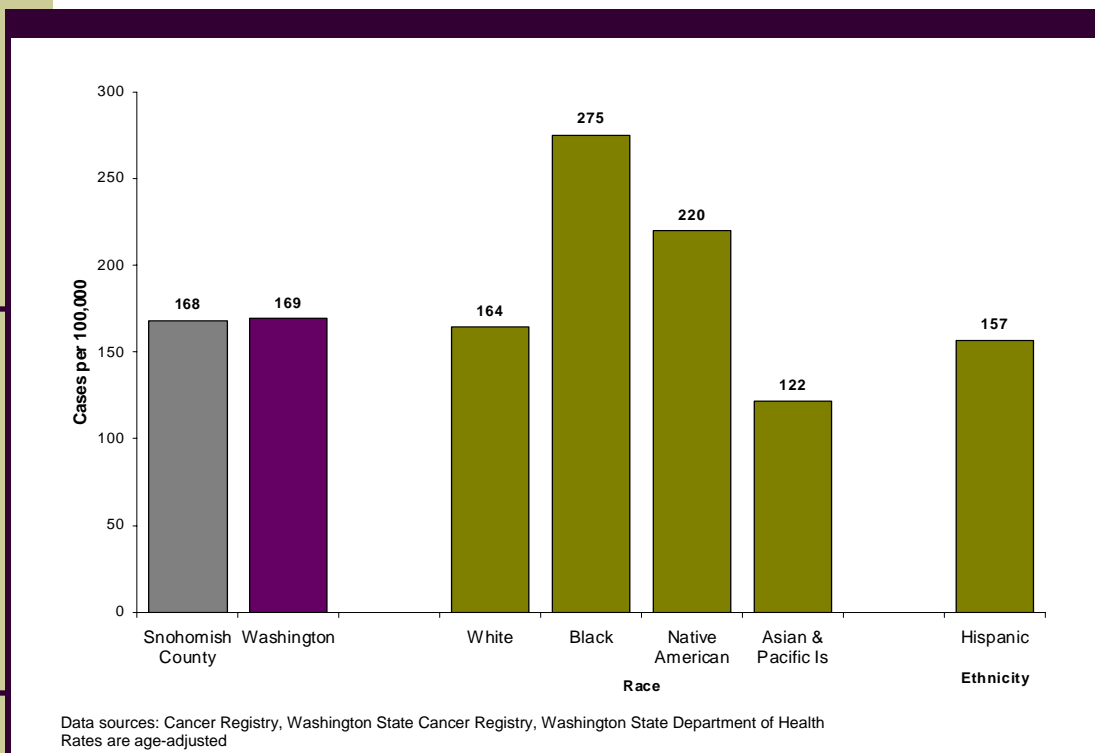
**Prostate Cancer  
Incidence,  
Hospitalizations, &  
Deaths  
Snohomish County,  
1992 - 2006**

- From 1992 through 2005, more than 5,000 Snohomish County men developed prostate cancer.
- The incidence rate of prostate cancer varied significantly during this period with a peak in 1999 of 225 cases per 100,000 men. Since then the rates have fallen to 151 cases per 100,000 men in 2005, but there was no clear overall trend during this period.
- More than 760 men died of prostate cancer from 1992 through 2006, but the rate of deaths from prostate cancer decreased from 43 deaths per 100,000 men in 1992 to 26 deaths per 100,000 men in 2006 ( $p = 0.001$ ).
- Hospitalization rates from prostate cancer dropped dramatically, from 153 per 100,000 men in 1992 to 49 per 100,000 in 2006 ( $p = 0.001$ ).

# Cancer

- In Snohomish County from 2001 through 2005, almost 2,000 men were diagnosed with prostate cancer, for an average of 168 cases per 100,000 men each year. This was similar to the rate for Washington State.
- Black men were significantly more likely to be diagnosed with this cancer than average for the county ( $p = 0.007$ ). National studies have shown that Black men are usually diagnosed at a more advanced stage of the disease than others, making them more likely to die of it.
- Asians and Pacific Islanders had a lower rates of prostate cancer than the county average ( $p < 0.001$ ).
- Hispanic men are less likely to be diagnosed with prostate cancer than the national average, but in Snohomish County there was no significant difference in the incidence rates of Whites and Hispanics ( $p = 0.26$ ).

**Prostate Cancer  
Incidence by  
Sex, Race,  
& Ethnicity  
Snohomish County,  
2001 - 2005  
(n = 1,987)**



## Risk Factors

Most of the identified risk factors for prostate cancer are genetic and biological, as opposed to behavioral (e.g., smoking) or environmental (e.g., toxic compounds). Age is the strongest risk factor for prostate cancer. The chances of developing prostate cancer increase rapidly after the age of 50, and two of three cases occur in men older than age 65. Having a father or brother with prostate cancer more than doubles a man's risk for developing this disease. Having several affected relatives increases the chances even more.

Prostate cancer occurs more often in Black men than in other races. Asians and Hispanics are at lower risk of developing the disease. Men living in North America, Northwest Europe, Australia, and on Caribbean islands are more likely to develop prostate cancer than those living elsewhere.

The effect of diet on the chance of developing prostate cancer is unclear. Consumption of a large amount of red meat and high-fat dairy products seems to increase the chance, but this finding is confounded with not eating enough fruits and vegetables. Other possible risk factors that have been identified are obesity, lack of exercise, prostatitis (inflammation of the prostate), and vasectomy, but their effects have not been confirmed.

## Screening and Prevention

It is unclear whether regular screening for prostate cancer improves the chances that the disease will be diagnosed at an early stage, thereby improving the patient's prognosis. Neither the Centers for Disease Control and Prevention nor the U.S. Preventive Services Task Force believe that the evidence supports regular screening for prostate cancer. The American Urological Association recommends yearly prostate specific antigen (PSA) testing for men 50 and older, and the American Cancer Society suggests that doctors offer the test annually to men 50 and older who are expected to live an additional 10 years or more. Data on colorectal cancer screening are available from the Behavioral Risk Factor Surveillance System (BRFSS) survey.

- A digital rectal exam (DRE) is a screening tool to detect rectal and prostate cancers. In Snohomish County between 2001 and 2005, 51% of men 50 and older reported that they had a DRE in the past year.
- A prostate specific antigen (PSA) test is a blood measurement for the amount of a protein produced by the prostate. Just over half of men 50 and older had a PSA test in the prior year.
- Only 39% of men 50 and older had neither a DRE nor a PSA in the previous year.

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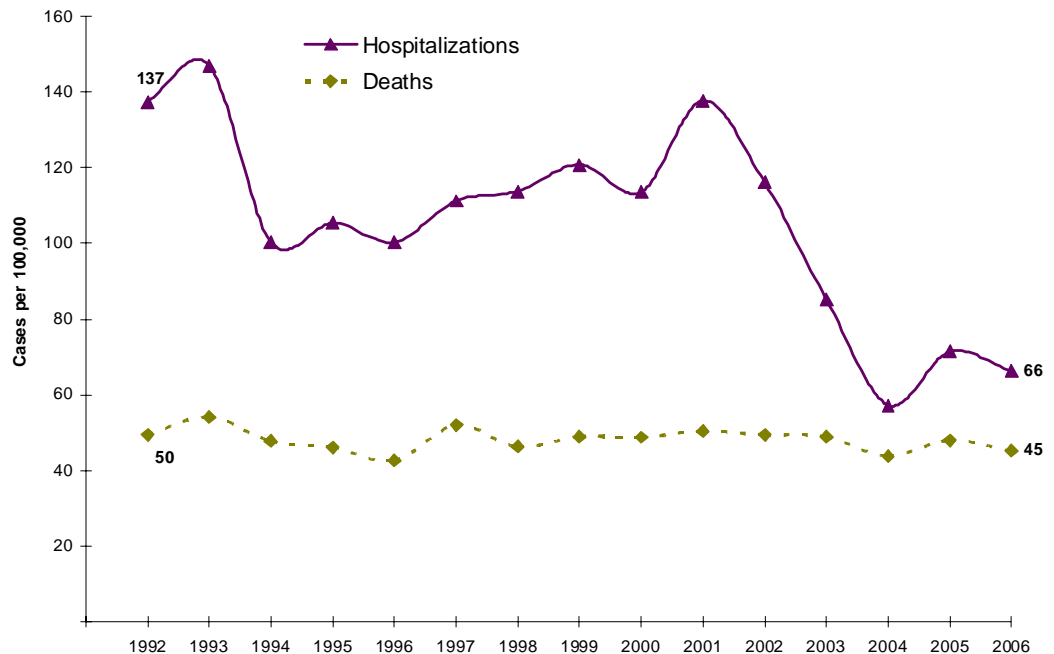
# Lung Disease

## Chronic Obstructive Pulmonary Disease (COPD)

*Chronic obstructive pulmonary disease (COPD)* refers to two similar lung diseases, emphysema and chronic bronchitis. Both these diseases involve an obstruction of airflow to the lungs and interfere with the patient's ability to breathe. Because these two conditions often co-exist, the term COPD is used. Chronic bronchitis is the inflammation and eventual scarring of the linings of the bronchial tubes. Emphysema begins with the destruction of the air sacs (alveoli) in the lungs where oxygen from the air is exchanged for carbon dioxide in the blood.

COPD was the fifth leading cause of death in Snohomish County during 2006, but nationally it was the fourth. Approximately 209 people die of this disease each year in the county. However, because most people who die of the disease are elderly, only about 225 potential years of life are lost each year in Snohomish County from COPD. Recent research suggests that COPD is underreported, as 24 million Americans had evidence of impaired lung function in 2004, but only 11.4 million had been diagnosed with COPD.

### COPD Hospitalizations & Deaths Snohomish County, 1992 - 2006

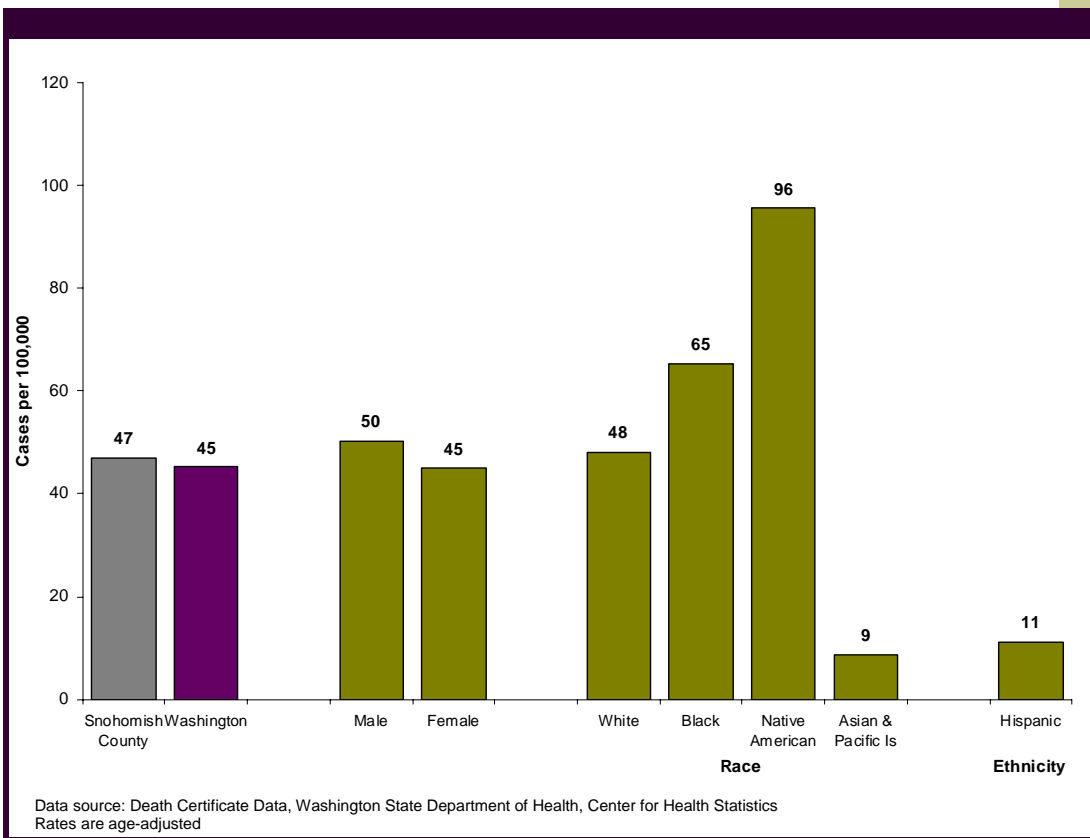


Data sources: Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems Death Certificate Data, Washington State Department of Health, Center for Health Statistics  
Rates are age-adjusted

- From 1992 through 2006, 3,140 Snohomish County residents died of COPD, or about 209 each year.
- Mortality rates from COPD were fairly consistent throughout this period, averaging 48 deaths per 100,000 residents each year.
- Hospitalizations from COPD decreased 52% from 1992 through 2004. This decrease was statistically significant ( $p = 0.001$ ). The greatest decline occurred between 2001 and 2004. This decrease is puzzling because there was no corresponding change in hospitalization rates statewide.

## Lung Disease

- The mortality rate for COPD in Snohomish County was 47 deaths per 100,000 from 2002 through 2006. This was very similar to the statewide rate.
- Males were no more likely to die from COPD than females ( $p = 0.06$ ).
- Asians and Pacific Islanders had the lowest COPD mortality rates in the county ( $p < 0.001$ ). Hispanics also had a mortality rate significantly lower than the county average ( $p < 0.001$ ).
- Native Americans had a higher rate of mortality from COPD than was average for Snohomish County ( $p < 0.001$ ). This difference was also reflected at the statewide level ( $p < 0.001$ ).



Deaths from COPD  
by Sex, Race, &  
Ethnicity  
Snohomish County,  
2002 - 2006  
(n = 1,180)

## Risk Factors

Smoking is the primary risk factor for COPD. Nationally it is estimated that between 80% and 90% of COPD deaths are from smoking. A person who smokes is 12 to 13 times more likely to die of COPD than a nonsmoker.

Environmental risk factors for COPD include air pollution and secondhand smoke. Occupational exposure to certain industrial pollutants also increases a person's chances of developing COPD. Among nonsmokers, nearly one-third of cases of COPD are from occupational exposures. A history of childhood respiratory infections and heredity are additional risk factors for developing COPD.

## Screening and Prevention

There is currently no preventive screening test for COPD. Patients suffering from the symptoms of COPD (cough, sputum production, shortness of breath, wheezing, chest tightness) are administered a spirometry test. This is a simple test of lung function that can determine whether a patient has COPD and, if so, how severe the disease is.

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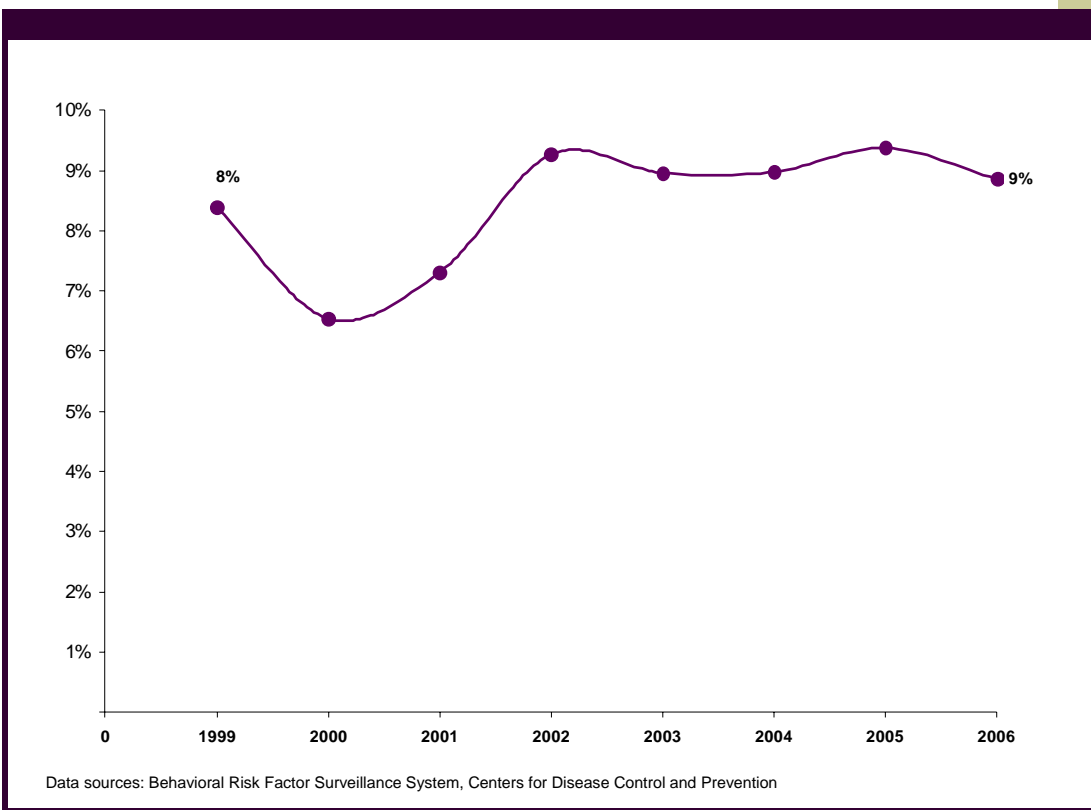


## Asthma

Asthma is a chronic disease in which the linings of the airways leading to the lungs become inflamed and sensitized to allergens and other irritants. When the airways react to such irritants the linings become more inflamed and less air flows to the lungs. This is called an asthma "attack." During an attack the muscles around the airways constrict, making the airways even narrower. People can die of an asthma attack of sufficient severity. Symptoms of asthma include chronic cough, difficulty breathing, wheezing, shortness of breath, itchy or sore throat, and being unable to talk in full sentences. Asthma is rarely cured, but its effects can be controlled.

### Asthma in Adults

Asthma is not a leading cause of death in Snohomish County, as only six deaths a year are caused by the disease. Most of those who die of asthma are elderly, totaling fewer than 20 years of potential life lost each year. However, asthma can seriously impact a person's quality of life and limit their life choices. Asthma is one of the leading causes of school and work absences. It is difficult to estimate the true prevalence of asthma in Snohomish County because there is no systematic reporting mechanism for this disease. However, estimates for adults are available from the Behavioral Risk Factor Surveillance System (BRFSS). Adults who reported they have been diagnosed with asthma and have the disease are included in these prevalence estimates.



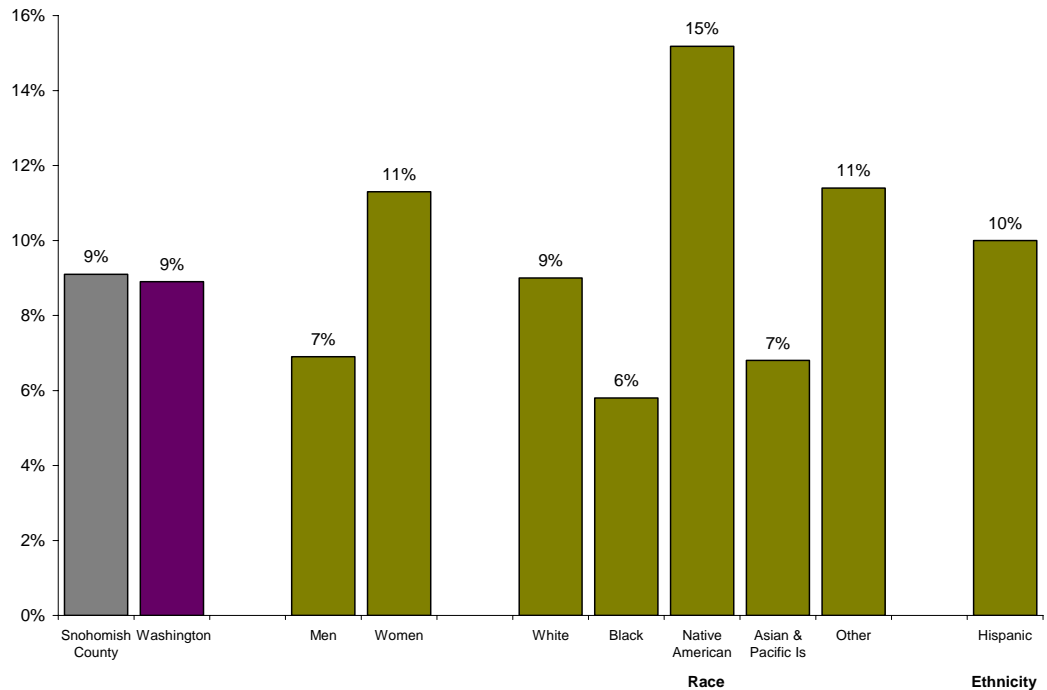
**Asthma  
Prevalence in Adults  
Snohomish County,  
1999 - 2006**

- From 1999 through 2006, there was no significant change in the percentage of adults with asthma. In 1999, 8% of adults said that they currently had asthma; 9% reported having asthma in 2006.

# Lung Disease

- From 2002 through 2006, approximately 9% percent of Snohomish County adults said they currently had asthma. This was similar to the statewide average.
- Women were more likely to report having asthma than men ( $p = 0.001$ ).
- Native Americans were more likely than other races to report having been diagnosed with asthma, whereas Blacks, Asians, and Pacific Islanders were less likely. However, none of these differences was statistically significant.

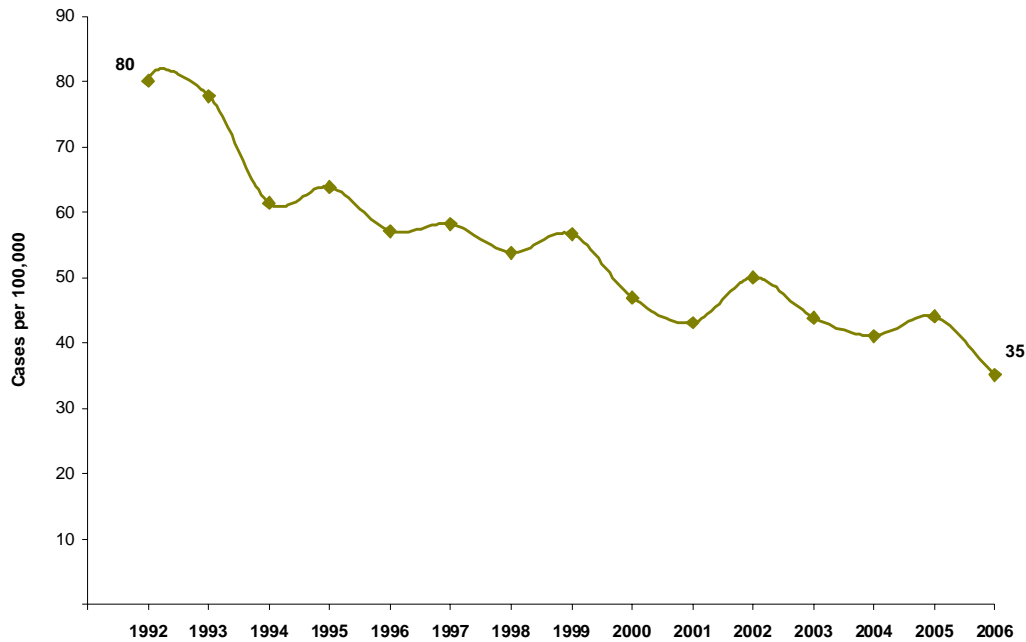
## Asthma Prevalence in Adults by Sex, Race, & Ethnicity Snohomish County, 2002 - 2006 (n = 8,265)



Data source: Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention

## Lung Disease

- Adult hospitalizations from asthma decreased 56% from 1992 through 2006. This decrease was statistically significant ( $p = 0.001$ ). This improvement may have resulted from the development of better asthma management techniques during this period or from the increased use of emergency department services for asthma cases.



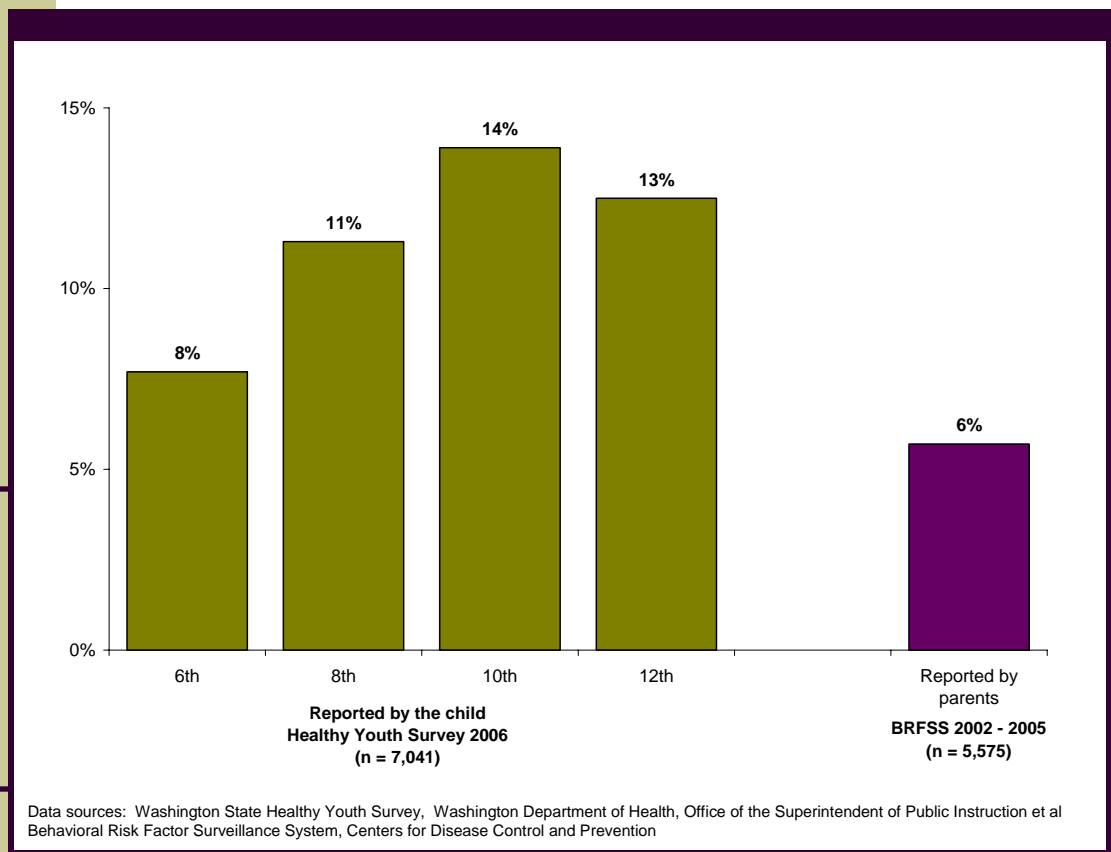
Data source: Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems  
Rates are age-adjusted

**Asthma  
Hospitalizations  
in Adults  
Snohomish County,  
1992 - 2006**

# Lung Disease

## Asthma in Children

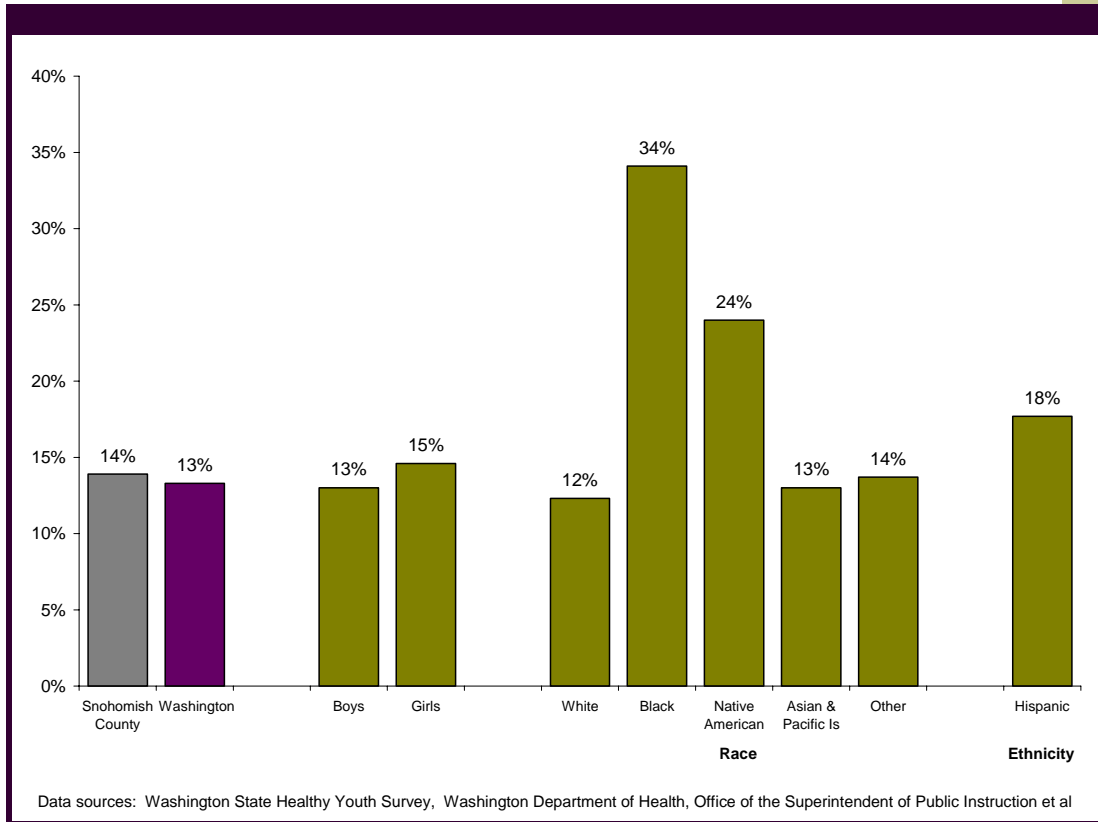
Students were much more likely than their parents to say they had asthma (defined as experiencing an asthma attack or using medication in the year prior to the survey). The number of students reporting that they had an asthma attack or took asthma medication in the year prior to being surveyed was approximately twice what adults reported for their children (11% versus 6%). Because asthma prevalence increased with age in the Healthy Youth Survey (HYS), it is reasonable to assume that children younger than the 6th grade would have even lower rates of asthma. Because parents in the BRFSS survey would include children younger than those included in the HYS, it seems reasonable that the overall average reported by parents would be lower. Conversely, the difference may be due to differences in how asthma questions were asked in the two surveys.



- Asthma prevalence increased with age ( $p = 0.001$ ), although most of the increase seemed to occur before children reach high school age.
- From 2002 through 2006, parents reported that 6% of the children living in their household had asthma.

## Lung Disease

- One in seven 10th graders said they had asthma. This was similar to the prevalence statewide.
- Girls were slightly more likely than boys to say they had asthma, but this difference was not significant.
- Black and Native American students had a higher prevalence of asthma than other races. The higher prevalence among Black students than was average for the county was statistically significant ( $p = 0.001$ ), but the high rate for Native Americans was not. This was probably because of the small number of Native American students who responded to the survey.

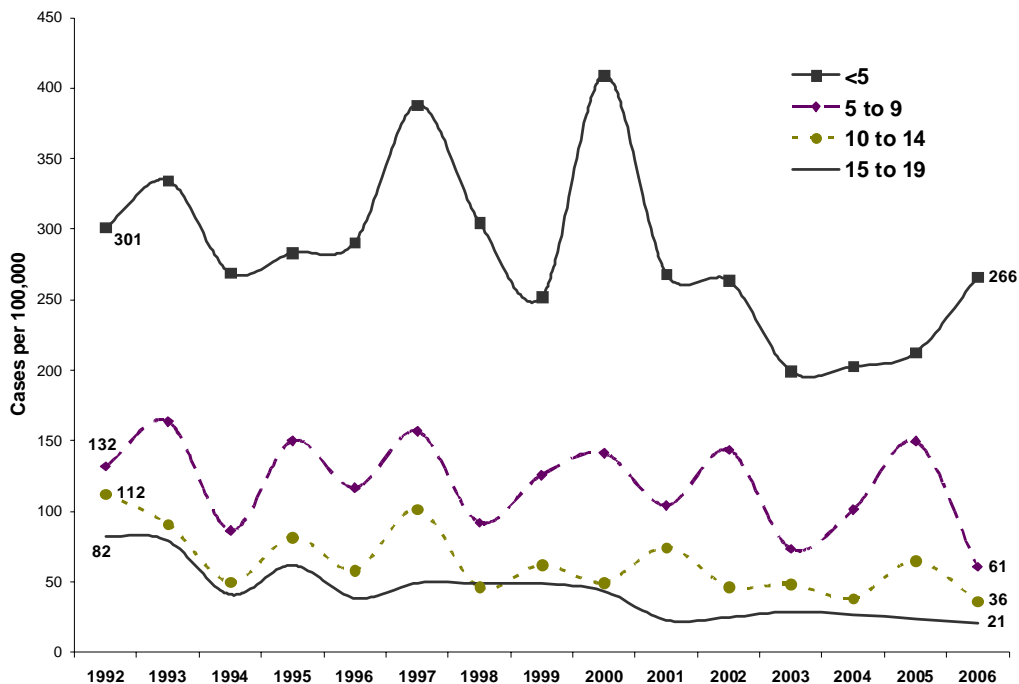


**Asthma Prevalence  
in Children  
(10th grade)  
by Sex, Race,  
& Ethnicity  
Snohomish County,  
2002 - 2006  
(n = 1,665)**

# Lung Disease

- Childhood hospitalizations from asthma generally declined from 1992 through 2006 ( $p < 0.001$ ), although the large changes in rates from year to year make it difficult to discern this pattern.
- Hospitalizations for asthma generally decreased with age. Children younger than age five were more than twice as likely to be hospitalized with asthma than children between ages five and nine. This finding suggests that as children get older they improve their ability to control their asthma.

## Asthma Hospitalizations in Children by Age Snohomish County, 1992 - 2006



Data sources: Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems

### **Risk Factors**

The etiology of asthma is not understood at this time. Research suggests that family members of an asthma sufferer are more likely to develop the disease themselves, suggesting a genetic component. Early childhood exposure to asthma triggers like tobacco smoke increases a person's chances of developing asthma. People who live in poverty are also more likely to have asthma.

Known triggers for asthma attacks include tobacco smoke, dust, wood smoke, dust mites, ozone, vehicle exhaust, cockroaches, exercise, animal dander, perfume, hairspray, paint and gasoline fumes, cold air, pollen, airborne molds, viral respiratory infections, heartburn, and sinusitis.

### **Screening and Prevention**

There is currently no preventive screening test for asthma. Patients suffering from symptoms of asthma (coughing, shortness of breath, wheezing, sore throat) are administered a spirometry test. This is a simple test of lung function that can determine whether a patient has asthma and, if so, how severe the disease is.

### **Sources of Information**

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# Diabetes

Diabetes is a disease in which the body does not produce or properly use insulin. Insulin is a hormone that is needed to convert sugar, starches, and other food into energy needed for daily life. The cause of diabetes continues to be a mystery, although both genetics and behavioral factors such as obesity and lack of exercise appear to play roles.

The two main types of diabetes are type 1 and type 2. Type 1 usually strikes children and young adults, which is why it is also called *juvenile-onset diabetes*. In this type of diabetes, the body's immune system destroys the cells in the pancreas that make insulin. Insulin must then be delivered by injection, pills, or pump. Type 1 diabetes accounts for between 5% and 10% of all cases of diabetes. There is no known way to prevent type 1 diabetes.

Type 2 diabetes is the more prevalent form of the disease. It usually begins as insulin resistance, a disorder in which cells do not use insulin properly. As the need for insulin increases, the pancreas loses its ability to produce it. Insulin must then be delivered from outside the body.

Rarer forms of diabetes include gestational diabetes, which is a form of glucose intolerance found in some women during pregnancy. After pregnancy, 5% to 10% of women with gestational diabetes are found to have type 2 diabetes. Other types of diabetes result from specific genetic conditions, surgery, drugs, malnutrition, infections, and other diseases. These types of diabetes account for only 1% to 5% of diagnosed diabetes cases.

To survive, people with type 1 diabetes need insulin delivered by injection or pump. Those with type 2 diabetes can often control their blood sugar by following a healthy diet, exercising, losing excess weight, and taking oral medications. Many people with diabetes require additional medications to control their cholesterol and blood pressure. The key element of medical care is teaching the patient to control his or her own diabetes, called *diabetes self-management education*.

It is estimated that 7% of the U.S. population has diabetes. Only 5% have been diagnosed with the disease; the additional 2% are thought to have the disease but have not yet been diagnosed.

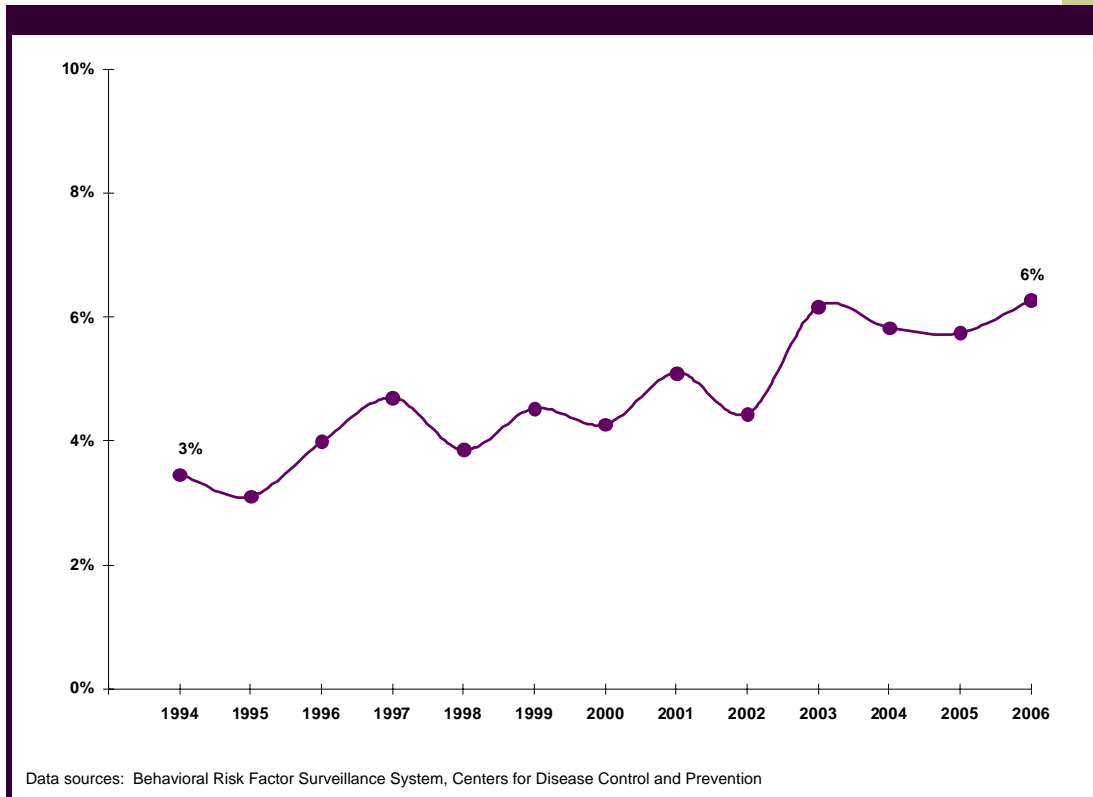
Adults with diabetes are two to four times more likely to die of heart disease than those without diabetes. Those with diabetes are also two to four times more likely to suffer a stroke. Nationally, heart disease deaths among diabetics increased over a 30-year period, whereas heart disease deaths decreased among nondiabetics. In addition, diabetes is associated with a number of serious complications (all data are for the U.S. population):

- Nearly three-quarters (73%) of adult diabetics have high blood pressure.
- Diabetes is the leading cause of new cases of blindness in people between 20 and 74 years of age.
- Diabetes is the leading cause of kidney failure.
- About two-thirds of diabetics suffer from some form of nervous system damage.
- The rate of amputations among people with diabetes is 10 times higher than among those without diabetes.
- Other complications include periodontal disease, complications from pregnancy, and sexual dysfunction. People with diabetes also tend to be more susceptible to many other diseases, and their prognoses are generally worse than for people without diabetes.
- The total estimated cost for diabetes in 2007 was \$174 billion nationally, including \$116 billion in medical payments and \$58 billion in reduced productivity.

**Adults with diabetes are two to four times more likely to die of heart disease than those without diabetes.**

## Diabetes in Adults

In Snohomish County diabetes is responsible for approximately 125 deaths each year. These deaths represented 288 potential years of life lost in 2006. About two-thirds of diabetes-related deaths occur in people older than 65. Although it is not possible to track how many Snohomish County residents suffer from each of the complications listed on the previous page, it is telling that those with diabetes are twice as likely to report activity limitations from health problems compared with nondiabetics (44.6% versus 20.4%,  $p = 0.001$ ) and more than three times as likely to report a health problem that requires them to use special equipment such as a cane, a wheelchair, or a special bed (21.0% versus 5.8%,  $p = 0.001$ ).



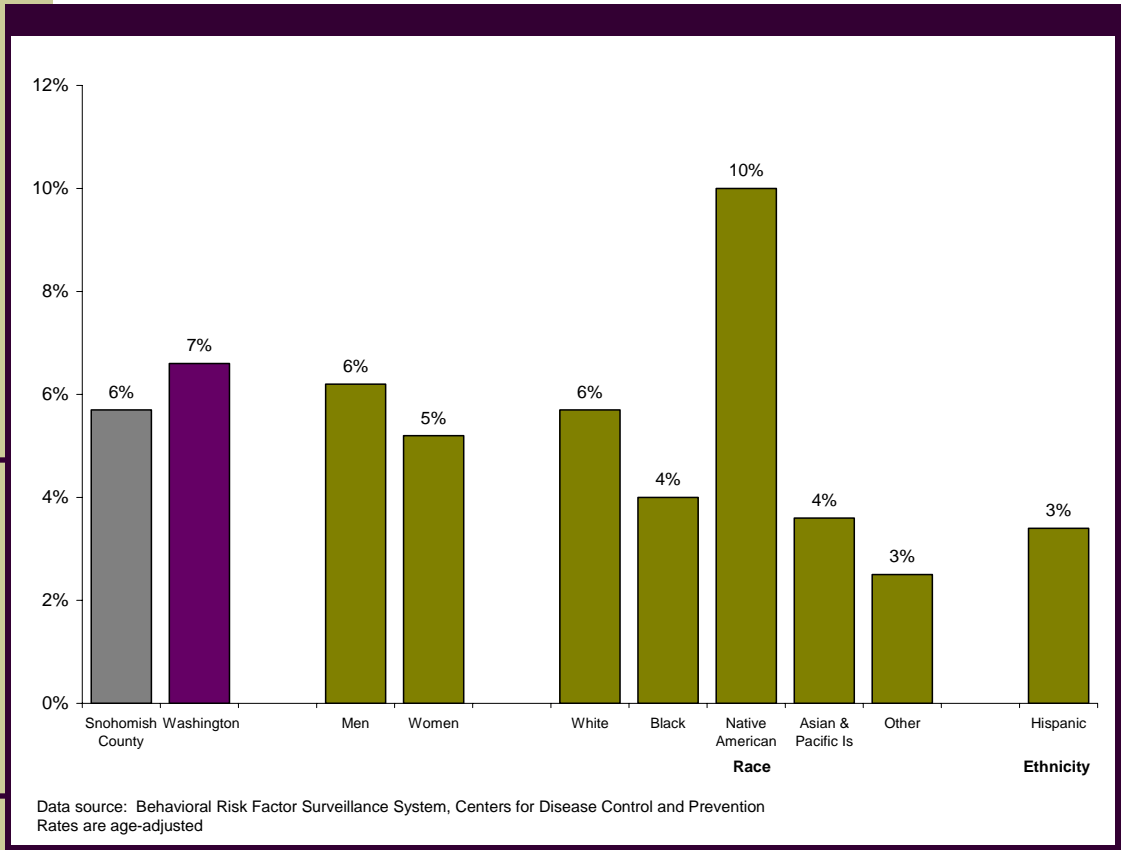
Diabetes Prevalence  
in Adults  
Snohomish County,  
1994 - 2006

- From 1994 through 2006, the percentage of adults who reported being diagnosed with diabetes increased by 80%, from 3.5% to 6.3%. This increase was statistically significant ( $p < 0.001$ ).

# Diabetes

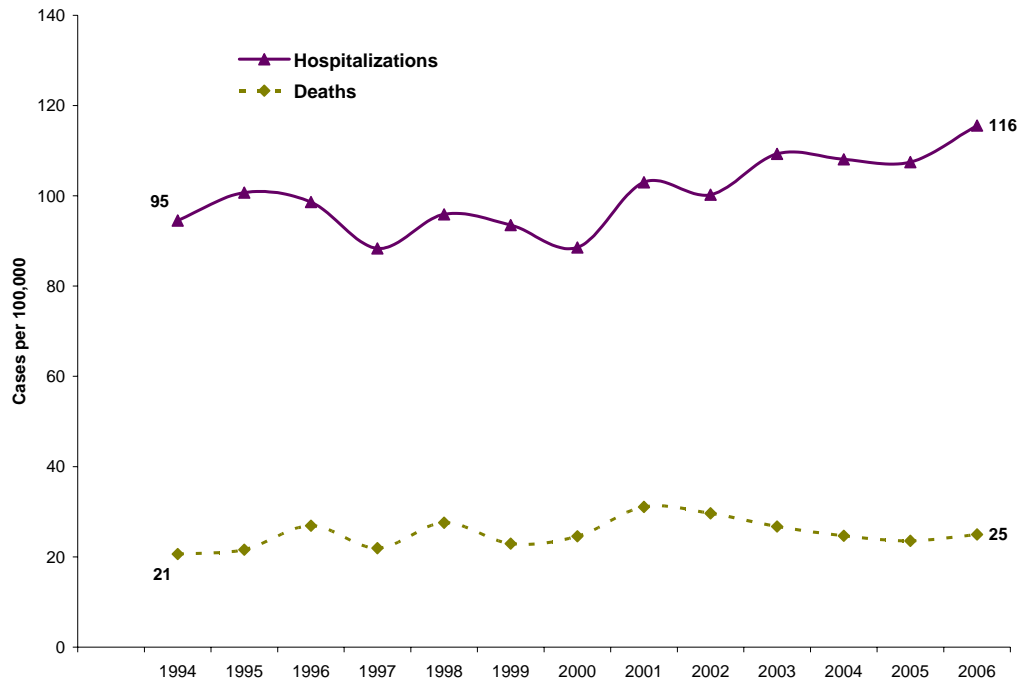
- From 2002 through 2006, more than 1 in 20 Snohomish County adults (5.7%) said they were diagnosed with diabetes.
- Men and women were equally likely to be diagnosed with diabetes.
- The prevalence of diabetes did not vary statistically by race. The rate for Native Americans was higher than the average, but this difference was not statistically significant ( $p = 0.08$ ).

## Diabetes Prevalence in Adults by Sex, Race, & Ethnicity Snohomish County, 2002 - 2006 (n = 8,295)



# Diabetes

- Mortality from diabetes did not change significantly from 1994 through 2006, with an average of about 23 deaths per 100,000 population each year.
- The rate of hospitalizations from diabetes increased by 22% from 1994 through 2006 ( $p = 0.001$ ). Most of this increase occurred after the year 2000.



Data sources: Hospitalization Discharge Data, Washington State Department of Health, Office of Hospital and Patient Data Systems, Death Certificate Data, Washington State Department of Health, Center for Health Statistics  
Rates are age-adjusted

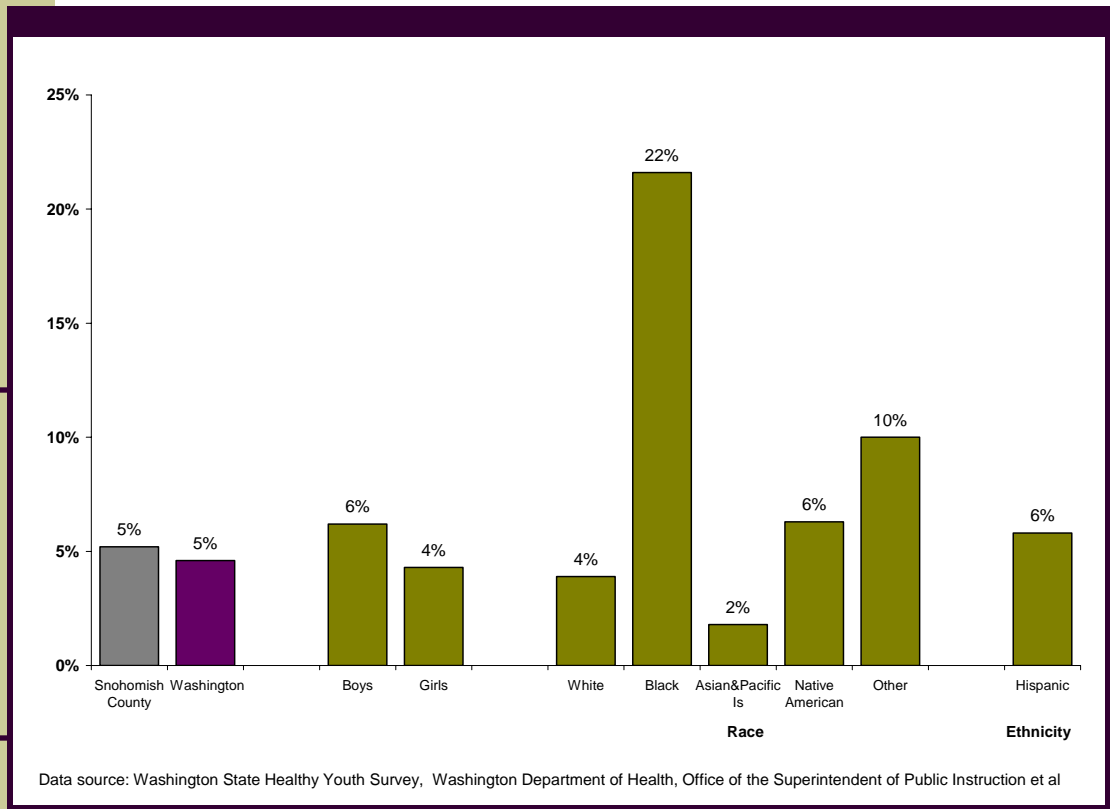
**Diabetes  
Hospitalizations  
& Deaths in Adults  
Snohomish County,  
1994 - 2006**

# Diabetes

## Diabetes in Children

Diabetes is one of the most common diseases in school-aged children. Type 1 diabetes accounts for 5% to 10% of all diagnosed cases of diabetes, but it is the leading cause of diabetes in children of all ages. In children younger than 10 years, type 1 diabetes accounts for almost all cases. After 10 years of age, type 2 diabetes becomes increasingly common, especially in some minority populations. Some youth have been diagnosed with “hybrid” diabetes, which has elements of both types 1 and 2. Recently there has been an increase in the number of cases of both type 1 and type 2 diabetes being reported in young people. The increasing incidence of type 2 diabetes in youth may be a result of the increasing number of children and adolescents in the U.S. becoming overweight, obese, and inactive.

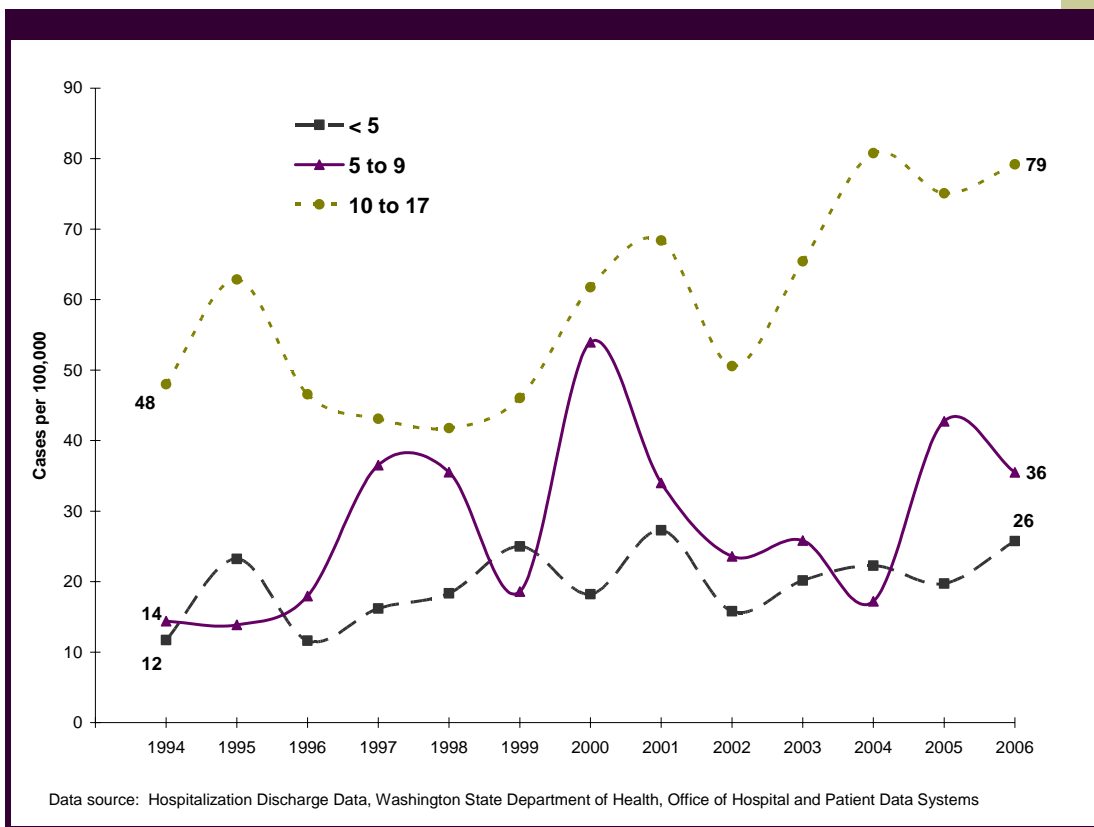
### Diabetes Prevalence in Children by Sex, Race, & Ethnicity Snohomish County 10th Graders, 2006 (n = 1,551)



- 5.2% of Snohomish County 10th grade public school students had diabetes in 2006. This was not significantly greater than the 4.5% reported in 2004.
- Boys were no more likely than girls to have diabetes ( $p = 0.09$ ). This difference was significant in 2004, when 5.2% of boys reported having diabetes compared with 3.1% of girls ( $p = 0.01$ ). By 2006 the female rate of diabetes had increased to be more comparable to the male rate.
- Black students were four times more likely to have diabetes than non-Blacks ( $p < 0.001$ ).

# Diabetes

- Hospitalization rates for diabetes increased as children got older. Children 10 years and older were about three times more likely to be hospitalized than those younger than 5.
- Hospitalizations of all children for diabetes nearly doubled from 1994 through 2006, from 28 cases per 100,000 to 53 per 100,000 ( $p < 0.001$ ). The most dramatic increase was seen in children between the ages of five and nine, whose hospitalization rates increased by 147% ( $p = 0.04$ ).
- Hospitalizations of children aged 10 and older for diabetes increased by 65% from 1994 through 2006 ( $p < 0.001$ ).
- Although hospitalization rates for children younger than five also increased from 1994 through 2006, this increase was not statistically significant ( $p = 0.19$ ).
- Two children died from diabetes in Snohomish County from 1994 through 2006.



**Diabetes  
Hospitalizations  
in Children  
by Age Group  
Snohomish County,  
1994 - 2006**

## Risk Factors

The etiology of type 1 diabetes is well not understood. Risk factors for type 1 diabetes may be genetic, autoimmune, or environmental.

Type 2 diabetes is associated with increasing age, obesity, family history, a history of previous gestational diabetes, impaired glucose metabolism, physical inactivity, and race or ethnicity. Blacks, Hispanics, Native Americans, some Asians, and some Pacific Islanders are at increased risk for this type of diabetes and its complications.

According to the Centers for Disease Control and Prevention (CDC), “type 2 diabetes in children and adolescents already appears to be a sizable and growing problem among U.S. children and adolescents ... it is hard to detect type 2 diabetes in children because it can go undiagnosed for a long time; because children may have no or mild symptoms; and because blood tests are needed for diagnosis. It is difficult to be sure it is type 2, because criteria for differentiating between types of diabetes in children are confusing.”

Gestational diabetes is most common among Black, Hispanic, and Native American women. Other risk factors for this form of diabetes include obesity and a family history of diabetes.

## Screening and Prevention

There are no clear-cut guidelines for when to screen for diabetes. It is reasonable to screen adults if they have one or more of the following conditions:

- A weight that is 20% more than ideal body weight;
- Risk factors for heart disease (e.g., high blood pressure, unhealthy cholesterol levels);
- A close relative with diabetes;
- They belong to a high-risk racial or ethnic group;
- Women having a baby weighing nine pounds or more or having a history of gestational diabetes.

In addition, some experts recommend that children as young as 10 be screened if they are overweight and have at least two of the risk factors mentioned above. Several screening methods are available:

- Fasting plasma glucose (FPG): A simple blood test taken after eight hours of fasting. The resulting FPG level is used to determine if a person is normal, prediabetic, or diabetic. This test is not always reliable, so a repeat test is recommended if the first test indicates diabetes.
- Glucose tolerance test: After a positive FPG test, another blood test is done two hours after the patient has drunk a special glucose solution. This yields an oral glucose tolerance (OGT) level that validates the FPG test. This test may over diagnose diabetes in people who do not have the disease.
- Test for glycated hemoglobin: Tests for glycated hemoglobin (also known as hemoglobin A1c, or HbA1c) are not used for initial diagnosis of the disease, but rather for determining its severity. This test is not affected by food intake, so it can be done at any time. A home version of this test is available.
- Testing for insulin resistance: Research is under way to develop a simple test for insulin resistance. This test may also be a predictor for heart disease independent of diabetes.



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# Dementia

Dementia is one of the most common causes of institutionalization, morbidity, and mortality among older adults. The term *dementia* describes symptoms that are caused by disorders of the brain, not a specific disease. It is a progressive deterioration in intellectual function and other cognitive skills, leading to a decline in a person's ability to perform activities of daily living, such as eating or dressing. People with dementia may lose their problem-solving ability or control of their emotions. Their personalities may change, and they may become agitated or see things that are not there.

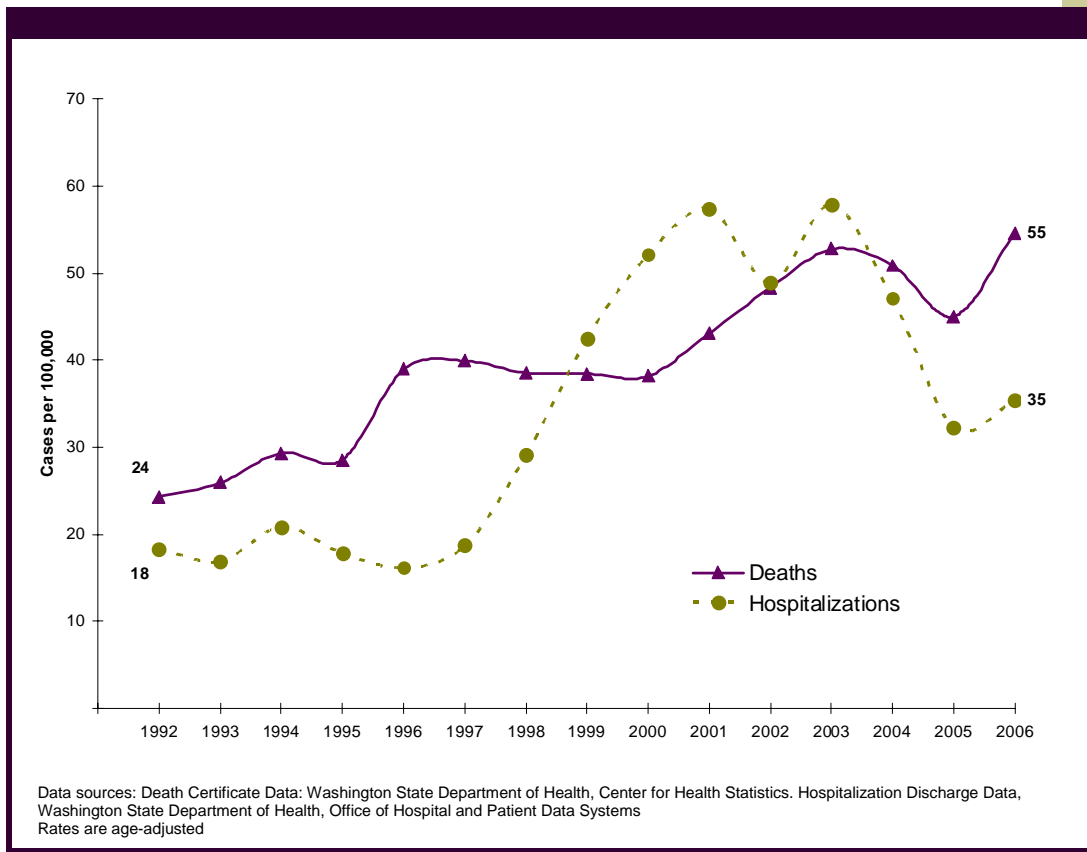
People with dementia have serious problems with brain functions such as memory and language. Dementia is typically preceded by a state of mild cognitive impairment that may last for years. This is problematic, as mild slowing of cognitive processes is normal with aging, so the beginning of dementia may go unnoticed. Similarly, memory loss is also a function of age, making it another symptom of dementia that may go unnoticed. Whereas memory loss is a common symptom of dementia, loss of memory by itself does not constitute dementia. Drugs are available to treat the disease, but they cannot cure dementia or repair damage to the brain. They may, however, improve symptoms or slow the progress of the disease.

Many different diseases can cause dementia, including Alzheimer's disease and stroke. Alzheimer's disease is the most common cause of dementia, accounting for 80% of dementia cases in Snohomish County. It is characterized by plaques, tangles of nerves, and atrophy of brain. The most common early symptom of Alzheimer's disease is short-term memory impairment. In addition, at least one of the following is almost always significantly impaired: language, visual processing, skilled motor activities, abstract reasoning, or the ability to concentrate. As the disease progresses, some patients become apathetic, irritable, or agitated.

To avoid confusion and biasing of the results, this report combines cases of Alzheimer's disease with other forms of dementia. Coding changes occurred during 1999, when deaths began to be coded using the International Classification of Disease, 10th revision (ICD-10) system instead of the previous 9th revision (ICD-9). Under the new definitions, many cases that would have been classified as "senile dementia" are now classified as Alzheimer's disease. In addition, hospitalization data classify cases using yet another coding system, the ICD-9-CM (Clinical Modification) standard. These differences in coding lead to a situation where "senile dementia" is responsible for most of the hospitalizations, while Alzheimer's disease is held responsible for most of the deaths from dementia. Combining all cases of dementia into one category avoids confusion caused by the different classification systems.

# Dementia

In Snohomish County during 2006 dementia was the third leading cause of death. From 2002 through 2006, approximately 1,400 Snohomish County residents died of dementia, or about 275 deaths each year. Because it is a disease of old age, the total potential years of life lost to dementia each year is fewer than 20 years.



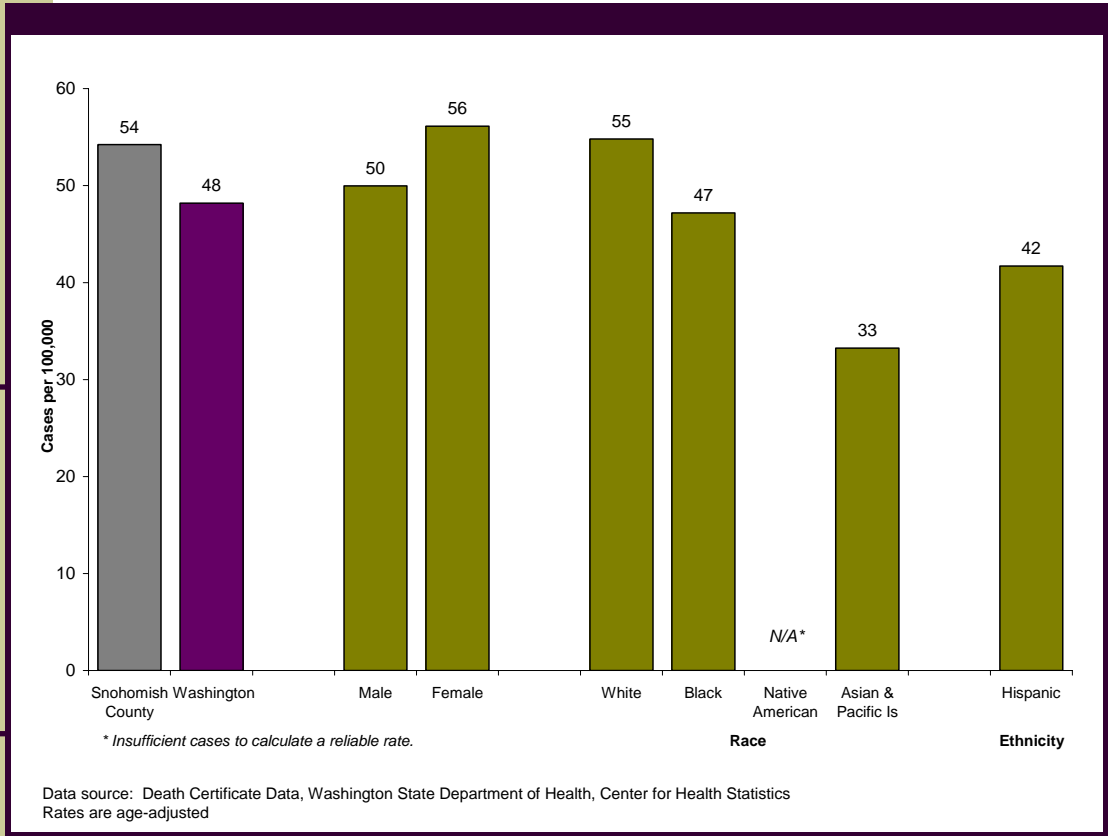
## Dementia Deaths & Hospitalizations Snohomish County, 1992 - 2006

- The rate of deaths from dementia doubled from 1992 through 2006, from 24 deaths per 100,000 to 55 deaths per 100,000. This increase was statistically significant ( $p = 0.001$ ).
- From 2002 through 2006, mortality rates from dementia were higher in Snohomish County than in Washington State, where the rate was 48 deaths per 100,000 ( $p < 0.001$ ).
- A similar increase occurred in the rate of hospitalizations from dementia ( $p < 0.001$ ). This rate tripled from 18 per 100,000 population in 1992 to 58 per 100,000 in 2003. Since then hospitalization rates have fallen to 35 per 100,000 in 2006.

# Dementia

- The rate of deaths from dementia in Snohomish County was significantly higher than for Washington State ( $p < 0.001$ ).
- Females were more likely to die of dementia than males ( $p = 0.02$ ). Because women generally live longer than men, they are more likely to die of age-related diseases like dementia.
- Asians and Pacific Islanders had a lower mortality rate from dementia than the county average ( $p = 0.02$ ).

Deaths from  
Dementia by Sex,  
Race, & Ethnicity  
Snohomish County,  
2002 - 2006  
(n = 1,575)



## Screening and Prevention

Currently no screening tool for dementia is available other than regular mental status evaluation of elderly patients during regular checkups. The Folstein Mini-Mental State Examination is the most commonly used. Diagnosis focuses on determining whether dementia, another disorder with similar symptoms (e.g., delirium, age-related memory loss, or depression), or a combination of diseases is present. If dementia is diagnosed, the cause is identified (where possible) along with potentially reversible contributing factors.

Not all of the possible causes of dementia are known, so strategies to avoid it are not well developed. The prevention strategy that has been most consistently associated with older adults who do not develop dementia is continuing to engage in challenging mental activity throughout their lifespan. This is the “use it or lose it” strategy – preventing dementia by keeping the mind active. Other aspects of this strategy involve recreation and exercise. Both of these activities can be social, which provides conversation and additional stimulation.

Proper nutrition is also recommended as protective against dementia. This not only prevents vitamin deficiencies that are suspected of being risk factors for dementia, but it keeps the person healthy generally. Recently the accumulation of mid-body fat in middle age has been associated with an increased risk of dementia, so maintaining a healthy weight is important. The most effective way to do this is through proper nutrition and exercise.

Other prevention strategies involve avoiding known risk factors for developing dementia. For example, stroke is sometimes a cause of dementia, so minimizing one’s risk of stroke reduces one’s chances of developing dementia. One known prevention technique for this is avoiding smoking. Head injuries are also thought to be a possible cause of dementia. Avoiding these through the use of protective helmets when biking or during other activities reduces one’s chances of developing dementia later in life.

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## Summary of Risk Factors

The table below summarizes the major risk factors for the chronic diseases described in this report. It shows how many possible risk factors are associated with a disease. Some risk factors are avoidable (e.g., smoking) and some are not (e.g., genetics and sex). It also shows which behaviors are most likely to lead to some form of chronic disease. For example, tobacco use is a risk factor for eight (possibly nine) diseases on this list, meaning that smoking increases a person's risk of developing one or more of these conditions. This suggests how harmful such behaviors can be and why they should be avoided – to prevent chronic conditions from occurring in the first place.

Disease	Genetics	Environmental Exposures	Tobacco Use	Obesity	Alcohol Use	Other Risk Factors
Heart disease	+		+	+	+	Diabetes
Stroke	+		+	+	+	Heart disease
Lung cancer	?	+	+			
Colon cancer	+		+	+	+	Age Diet
Hematologic cancers	+	+	+			Age Race Epstein-Barr virus
Breast cancer	+	+	?	+	+	Menopause
Prostate cancer				?		Age Race
Dementia			+			Prior stroke Head injury Diet Exercise
Diabetes	+			+		Age Race
Asthma	+	+	+	?		Poverty
COPD*	+	+	+			History of childhood respiratory diseases

### Key

**+** = Confirmed risk factor

**?** = Possible risk factor

\* Chronic Obstructive Pulmonary Disease

## Data Sources

This report used a number of different data systems to describe the extent of chronic disease in Snohomish County. The main sources were population-based data systems (maintained by the Washington Department of Health) that track causes of death, hospitalizations, and cancer incidence. Data from these systems tend to be very complete and reliable. In general, data for the years 1992 through 2006 have been used. However, at the time of this report, cancer incidence data were available only through 2005. These data have been presented as *rates* per 100,000. These rates have been *age-adjusted* to the standard U.S. 2000 population (see definition below for definitions of rates and age adjustment).

Data were also drawn from two surveys, the Behavioral Risk Factor Surveillance System (BRFSS) and the Washington Healthy Youth Survey (HYS). 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 Washington State. The Snohomish Health District purchased additional surveys to enable us to generate reliable statistics at the county level. Most of the BRFSS data included in this report were collected from 2002 through 2006.

The HYS is administered to students in the 6th, 8th, 10th, and 12th grade during even numbered years. In its present form, it was administered in 2002, 2004, and 2006. It is administered to students in the classroom and asks about a number of health issues, including use of tobacco, alcohol, and illegal drugs. This is our best source of health-related data for children. Unfortunately, not all questions are asked of all grades, and not all questions are asked during each administration of the survey, which tends to make interpretation of these data challenging.

Both surveys collect important information about health-related conditions and behaviors. However, because they contain self-reported data, the results may be *biased*. Research has shown people tend to present themselves in a favorable light, even during an anonymous telephone survey. For example, men tend to overreport their heights, and women tend to underreport their weight. Both tendencies lead to an underestimation of their body mass index (a measure of whether a person is obese or not) and a subsequent underestimate of the number of obese people in the population. The National Health and Nutrition Survey (NHANES), in which professionals actually measure people's heights and weights, found that 33% of the adult population is obese. This tendency for people to want to be seen in a positive light should be kept in mind when examining results from these and similar self-report surveys.

## Definitions

- *Rates*: A rate is 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 make them more understandable. For example, if 47 men died in motor vehicle collisions in 2006 out of a population of 336,432, then  $47/336,432 = 0.00014$ . Multiplied by 100 to obtain a percentage would yield 0.014%. But it is easier and more understandable to express it as 14 deaths per 100,000 residents.
- *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.
- *Incidence*: The number of new cases of a disease occurring during a given period.
- *Prevalence*: The number of people with a given disease at a given point in time.
- *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 seem larger than they really are. Bias is rarely directly measurable.

## 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 so unlikely that it is probably not from chance. Generally, when a difference has a chance of occurring randomly of 5% or less (expressed as  $p \leq 0.05$ ), it is said to be statistically significant. In this report, all results of less than 0.001 (one-tenth of 1%) are presented less than 0.001 ( $p < 0.001$ ) because results for probabilities lower than this are not reported by the software program used for this report (Stata). In general, findings where the significance is reported at 0.001 should be seen as highly significant.

The significance of 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 those changes occurred.

For population-based data that are age-adjusted (mortality, hospitalizations, and cancer incidence), the significance of differences between groups (i.e., male versus female, races) were calculated using the Poisson test. When comparing races, each race was tested against the overall county average. The Poisson test calculates the probability that the number of cases observed for a given racial group differed from what would be expected if the age-adjusted rate for that race was the same as the county average.

For survey-based data (from the Behavioral Risk Factor Survey and the Healthy Youth Survey) the significance of differences between groups were tested using the chi-square test.

For comparisons between races, an overall chi-square was calculated for all racial groups. If this was found to be significant, each race was compared separately with all other races combined (e.g., Blacks were compared with all non-Blacks) to determine which races were significantly different from the others.

For the analyses in this report, Hispanics were considered as a separate racial category. Most of the data systems used for this report distinguish Hispanic ethnicity separately from race, so that a person of Hispanic origin is also considered to be White, Black, Asian, etc. However, the data from the Washington Cancer Registry (used to report cancer incidence) treat Hispanics as a race. To keep the analyses consistent, Hispanics were treated as a separate racial group and not counted in other racial groups. That is, people who were identified as being of Hispanic ethnicity and White race are counted as Hispanics, not Whites. People of Hispanic origin are called an ethnicity in keeping with the Census Bureau's definition of Hispanic: "a person of Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin, regardless of race."

The number of cases used for demographic comparisons is shown in the titles for those graphs. When discussing mortality or cancer incidence, the number of cases (n) represents the total number of deaths or cases of cancer that occurred during the period described (2001-2005 for cancer incidence, 2002-2006 for deaths). For graphs describing the results from either the Behavioral Risk Factor Survey or the Healthy Youth Survey, n describes the total number of people who participated in the survey and answered the question described.

